



REPORT

WELLINGTON
TRANSPORT
ANALYTICS UNIT

Hutt Aimsun Model: TN4 Calibration and Validation

PREPARED FOR HUTT CITY COUNCIL

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1. Introduction

The Hutt Aimsun Model (HAM) has been updated by the Wellington Transport Analytics Unit (WTAU) to a new base year of 2024 for use on upcoming projects in the Lower Hutt area on behalf of Hutt City Council (HCC) and Waka Kotahi (NZTA).

This report documents the results of the calibration and validation of the 2024 base year model. The results have been compared against the Transport Model Development Guidelines (TMDG). TMDG is the New Zealand industry standard in terms of traffic model development guidance and calibration/validation criteria. Based on the purpose of the model and the geographic coverage, the model has been calibrated and validated against the criteria of Category C in the guidelines. Category C is for urban area assessments which TMDG describes as follows:

“Urban area assessments focus on the operation of urban conurbations, city centres, and other urban style environments. This is a potentially wide range of applications which may include local authority planning, development strategy, urban traffic management and road schemes, infrastructure and policy change assessments, ITS etc. These models are typically of varying form.”

The model is compared to the TMDG Category C criteria with:

- Static and Hybrid Layer screenline and individual link comparisons
- Hybrid Layer individual turn comparisons
- Modelled vs Observed scatter plots and statistical comparisons
- Travel time validation comparisons

1.1 History of HAM

The previous Hutt AIMSUN model was developed in 2019 and represents a 2017 base year. The primary purpose of the model was as follows:

- The model should be able to assess local traffic impacts of development proposals near the vicinity of Petone and Boulcott area
- The model should be able to support the understanding of urban densification near the Waterloo station
- The model should be able to assess the wider impacts on the city traffic network resulted by major schemes such as state highway improvements and the creation of Cross Valley Link

It is explicitly noted in the 2019 validation report that:

“The scope of the proposed model has been developed to fit for the immediate purpose. Possible long terms purposes have also been considered but these will not be included in the current model development. The possible long-term purposes include assessing future detail design schemes such as Cross Valley Link and SH improvements, future scenarios, weekend performance and economical assessments.”

The initial model focussed on the AM peak and PM peak, and only represented the light vehicle user class. A subsequent update undertaken in 2022 refined the model as follows:

- Added an inter-peak (IP) model
- Added an HCV user class

The current model is approaching 7 years of age and is considered to be nearing the end of its useful life. Furthermore, with changes in travel patterns over the last few years due to Covid 19 and growth within the Hutt Valley, coupled with potentially significant transport investment proposals on the horizon in the form of Petone to Granada (P2G) and Cross Valley Link (CVL), an updated model is required to provide a robust basis for the development and assessment of these projects.

The previous Hutt AIMSUN model has a number of known limitations:

- Model base year is 2017

- Limited representation of car parking within Lower Hutt CBD
- Limited alignment with new WTSM model zone system
- Changes in travel patterns and development characteristics due to Covid 19

The critical findings concluded from the peer review of the previous HAM have also been addressed in the current HAM, they are:

- In the previous HAM, speeds were generally too fast on roundabouts (particularly at the Woburn Rd/Queens Dr intersection). In the current HAM, the approach turn of a roundabout has had their speed halved down, and speed of 25 km/h has been applied to the road type of the circulating sections. However, there is also a pseudo roundabout type introduced in the current HAM, which has quite distinct settings, the details are explained in 3.4 Mini Roundabouts.
- In the previous HAM, the average vehicle (car) length is short with a considerable amount of vehicles shorter than 4 m. In the current HAM, they have been adjusted in consistent with what is used in N2AM (Wellington City model) and PTM (Porirua model).

1.2 Purpose, principle and functionality of HAM

1.2.1 Purpose

The purpose of updating the Hutt AIMSUN Model is to provide a tool that can be used as follows:

- to design and assess significant transport interventions such as P2G and CVL, in parallel with the current strategic modelling tools
- to design and assess operational improvements within Hutt CBD and on the state highway, such as changes to signal timings
- understand the potential network impacts relating to the construction of transport projects, major utilise works and events, to inform traffic management plans and mitigation
- understand the network impacts of investment in public transport priority measures and cycle ways, and inform discussions regarding the level of behaviour change that might be required to minimise highway network impacts
- undertake modelling associated with development proposals

1.2.2 Design principles

The key design principles for HAM are as follows:

- the model will compliment and link into the existing regional analytical tools
- the approach is aligned with the rest of Wellington Region and the evolution of the micro modelling within the region
- whilst WTSM will reflect the impact of developments in the Hutt City, the model should have the flexibility to assess the local traffic impacts of specific development proposals
- the model should be linked closely to WTAM, but have the flexibility to adjust demand to reflect local level development plans and should also have the ability to model traffic suppression using elasticity type techniques (should this approach be required)
- the model structure and setup should be flexible and transparent, providing the ability to undertake “what if” analysis
- the model structure should be as simple and transparent as the software permits and should align (as best as possible) with similar models in Wellington and Porirua
- the microsimulation model extent will be focussed on Hutt City, but will have the flexibility through a broader meso layer to reflect wider route choice

1.2.3 Over-arching principles

In order to deliver a high quality, robust final product that will add value in coming years, the following is required:

- a clear understanding at the outset regarding the purpose and function of the traffic network of Lower Hutt – what it will do and what it will not do
- local knowledge and input into data collection, network and zone system specification and model development
- a team that is innovative and flexible, with a high level of technical competence, experience of delivering similar models and a willingness to work collaboratively, working along HCC and NZTA who will be advising the team to help deliver the model and transfer knowledge for future operation of the model by WTAU (or appointed consultants)

2. Usage of Data

A range of data has been used for the calibration and validation process. The collected data have been cleansed and analysed to compare link counts, turn counts, and travel times. Table 1 summarises the raw datasets collected.

Given the varying levels of accuracy and coverage, we prioritised these sources from top to bottom as follows:

- **TEAM counts** – While not comprehensive, these surveys were undertaken specifically for this project, ensuring targeted and relevant data.
- **TomTom travel time data** – Provides consistent and reliable travel time measurements, making it a key source for model validation.
- **TMS counts** – Primarily focused on state highways (SH), providing useful data but with limitations in accuracy and coverage.
- **SCATS counts** – Offers turn counts and signal timing information, but accuracy is limited.
- **HCC, UHCC, and WCC tube counts** – Provide comprehensive spatial coverage but are generally less accurate than other sources.

By structuring the data prioritisation this way, we ensured a balanced approach, leveraging the strengths of each dataset while accounting for their limitations in the calibration and validation process of HAM.

Table 1: Data collected and used for calibration and validation

Data sources	Purposes	Available time periods	Notes
TEAM counts	Link/turn counts	2024, Sep	Most reliable data set
TomTom	Travel times	2024, Sep	
TMS counts	Link counts	2024/23, Sep & other months	For SH only. Vehicle class classified and unclassified.
SCATS counts	Link counts	2023, Sep	For Hutt City area
HCC tube counts	Link counts	2023, various months	For Hutt City area
UHCC tube counts	Link counts	2023, various months	For Upper Hutt area
WCC tube counts	Link counts	2023, various months	For Wellington City area
AECOM counts	Link counts	2024, May	Available for middle 2-hour peak only

3. Model Scenarios

3.1 Model layers

A static layer is developed to provide initial route choice paths, which are then fed into a more detailed hybrid simulation layer. This is considered best practice and is used for other AIMSUN models in the Wellington region. The four-hour demands profiled in 15-minute timeslices are assigned to both the Static and Hybrid layers. The static layer is a simplified assignment, similar to the regional model. Paths from the static layer are then passed through as an input the Hybrid layer which has expanded.

The hybrid layer is a stochastic route choice assignment model (SRC). Aimsun uses a stochastic process to approximate the random probabilities of various attributes such as the release of vehicles onto the network, selection of route choice and the timing of public transport vehicles. The stochastic process requires the specification of a random seed number. Each seed number will produce a slightly different result so a variety of replications should be run with different seed values. The fixed route and re-route applied in the model are in a split of 60/40¹. HAM will include five SRC replications and report on the average of these runs.

The hybrid layer consists of a micro-simulation and meso-simulation geographically, and they are applied in this HAM which primarily covers the Lower Hutt area but also extends to SH1 to the West and Upper Hutt to the north. These extension areas don't require the same level of network detail or model simulation. The model extents are shown in Figure 1 which shows:

- The Lower Hutt area in Green. This area has detailed zonal and network coverage and is simulated in micro-simulation.
- The Western SH1 Area in Orange. This area is also in micro-simulation but has less detailed network and zonal coverage.
- Upper Hutt is shown in blue. The area is simulated in the less detailed meso-simulation and, like the Western SH1 area, also has a less detailed network and zonal coverage.

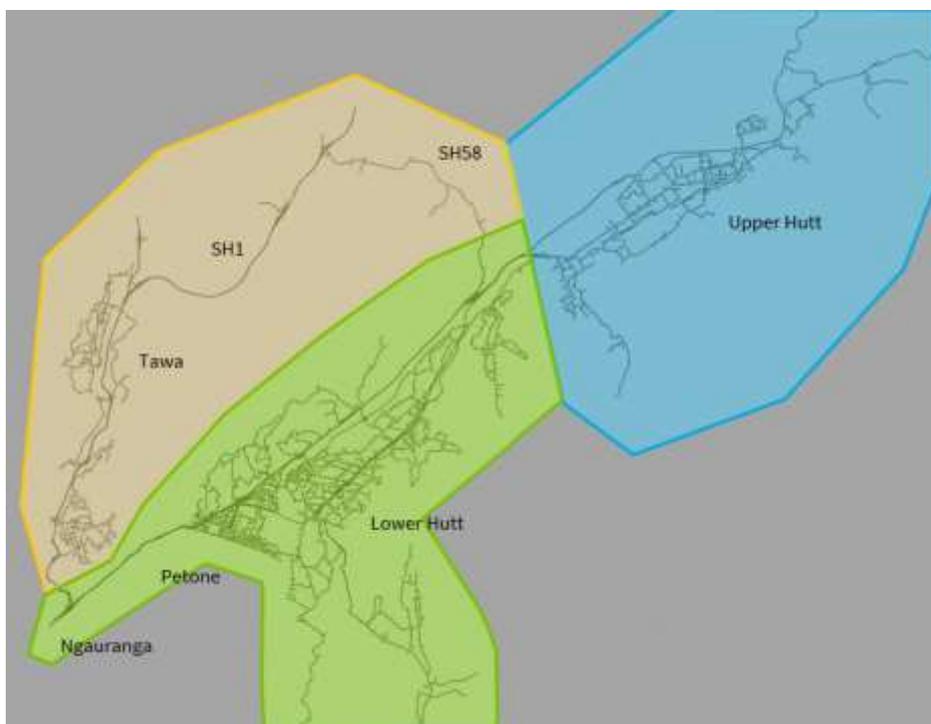


Figure 1: HAM model extent

¹ Section 5.4 of TN3 – Networks: “The car fixed path percentage does differ from the Wellington model (40%) and the Porirua model (70%), falling in between these two models at 60% fixed paths. The 60% setting here sets a balance between the other two models in the region and provides improved flexibility compared to the previous HAM’s 90% fixed paths.”

3.2 Model time periods

The demands provided from WTSM cover an AM peak of 6-9 am, an IP of 10 am-3 pm and a PM peak of 3-6 pm. HAM has adopted the WTSM demands factored to 4 hours for all the periods. A flow profile of the interval of 15 minute time slices has been calculated using a selection of mainly TEAM counts and some TMS counts.

3.3 Vehicle classes

The vehicle classes used in the model are light vehicles and heavy vehicles. The result comparisons for the calibration and validation process are specified for these two vehicle classes.

3.4 Mini Roundabouts

Mini Roundabouts have been introduced to HAM. These are a new type of roundabout coding does not follow the conventional way of coding for roundabouts commonly applied in any of the Aimsun models in the Wellington Region. The conventional roundabout consists of the approach sections, circulating sections and the turns connecting them formed as a single node. However, the circulating sections for small roundabouts are very short and they could even be shorter than the vehicles used in the model, potentially creating gridlocks when the network gets congested.

Aimsun outlines the suggested small/mini roundabout coding in their roundabouts technical note². This note describes coding mini roundabouts in a single node as a common priority-controlled intersection without the circulating lanes. The conflicting movement give way parameters are then set manually within the node. Figure 2 shows an example mini roundabout as coded in the model. The general process of coding mini roundabout is as follows:

- A circular polygon added to replicate the location and the size of the central island (shown in purple)
- Trajectory of the turns adjusted to follow expected manoeuvres of the vehicles around the central island (shown in orange)
- The costs of each turn are consistent with what has been used for the conventional roundabout (e.g. second user-defined cost is 2, as well as other costs)
- All the turns give way to their right, plus the right turn movement of their opposite direction
- A particular road type applied to all the approach sections of the mini roundabout (shown in red). The main parameters that affect the operation of them are the speed limit (40 km/h), the initial safety margin (3.5 sec with factor of 1), the final safety margin (1.5 sec with factor of 2), visibility to yield (10 m) and the visibility along main stream (1 m). Without the actual circulating lanes coded in adding the complexity of replicating the correct give-way system of a roundabout. For example, some give ways would be ignored or traffic does not give enough gaps, especially when the right turn traffic from the opposite side is approaching as the turn it follows has a long distance. Therefore, the above parameters have had to be modified specifically so that it could operate as close as to the conventional roundabout, although there are no reliable information for each of these mini roundabouts to be calibrated against to.

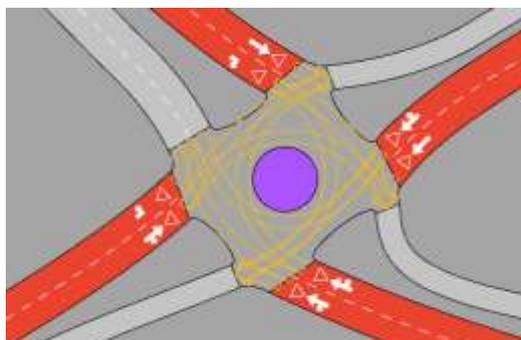


Figure 2: Example of a mini roundabout

² <https://www.aimsun.com/technical-notes/roundabouts-1/>

The method of mini roundabout has been utilised for 13 small roundabouts in the Hutt CBD and near the Waterloo station. They are the busy areas where the congested traffic could have constantly caused gridlocks if they were in a convention form. The locations of these roundabout are shown in Figure 3.



Figure 3: Locations of mini roundabouts in the model

4. Demand Adjustment

The demand adjustments have been undertaken through the processes of matrix estimation and re-profiling. The following sub-sections elaborate these procedures and compare the results in detail. Table 2 summarises the differences between the original demands and the adjusted demands.

Table 2: Comparisons between original and adjusted demands

	AM			IP			PM		
	Light	Heavy	L/H	Light	Heavy	L/H	Light	Heavy	L/H
Original	140,314	6,459	96/4	135,095	7,313	95/5	184,367	6,343	97/3
Adjusted	142,513	6,882	95/5	140,015	7,339	95/5	196,107	6,057	97/3
Diff (abs)	2,199	423	-1/1	4,920	26	-	11,740	-286	-
Diff (%)	1.6%	6.6%	-	3.6%	0.4%	-	6.4%	-4.5%	-

In TN2 – Demand Development, the demand comparisons between Prior and Matrix Estimated suggest there has been no changes for AM at all, minor increases in light vehicles and decreases in heavy vehicles for IP, and slight decreases for PM (both light and heavy vehicles). Since the adjustments have made during the calibration process, there have been increases for both light and heavy vehicles AM, and light vehicles only for IP and PM, and even less decrease for PM heavy vehicles (it was -408 trips). That means there has been considerable changes in demands for all the periods during the process, especially PM.

4.1 Matrix estimation

This section summarises Matrix Estimation and additional demand adjustments as part of the demand development process. The development of the prior matrix is documented in TN 2 – Demand Development.

Matrix estimation is an automated process built into most transport modelling software which attempts to adjust demand matrices to match selected count data. This process takes the prior trip matrices, usually derived from a higher level demand model, assigns these trips to the model network and compares the results to the count data. Matrix estimation will then add or remove trips from the assigned trip matrix in an attempt to match the count data. Left unconstrained, this process will tend towards removing longer trips and adding shorter trips. The ME process is generally also iterative to allow the adjustments to balance out.

The Aimsun Next software platform allows for the demand and trip length (distance) to be constrained in the form of an elasticity value. This elasticity value ranges from 0 (inelastic i.e. won't change at all) to 1 (highly elastic i.e. able to change greatly). In HAM, the demands have a 1.0 elasticity (highly elastic) and the trip length has an elasticity of 0.5 (moderately elasticity). Both vehicle types, cars and trucks, have used the same elasticity values.³

The matrix estimation process for HAM uses the cordon demands from the WTSM as the prior trip matrices, along with all the available screenline counts during the initial iteration. Additional links counts have been incorporated to address suspected demand-related issues rather than route choice discrepancies. The process primarily focuses on light vehicle demand, given its dominance in the network. As a result, heavy vehicle demand is often overlooked in the automated process. To rectify this, a manual adjustment was applied, specifically increasing truck demand between Wainuiomata/Seaview and Upper Hutt sectors by a factor of 5. As the result, truck demand between Wainuiomata/Seaview to Upper Hutt is increased from 24 vehicles to 120 vehicles for the entire AM period.

The locations for the adjustments for light vehicles have been included in the process as the additional links are listed in Table 3, as well as the corresponding time period they have been applied to.

Table 3: Additional links/areas added for matrix estimation

Locations	AM	IP	PM
The Melling Bridge vicinity, including Rutherford Street and High Street	Applied		Applied
The High St/Melling Link roundabout		Applied	
Cornwall St		Applied	
Queens Drive to the east of Laings Rd			Applied
Jackson Street	Applied	Applied	Applied
Petone off-ramp			Applied
SH1 north of Ngauranga	Applied		
SH2/Silverstream interchange	Applied		Applied

To understand the level of change the matrix estimation process has had on the shape of the demand matrices, the length of trips before and after the adjustment process can be compared. Figure 4-Figure 6 compare the trip length distribution for each period, respectively. The cause of these significant changes may be found by the sector demand comparisons, which is included in Section 4.3 Matrix sector to sector comparisons. The results are as follows:

- During AM, for the distance up to 23 km, there has been hardly any difference. After 23 km, the adjusted trips are slightly more than the original trips. However, there is a significant drop for 25 km as the trips originated from Upper Hutt and SH2 have dropped.
- During IP, there has been minor increased trip after adjustments before 8 km and after 23 km. Between 7 and 24 km, the adjusted trip hardly has changes. However, there is a significant drop for 23 km (as most of the decreases occur for the external remote sectors) and a more moderate rise for 24 km.
- During PM, there has been increased trip after adjustments before 7 km and after 24 km. Between 7 and 24 km, the adjusted trip has drop slightly. However, there is a significant drop for 23 km (as most of the

³ Details of adoption of the elasticity values are included in TN2 – Demand Development.

decreases occur for the external remote sectors) and a more moderate rise for 24 km (significant increases in the trips from Tawa and external sectors to Naenae).

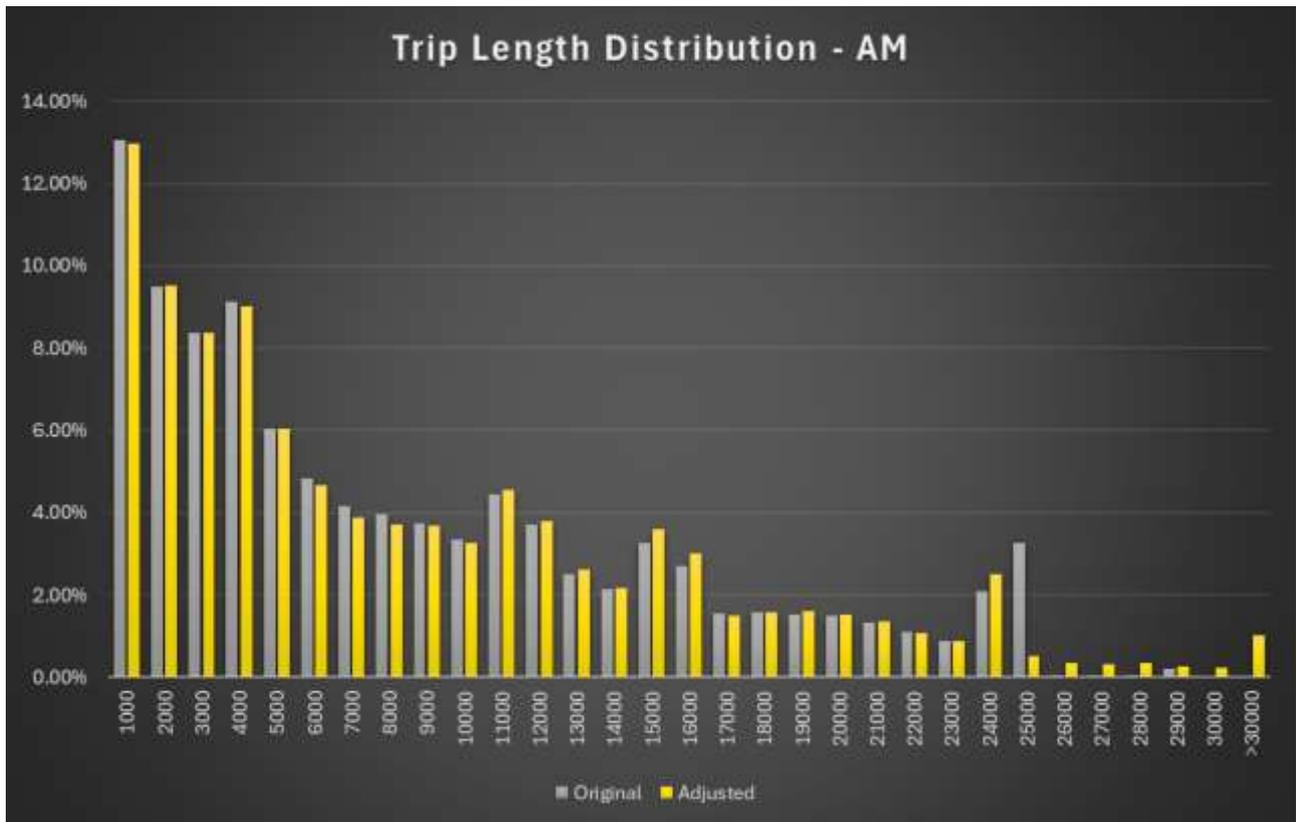


Figure 4: Comparison of trip length distribution - AM

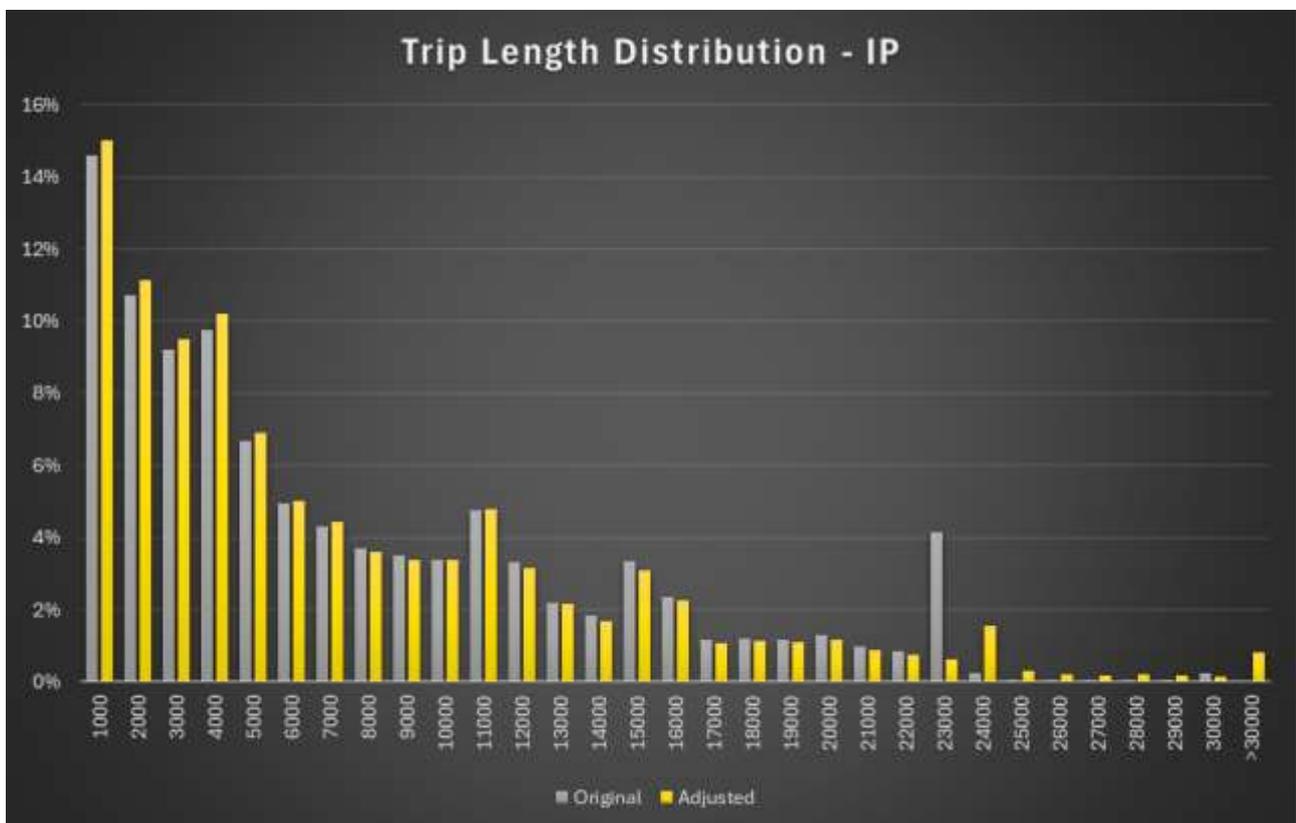


Figure 5: Comparison of trip length distribution - IP

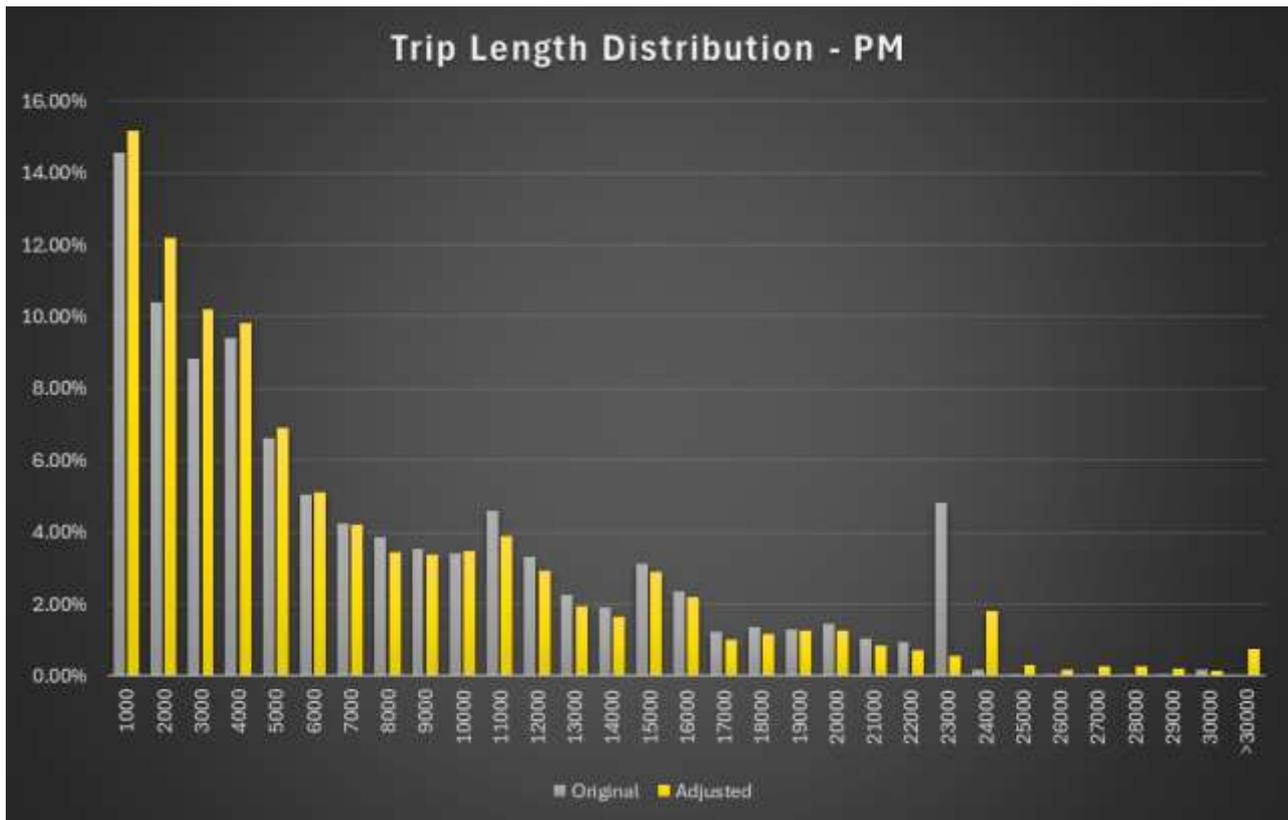


Figure 6: Comparison of trip length distribution - PM

4.2 Re-profiling

The matrix estimation process may have shifted some demands across different time periods, therefore affecting the demand profiles. The demand profiles for light vehicles have also been adjusted as part of the demand adjustment process after comparing the results of the initial hybrid model runs have against the TMDG criteria.

As the demand results have been compared for each hour, a common trend was observed for both the AM and PM periods in which the traffic volumes skewed towards the later hours of the simulation period, with lower volumes in the first hour and higher volumes in the later hours. To correct this imbalance, the following adjustments were made:

- AM
 - More demand shifted to the earlier hours for trips between Petone, Seaview, Wainuiomata, and Wellington sectors
 - Demands redistributed to later hours for traffic heading to the Eastern Hills sector
- IP
 - Re-profiling has not been applied
- PM
 - Profiles adjusted consistently for all sectors
 - Demands shifted to the first hour from the third and fourth hours

Together with the changes from the matrix estimation process, the final overall profiles are shown in Figure 7- Figure 9 for each period respectively. By comparing to the profiles before the calibration, more demands have been mainly shifted to the peak hour and the early hours from the late hours for AM, however for IP and PM the differences are fairly unnoticeable.

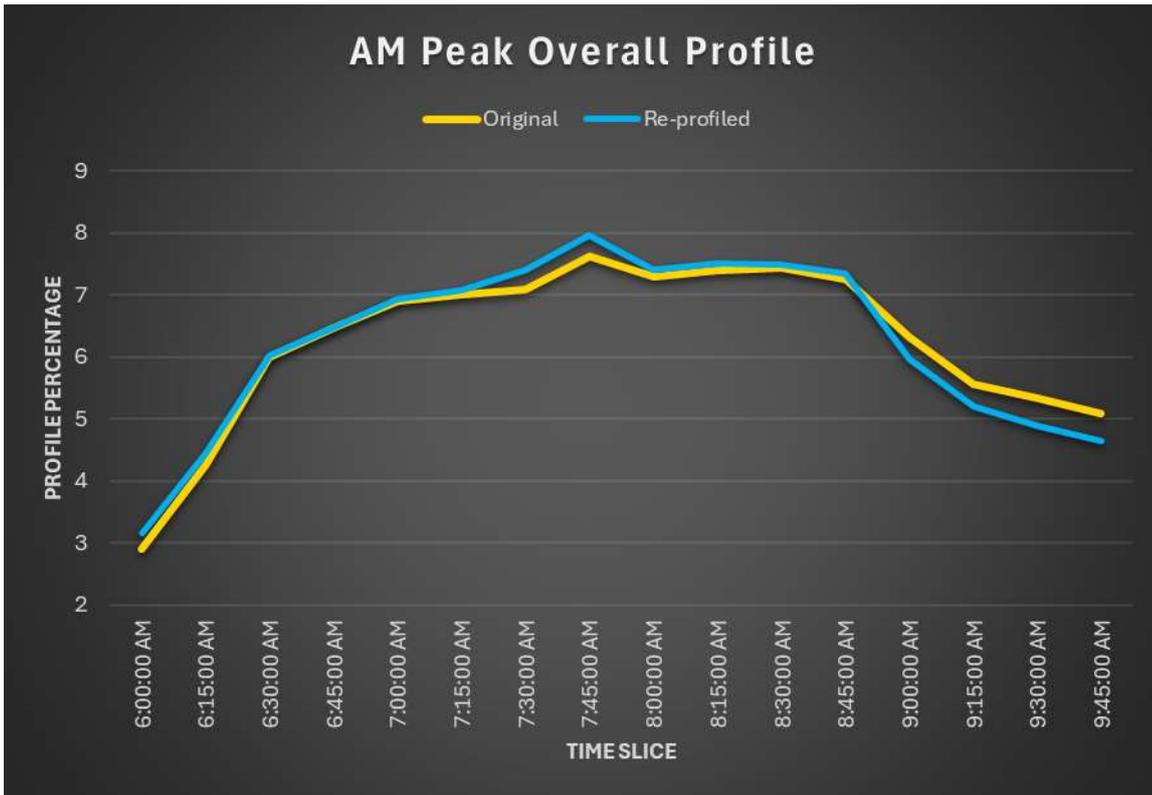


Figure 7: Final overall profile for AM after calibration

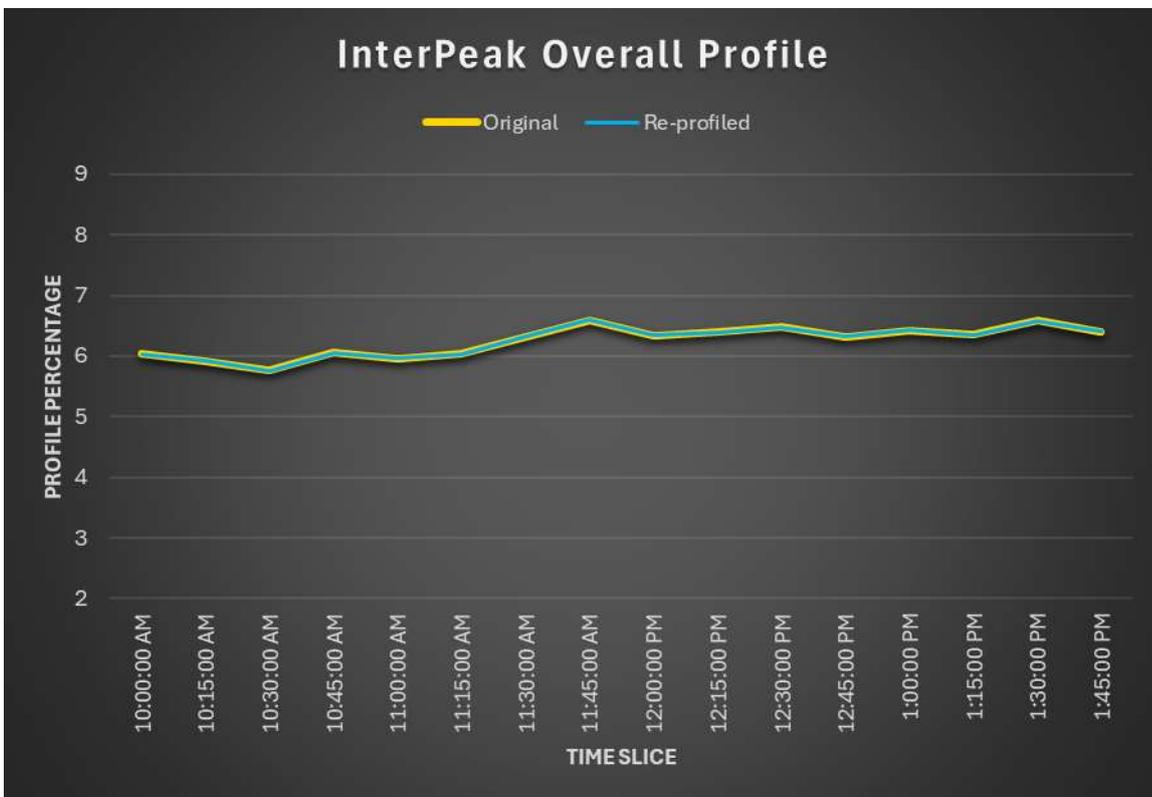


Figure 8: Final overall profile for IP after calibration

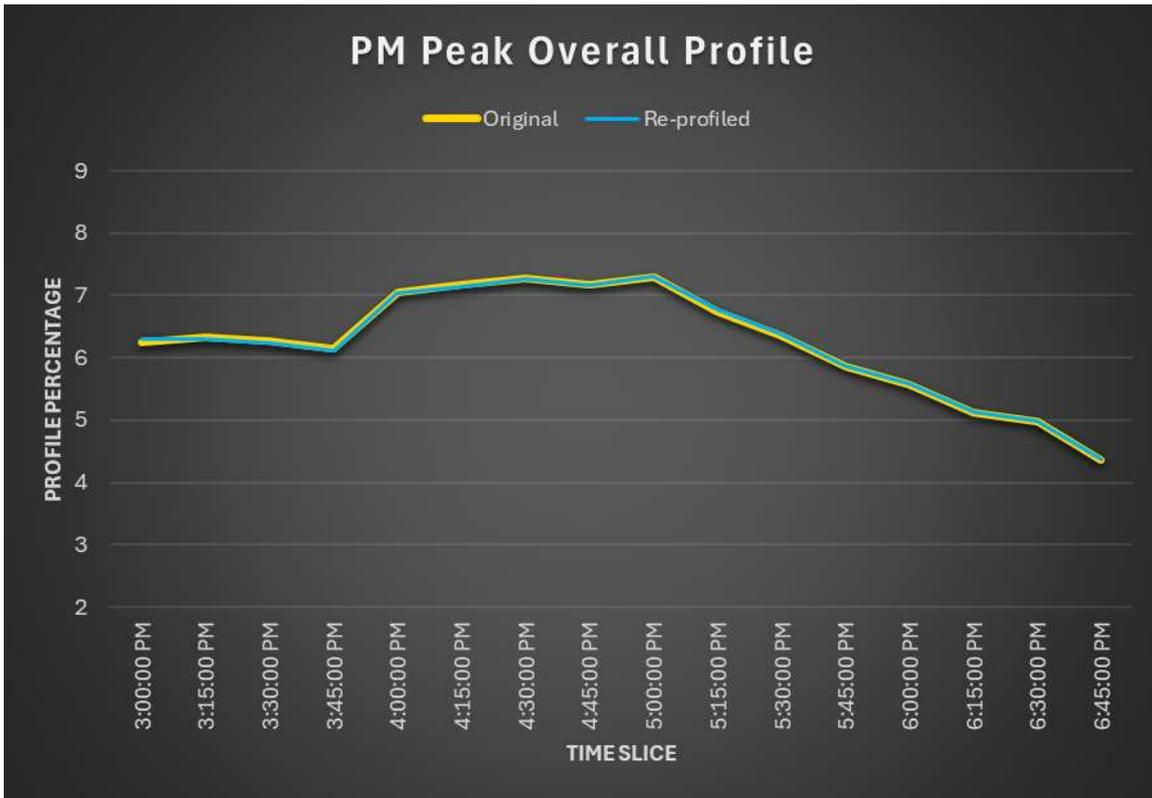


Figure 9: Final overall profile for PM after calibration

4.3 Matrix sector to sector comparisons

Table 4 compares the prior and final demand matrix in the absolute values for the AM peak. Overall the matrix has increased by 2,199 (out of 140,314) trips.

- Trips between Wellington City and places outside the Hutt Cite area (i.e. SH59, SH1 and Tawa) has the greatest increase in both directions to respond to the low SH1 demand (compared to TMS). This is likely the main source of the increase for the very long trips – as an example, the distance from Wellington to the SH59 external is around 23 km
- Trips to Upper Hutt has moderately decreased, followed by trips to Hutt Central and Petone West, this reduction is to meet the lower count data on SH2.
- However, the trips originated from Upper Hutt has significantly dropped. As it is at the edge of the model extent, it likely causes the significant drop for 25 km.

	Wellington	SH2	SH59	SH1	Johnsonville	Uhnorth	Uhsouth	Tawa	Newlands	HuttCentral	PetoneWest	PetoneEast	Alicetown	Wainuiomata	EasternHills	Woburn	Waiwhetu	Waterloo	Epuni	Naenae	Boulcott	Avalon	Taita	StokeValley	Eastbourne	Seaview	PnR a	PnR b	PnR c	PnR d	PnR e	PnR 815 f	Total
Wellington	0	2	405	253	0	13	45	213	22	-66	-265	-31	7	52	61	-6	29	2	7	84	10	22	23	30	-8	38	0	0	0	0	0	0	941
SH2	-108	0	-12	-82	-5	-70	-165	-8	-9	-42	-55	-7	-15	-14	-30	-6	-12	-6	-10	-14	-4	-7	-21	-29	-6	-26	0	0	0	0	0	0	-763
SH59	829	0	0	0	8	-1	3	0	91	12	8	1	14	8	27	3	13	3	5	3	2	0	0	1	2	24	0	0	0	0	0	0	1053
SH1	574	-10	0	0	2	-14	63	0	30	-58	-4	5	7	-19	6	-3	-5	41	20	102	14	10	12	18	-8	-12	0	0	0	0	0	0	770
Johnsonville	31	0	0	0	0	2	8	0	3	-10	-73	-9	3	9	18	-1	7	1	2	20	2	3	5	5	-1	14	0	0	0	0	0	0	38
Uhnorth	-117	0	-15	-77	-6	-243	-414	-10	-10	-226	-150	-16	-44	-29	-66	-36	-35	-8	-41	-19	-15	-24	-43	-73	-20	-75	0	0	0	0	0	0	-1809
Uhsouth	68	-9	8	50	6	-110	-5	6	7	-173	-61	5	-4	-23	-17	-17	-21	27	13	8	12	1	-5	-9	-18	-48	0	-6	0	0	0	0	-315
Tawa	372	0	0	0	2	-1	5	0	42	15	5	1	11	8	21	3	11	5	7	19	3	5	6	1	2	15	0	0	0	0	0	0	558
Newlands	60	0	143	17	1	2	7	59	7	-7	-54	-7	3	8	16	-1	6	1	2	16	1	3	4	4	-1	12	0	0	0	0	0	0	301
HuttCentral	56	-1	13	8	6	-28	-7	10	5	203	34	11	25	-20	-8	8	1	24	24	64	28	-19	15	49	-13	0	0	0	0	0	0	0	489
PetoneWest	43	-2	43	2	10	-35	-24	23	11	32	20	8	19	44	-13	3	56	14	28	32	22	4	15	9	22	96	0	0	0	0	13	0	494
PetoneEast	-9	0	8	14	-1	11	23	5	-1	53	122	2	44	19	18	17	26	13	21	28	13	11	19	15	7	46	0	0	0	0	25	0	549
Alicetown	34	0	14	6	4	-7	3	9	5	-6	-14	2	0	-16	-3	-5	-6	-2	8	7	9	6	12	9	-8	-2	0	0	0	0	0	0	58
Wainuiomata	89	-2	26	-7	6	-14	-9	17	9	-89	94	20	-16	0	-26	-46	19	17	-24	22	-1	28	-4	-6	-29	5	0	0	0	0	54	0	134
EasternHills	79	-1	26	24	7	-11	7	25	12	-194	-72	6	-8	-33	-12	-48	-21	5	-13	72	4	2	6	8	-17	-20	0	0	-9	0	4	0	-171
Woburn	56	0	9	2	3	-6	-1	6	5	15	12	4	8	-13	1	0	-4	3	1	10	6	-3	8	8	-8	-4	0	0	0	0	-1	0	117
Waiwhetu	-1	-1	9	-6	0	-19	-16	6	0	-91	19	10	-22	-13	-14	-56	-1	0	-31	9	-5	4	-13	-13	-16	0	0	0	0	0	0	0	-259
Waterloo	-61	1	6	37	-5	24	-4	3	-6	-90	-29	4	-15	-15	-4	-45	-2	0	-26	29	0	94	-12	-16	-11	0	0	0	0	0	0	0	-144
Epuni	36	-1	7	0	2	-24	-15	7	3	75	22	13	21	-5	-9	1	1	12	0	84	2	-26	-21	-18	-10	-2	0	0	0	0	0	0	156
Naenae	145	0	7	45	11	3	4	14	16	-11	-17	-1	-14	-19	33	-52	-18	-25	145	2	53	71	14	2	-17	-21	0	-37	0	0	0	0	333
Boulcott	47	0	4	0	3	-11	-7	5	4	100	29	13	21	3	2	15	4	4	3	26	0	-18	-13	-8	-1	4	0	1	0	0	0	0	229
Avalon	-33	-1	-1	-7	-2	-16	-4	2	-2	-51	-27	4	-2	-5	-38	-13	-3	3	-41	17	-17	-4	7	-2	-10	-8	0	-12	0	0	0	0	-266
Taita	-32	-1	1	8	-2	-9	1	3	-3	37	-37	14	12	-1	-36	14	9	15	-51	20	-18	-1	10	0	-4	13	0	0	0	0	0	0	-38
StokeValley	-30	-2	5	29	-2	-28	4	4	-2	149	-47	14	23	-8	-33	39	-3	2	-28	3	-8	7	0	0	-3	-3	0	0	0	0	0	0	76
Eastbourne	-17	-1	6	-6	-1	-11	-14	4	-1	-63	22	3	-16	-9	-15	-23	-13	-7	-20	-11	-4	-15	-12	-10	-18	-34	0	0	0	0	-17	0	-304
Seaview	14	-1	5	-4	2	-13	-11	3	2	-24	36	7	-5	6	-5	-7	0	0	-10	4	-1	-3	-5	-7	-12	0	0	0	0	0	0	0	-29
PnR a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR b	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR d	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR f	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2123	-31	716	305	49	-617	-526	405	240	-511	-481	78	56	-85	-126	-261	38	145	-9	637	105	153	9	-29	-211	13	0	-53	-9	0	78	0	2199

Table 4: Sector demand comparison (absolute) – AM

Table 5 compares the prior and final demand matrices, presenting percentage values for the AM peak. Overall, the matrix reflects a 2% increase. The majority of this increase is attributed to aligning with traffic volumes (derived from TMS data) on SH1 and SH2 southbound, prior to the Ngauranga Interchange.

- Trips from the Petone East sector has the greatest percentage increases, and they mainly go to Boulcott.
- Trips to Naenae has significant increases, especially they are from Tawa.
- The major decrease happens for the trips originated from SH2, to the sectors across the entire network. This could be because the WTSM overestimated the volumes on SH2. As it is an external sector fairly away from the Lower Hutt area, the counts there were not calibrated very well in WTSM.

	Wellington	SH2	SH59	SH1	Johnsonville	Uhnorth	Uhsouth	Tawa	Newlands	HuttCentral	PetoneWest	PetoneEast	Alicetown	Wainuiomata	EasternHills	Woburn	Waiwhetu	Waterloo	Epuni	Naenae	Boulcott	Avalon	Taita	StockeValley	Eastbourne	Seaview	PnRa	PnRb	PnRc	PnRd	PnRe	PnR8.15 f	Total	
Wellington	0%	1%	45%	45%	0%	9%	27%	45%	2%	-9%	-21%	-21%	2%	25%	16%	-6%	18%	2%	4%	82%	13%	26%	29%	35%	-8%	18%	0%	0%	0%	0%	0%	0%	0%	11%
SH2	-35%	0%	-40%	-40%	-33%	-8%	-36%	-39%	-34%	-66%	-56%	-40%	-47%	-68%	-48%	-56%	-58%	-30%	-42%	-36%	-39%	-44%	-47%	-47%	-73%	-64%	0%	-9%	0%	0%	0%	0%	0%	-30%
SH59	32%	-10%	0%	0%	1%	-3%	12%	0%	20%	20%	4%	3%	33%	59%	53%	22%	51%	35%	35%	65%	47%	14%	11%	8%	20%	50%	0%	0%	0%	0%	0%	0%	9%	
SH1	32%	-10%	0%	0%	1%	-3%	11%	0%	21%	-21%	-2%	17%	9%	-26%	3%	-7%	-6%	40%	18%	60%	25%	12%	10%	8%	-35%	-17%	0%	0%	0%	0%	0%	0%	11%	
Johnsonville	2%	4%	0%	0%	0%	11%	29%	0%	0%	-8%	-20%	-20%	3%	26%	18%	-5%	19%	3%	5%	85%	15%	28%	30%	36%	-7%	19%	0%	0%	0%	0%	0%	0%	0%	
Uhnorth	-19%	0%	-23%	-20%	-17%	-5%	-15%	-22%	-19%	-52%	-41%	-24%	-31%	-55%	-34%	-44%	-43%	-9%	-25%	-17%	-20%	-28%	-30%	-28%	-62%	-52%	0%	-1%	0%	0%	0%	0%	-14%	
Uhsouth	10%	-15%	11%	11%	13%	-5%	0%	11%	12%	-29%	-13%	6%	-2%	-34%	-7%	-17%	-20%	22%	6%	5%	12%	1%	-2%	-2%	-43%	-27%	-7%	-1%	0%	0%	0%	0%	-3%	
Tawa	32%	-9%	0%	0%	0%	-3%	12%	0%	20%	20%	4%	3%	32%	59%	51%	22%	51%	33%	36%	132%	48%	63%	60%	10%	20%	50%	0%	0%	0%	0%	0%	0%	8%	
Newlands	3%	6%	24%	26%	0%	12%	29%	21%	1%	-7%	-18%	-19%	4%	27%	19%	-3%	20%	4%	7%	87%	16%	30%	31%	38%	-5%	21%	0%	0%	0%	0%	0%	0%	5%	
HuttCentral	16%	-24%	64%	8%	16%	-17%	-3%	65%	20%	22%	12%	26%	17%	-11%	-5%	6%	1%	18%	8%	31%	26%	-8%	7%	23%	-21%	0%	0%	3%	2%	0%	11%	0%	11%	
PetoneWest	6%	-32%	56%	2%	9%	-26%	-14%	54%	11%	7%	2%	5%	7%	29%	-8%	3%	38%	15%	23%	22%	54%	6%	15%	9%	26%	58%	0%	0%	21%	0%	10%	0%	10%	
PetoneEast	-4%	24%	39%	62%	-4%	32%	50%	39%	-2%	36%	34%	3%	44%	40%	34%	27%	45%	41%	51%	51%	98%	53%	60%	56%	21%	52%	0%	0%	41%	0%	29%	0%	31%	
Alicetown	12%	-17%	59%	15%	12%	-11%	3%	59%	14%	-3%	-6%	5%	0%	-24%	-4%	-7%	-13%	-4%	14%	13%	47%	15%	23%	17%	-27%	-6%	0%	0%	0%	0%	-1%	0%	3%	
Wainuiomata	10%	-36%	58%	-9%	10%	-30%	-12%	58%	11%	-15%	17%	16%	-9%	0%	-14%	-20%	6%	10%	-13%	17%	-1%	36%	-5%	-13%	-21%	1%	0%	10%	-15%	0%	10%	0%	2%	
EasternHills	8%	-17%	40%	16%	7%	-10%	4%	53%	9%	-22%	-9%	4%	-2%	-30%	-2%	-16%	-15%	4%	-5%	45%	4%	1%	5%	10%	-28%	-10%	0%	1%	-3%	0%	2%	0%	-2%	
Woburn	26%	-22%	77%	8%	26%	-16%	-3%	77%	28%	5%	9%	14%	13%	-18%	1%	0%	-7%	5%	1%	14%	20%	-4%	13%	17%	-25%	-6%	0%	0%	11%	0%	-1%	0%	6%	
Waiwhetu	0%	-41%	45%	-16%	0%	-36%	-20%	44%	1%	-23%	6%	13%	-17%	-8%	-20%	-27%	-1%	0%	-22%	6%	-14%	5%	-14%	-20%	-22%	0%	0%	0%	-21%	0%	0%	0%	-8%	
Waterloo	-18%	17%	35%	63%	-18%	30%	-3%	21%	-16%	-16%	-11%	7%	-12%	-12%	-4%	-21%	-1%	0%	-11%	9%	0%	62%	-7%	-15%	-21%	0%	0%	0%	-8%	0%	0%	0%	-4%	
Epuni	10%	-29%	42%	-1%	10%	-24%	-11%	57%	12%	12%	13%	38%	27%	-6%	-9%	1%	2%	14%	0%	48%	2%	-12%	-13%	-15%	-26%	-2%	0%	0%	2%	0%	0%	0%	5%	
Naenae	41%	0%	46%	47%	41%	5%	3%	96%	43%	-2%	-5%	-1%	-11%	-20%	18%	-27%	-10%	-10%	49%	0%	53%	35%	8%	2%	-28%	-9%	0%	-10%	12%	0%	0%	0%	7%	
Boulcott	31%	-29%	56%	0%	32%	-23%	-11%	84%	33%	42%	44%	101%	69%	9%	2%	25%	19%	16%	3%	37%	0%	-17%	-18%	-15%	-9%	15%	0%	2%	0%	0%	0%	0%	16%	
Avalon	-14%	-36%	-13%	-13%	-14%	-30%	-5%	25%	-13%	-10%	-19%	13%	-3%	-10%	-29%	-13%	-5%	3%	-18%	18%	-20%	-2%	5%	-2%	-33%	-10%	0%	-10%	-2%	0%	0%	0%	-10%	
Taita	-13%	-17%	11%	11%	-12%	-11%	1%	27%	-11%	8%	-16%	31%	12%	-1%	-27%	11%	10%	13%	-24%	13%	-22%	0%	5%	0%	-14%	11%	0%	17%	0%	0%	0%	0%	-1%	
StockeValley	-7%	-17%	15%	15%	-6%	-10%	1%	15%	-6%	26%	-14%	22%	17%	-13%	-19%	28%	-2%	1%	-12%	2%	-9%	4%	0%	0%	-23%	-2%	0%	0%	0%	0%	0%	0%	1%	
Eastbourne	-7%	-54%	37%	-32%	-6%	-49%	-39%	37%	-5%	-37%	11%	6%	-29%	-11%	-25%	-38%	-16%	-16%	-40%	-15%	-28%	-41%	-31%	-35%	-4%	-17%	0%	0%	-31%	0%	-16%	0%	-13%	
Seaview	13%	-42%	62%	-17%	13%	-37%	-25%	62%	16%	-23%	32%	26%	-15%	6%	-14%	-27%	0%	0%	-25%	7%	-11%	-10%	-14%	-21%	-22%	0%	0%	0%	0%	0%	0%	0%	-3%	
PnRa	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PnRb	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PnRc	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PnRd	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PnRe	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PnRf	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Total	12%	-5%	7%	7%	0%	-6%	-5%	7%	5%	-5%	-5%	5%	2%	-2%	-3%	-10%	2%	6%	0%	20%	8%	6%	0%	-1%	-13%	0%	0%	-4%	-1%	0%	4%	0%	2%	

Table 5: Sector demand comparison (percentage) – AM

Table 6 compares the prior and final demand matrix in the absolute values for the IP peak. Overall the matrix has increased by 4,920 (out of 135,094) trips.

- The internal trips within the Hutt Central show the greatest increase, followed by trips between here and Petone West. These are likely the main sources of the increase in short trips. There have also been significant increases from Petone West to Wellington City. The increases from Petone West are to meet the lower count data on Jackson St.
- Decreases mostly occur for the external/remote sectors (e.g. Upper Hutt and Stokes Valley), this could cause the significant drop for 23 km.

	Wellington	SH2	SH59	SH1	Johnsonville	Uhnorth	Uhsouth	Tawa	Newlands	HuttCentral	PetoneWest	PetoneEast	Alicetown	Wainuiomata	EasternHills	Woburn	Waiwhetu	Waterloo	Epuni	Naenae	Boulcott	Avalon	Taita	StockeValley	Eastbourne	Seaview	PnR a	PnR b	PnR c	PnR d	PnR e	PnR 815f	Total		
Wellington	0	15	0	0	0	18	21	0	0	177	28	15	35	81	38	41	45	17	10	-17	2	-15	-11	-11	32	55	0	0	0	0	0	0	0	576	
SH2	14	0	0	17	1	0	0	1	1	-1	3	1	0	-3	0	0	-1	-2	-1	-1	-1	0	0	0	0	-1	0	0	0	0	0	0	0	25	
SH59	0	0	0	0	0	1	1	0	0	10	3	2	4	5	5	3	4	1	1	-1	0	-1	0	1	4	7	0	0	0	0	0	0	0	50	
SH1	0	8	0	0	0	13	16	0	0	-7	20	5	3	-19	7	2	-6	-12	-12	-14	-7	-11	-2	6	-2	-4	0	0	0	0	0	0	0	-17	
Johnsonville	0	1	0	0	0	2	3	0	0	27	8	3	9	9	8	5	9	3	1	-3	0	-2	-2	-2	6	12	0	0	0	0	0	0	0	100	
Uhnorth	21	0	2	25	1	0	0	2	1	-27	32	6	0	-18	0	1	-13	-22	-28	-12	-16	-15	0	0	-4	-12	0	0	0	0	0	0	0	-75	
Uhsouth	26	0	3	32	2	0	0	3	2	-54	52	9	0	-25	0	2	-20	-34	-45	-14	-25	-19	0	0	-6	-17	0	0	0	0	0	0	0	-129	
Tawa	0	0	0	0	0	1	1	0	0	10	3	1	3	3	3	2	3	1	1	-1	0	-1	-1	0	2	5	0	0	0	0	0	0	0	37	
Newlands	0	1	0	0	0	2	3	0	0	22	7	3	8	8	7	4	8	3	1	-3	0	-1	-2	-1	5	10	0	0	0	0	0	0	0	85	
HuttCentral	58	-2	3	-11	5	-61	-96	2	4	600	330	78	81	-72	-54	46	-40	78	107	78	103	51	12	-34	-16	-21	0	0	0	0	0	0	0	1231	
PetoneWest	451	0	46	7	109	-3	-5	32	90	233	60	52	-1	65	6	38	94	61	38	-8	5	-21	-13	-20	79	108	0	0	0	0	1	0	1503		
PetoneEast	25	1	2	5	4	9	11	2	3	57	82	2	14	14	11	8	24	14	14	17	5	3	11	10	17	27	0	0	0	0	1	0	392		
Alicetown	29	0	2	5	5	0	0	2	4	129	93	16	0	-4	1	19	4	23	34	25	8	-2	13	9	4	5	0	0	0	0	0	0	0	426	
Wainuiomata	96	-3	3	-14	7	-17	-22	3	6	-75	68	13	5	0	-16	-19	-13	-7	-5	-7	3	-11	-9	-4	-12	-25	0	0	0	0	-2	0	-55		
EasternHills	77	0	7	9	11	-4	-5	5	9	45	52	10	-5	-13	-7	18	-2	-8	-14	-41	-13	-38	-26	-23	2	3	0	0	0	0	0	0	0	49	
Woburn	47	-1	2	-3	3	-12	-15	2	3	26	79	11	18	-22	3	0	-20	-1	0	-1	6	3	9	0	-8	-12	0	0	0	0	0	0	0	115	
Waiwhetu	60	-2	4	-8	8	-21	-27	3	6	-39	128	24	10	-11	-7	-16	-1	0	-3	-5	3	-9	-2	-5	0	0	0	0	0	0	0	0	0	92	
Waterloo	-11	-2	0	-8	-1	-21	-27	0	-1	82	123	20	25	-10	-7	2	-1	0	14	-8	2	-16	-11	-6	0	0	0	0	0	0	0	0	0	138	
Epuni	-40	-1	-2	-3	-3	-20	-26	-2	-2	167	45	16	6	-3	-27	11	-3	17	1	17	2	0	7	-4	-9	-9	0	0	0	0	0	0	0	138	
Naenae	-20	-1	-1	-8	-2	-13	-6	-1	-2	57	21	16	-1	-7	-32	6	-2	-3	-9	0	-6	2	21	-2	0	-1	0	0	0	0	0	0	0	8	
Boulcott	-17	0	-1	-1	-1	-8	-10	-1	-1	135	5	6	-1	5	-18	11	6	4	2	1	0	-3	-1	-4	1	3	0	0	0	0	0	0	0	110	
Avalon	-7	0	0	-2	0	-10	-5	0	0	41	7	2	-6	-5	-19	3	-5	-2	2	15	-1	0	10	-1	-6	-6	0	0	0	0	0	0	0	5	
Taita	-16	0	0	4	-2	0	0	-1	-2	8	-8	3	-13	3	-19	6	6	18	13	24	2	10	11	0	-3	1	0	0	0	0	0	0	0	46	
StockeValley	-41	0	1	13	-3	0	0	1	-3	-58	-27	3	-21	-4	-27	9	-2	-2	0	-2	-7	5	-1	0	0	-1	0	0	0	0	0	0	0	-169	
Eastbourne	54	-1	3	-5	5	-10	-13	2	5	-20	95	15	6	-4	-4	-6	0	0	-9	-1	0	-3	1	-2	0	0	0	0	0	0	0	1	0	107	
Seaview	73	-2	6	-7	9	-24	-29	4	8	-22	133	25	7	-9	-7	-8	0	0	-8	-3	1	-6	-3	-4	0	0	0	0	0	0	0	0	0	132	
PnR a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PnR b	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR d	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PnR f	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	879	9	84	47	159	-178	-232	58	132	1524	1444	357	184	-35	-153	188	74	146	106	34	66	-100	12	-97	85	127	0	4920							

Table 6: Sector demand comparison (absolute) - IP

Table 7 compares the prior and final demand adjusted matrix in the percentage values for the IP peak. Overall the matrix has increased by 4%.

- Trips from Petone sectors have the greatest percentage increases, and they go to almost all sectors across the network. The increases are to meet the lower count data on Jackson St.
- There have been some significant percentage decreased in the long distance trips between the remote suburbs (Eastbourne, Seaview and Wainuiomata) and external sectors (SH1, SH2 and Upper Hutt), although their absolute differences are very low.

	Wellington	SH2	SH59	SH1	Johnsonville	Uhnorth	Uhsouth	Tawa	Newlands	HuttCentral	PetoneWest	PetoneEast	Alicetown	Wainuiomata	EasternHills	Woburn	Waiwhetu	Waterloo	Epuni	Naenae	Boulcott	Avalon	Taita	StockerValley	Eastbourne	Seaview	PnRa	PnRb	PnRc	PnRd	PnRe	PnRf	PnR8.15 f	Total
Wellington	0%	11%	0%	0%	0%	11%	11%	0%	0%	24%	2%	10%	10%	25%	10%	41%	27%	13%	5%	-16%	3%	-17%	-13%	-11%	31%	31%	0%	0%	0%	0%	0%	0%	0%	5%
SH2	9%	0%	11%	11%	9%	0%	0%	11%	9%	-8%	19%	18%	0%	-37%	2%	4%	-27%	-31%	-26%	-16%	-32%	-23%	0%	0%	-17%	-23%	0%	0%	0%	0%	0%	0%	0%	3%
SH59	0%	6%	0%	0%	0%	6%	6%	0%	0%	25%	2%	11%	10%	25%	7%	41%	27%	12%	5%	-21%	3%	-22%	-4%	6%	31%	31%	0%	0%	0%	0%	0%	0%	0%	0%
SH1	0%	6%	0%	0%	0%	6%	6%	0%	0%	-6%	23%	24%	6%	-33%	5%	8%	-22%	-26%	-22%	-23%	-29%	-24%	-5%	6%	-12%	-18%	0%	0%	0%	0%	0%	0%	0%	0%
Johnsonville	0%	11%	0%	0%	0%	11%	11%	0%	0%	22%	2%	10%	10%	25%	9%	41%	27%	13%	5%	-16%	3%	-17%	-12%	-10%	31%	31%	0%	0%	0%	0%	0%	0%	0%	1%
Uhnorth	9%	0%	11%	11%	9%	0%	0%	11%	9%	-10%	18%	18%	0%	-37%	0%	4%	-27%	-31%	-27%	-15%	-34%	-23%	0%	0%	-17%	-22%	0%	0%	0%	0%	0%	0%	0%	-1%
Uhsouth	9%	0%	11%	11%	9%	0%	0%	11%	9%	-11%	18%	18%	0%	-36%	0%	4%	-26%	-30%	-27%	-11%	-34%	-17%	0%	0%	-17%	-22%	0%	0%	0%	0%	0%	0%	0%	-1%
Tawa	0%	6%	0%	0%	0%	6%	6%	0%	0%	23%	2%	10%	10%	25%	6%	41%	27%	14%	5%	-16%	3%	-17%	-11%	5%	31%	31%	0%	0%	0%	0%	0%	0%	0%	1%
Newlands	0%	11%	0%	0%	0%	11%	11%	0%	0%	22%	2%	10%	10%	25%	9%	41%	27%	14%	5%	-16%	3%	-17%	-13%	-11%	31%	31%	0%	0%	0%	0%	0%	0%	0%	2%
HuttCentral	9%	-21%	10%	-10%	7%	-20%	-20%	8%	7%	30%	46%	60%	29%	-16%	-11%	13%	-10%	14%	13%	14%	36%	10%	3%	-7%	-10%	-11%	0%	7%	0%	0%	19%	0%	12%	
PetoneWest	42%	-2%	42%	10%	45%	-2%	-2%	43%	46%	32%	3%	15%	0%	21%	1%	29%	29%	27%	19%	-3%	6%	-17%	-8%	-11%	44%	44%	0%	0%	-2%	0%	6%	0%	18%	
PetoneEast	16%	25%	15%	33%	16%	24%	23%	16%	16%	42%	24%	3%	18%	23%	18%	27%	34%	31%	38%	34%	40%	16%	16%	36%	30%	42%	42%	0%	0%	21%	0%	20%	0%	26%
Alicetown	9%	0%	9%	11%	9%	0%	0%	9%	9%	37%	18%	18%	0%	-3%	0%	31%	4%	22%	38%	26%	26%	-3%	17%	10%	7%	7%	0%	0%	0%	0%	3%	0%	14%	
Wainuiomata	22%	-36%	22%	-27%	22%	-36%	-35%	22%	22%	-17%	22%	20%	4%	0%	-15%	-24%	-7%	-6%	-4%	-9%	9%	-22%	-19%	-11%	-12%	-12%	0%	-6%	5%	0%	-6%	0%	-1%	
EasternHills	16%	-2%	12%	8%	14%	-3%	-3%	10%	15%	8%	12%	16%	-2%	-12%	-1%	24%	-3%	-10%	-10%	-29%	-17%	-30%	-25%	-22%	4%	4%	0%	17%	-10%	0%	-2%	0%	1%	
Woburn	39%	-29%	39%	-20%	39%	-29%	-29%	39%	39%	7%	54%	38%	32%	-29%	5%	0%	-23%	-2%	0%	-2%	18%	6%	17%	0%	-23%	-23%	0%	0%	32%	0%	2%	0%	7%	
Waiwhetu	30%	-37%	31%	-27%	30%	-36%	-34%	30%	30%	-11%	38%	34%	10%	-6%	-9%	-19%	0%	0%	-3%	-3%	9%	-13%	-2%	-6%	0%	0%	0%	0%	1%	0%	0%	0%	0%	3%
Waterloo	-7%	-27%	-7%	-18%	-6%	-27%	-24%	-6%	-6%	17%	52%	43%	28%	-7%	-8%	3%	0%	0%	9%	-3%	4%	-15%	-9%	-5%	0%	0%	0%	0%	13%	0%	0%	0%	5%	
Epuni	-18%	-17%	-17%	-7%	-18%	-17%	-17%	-18%	-17%	20%	21%	43%	8%	-3%	-22%	10%	-2%	10%	1%	8%	2%	0%	5%	-3%	-18%	-11%	0%	2%	-2%	0%	-20%	0%	4%	
Naenae	-13%	-16%	-13%	-13%	-13%	-15%	-5%	-13%	-13%	11%	9%	32%	-1%	-8%	-23%	9%	-1%	-1%	-5%	0%	-9%	2%	14%	-1%	-1%	-1%	0%	-1%	0%	0%	0%	0%	0%	
Boulcott	-20%	-15%	-19%	-5%	-20%	-15%	-15%	-20%	-20%	48%	7%	48%	-5%	16%	-25%	35%	19%	7%	2%	1%	0%	-4%	-1%	-7%	9%	11%	0%	0%	-7%	0%	-29%	0%	8%	
Avalon	-6%	-13%	-4%	-4%	-6%	-13%	-5%	-6%	-6%	8%	5%	11%	-9%	-10%	-15%	5%	-8%	-2%	1%	10%	-1%	0%	7%	-1%	-20%	-12%	0%	0%	0%	0%	-14%	0%	0%	
Taita	-14%	0%	9%	9%	-15%	0%	0%	-11%	-16%	2%	-5%	9%	-17%	7%	-19%	12%	7%	14%	8%	16%	3%	6%	6%	0%	-10%	2%	0%	0%	0%	0%	0%	0%	2%	
StockerValley	-26%	0%	11%	11%	-25%	0%	0%	11%	-26%	-13%	-14%	8%	-24%	-9%	-26%	17%	-2%	-2%	0%	-1%	-11%	4%	0%	0%	-2%	-2%	0%	0%	0%	0%	0%	0%	-4%	
Eastbourne	39%	-45%	39%	-37%	39%	-45%	-45%	39%	39%	-12%	56%	41%	11%	-4%	-7%	-19%	0%	0%	-19%	-3%	1%	-12%	2%	-7%	0%	0%	0%	0%	0%	0%	14%	0%	6%	
Seaview	39%	-40%	39%	-32%	39%	-41%	-40%	39%	39%	-12%	57%	40%	11%	-4%	-8%	-19%	0%	0%	-12%	-3%	5%	-14%	-6%	-7%	0%	0%	0%	0%	8%	0%	2%	0%	6%	
PnRa	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PnRb	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PnRc	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PnRd	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PnRe	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PnRf	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	8%	1%	1%	1%	2%	-1%	-2%	1%	3%	14%	16%	23%	6%	-1%	-4%	11%	3%	5%	3%	1%	5%	-4%	0%	-3%	4%	6%	0%	0%	0%	0%	0%	0%	0%	4%

Table 7: Sector demand comparison (percentage) – IP

Table 8 compares the prior and final demand matrix in the absolute values for the PM peak. Overall the matrix has increased by 11,740 (out of 184,367) trips.

- The internal trips within the Hutt Central show the greatest increase, followed by internal trips within Petone. These are likely the main sources of the increase in short trips. The increases within Petone are to meet the lower count data on Jackson St.
- The trips from Wellington City also show the highest increase to various sectors where have essential access of SH1 and 2. However, the drop for the Petone West sector is to suppress the high volumes on the off-ramp.
- Decreases mostly occur for the external/remote sectors (e.g. Upper Hutt, Stokes Valley and Eastbourne), this could cause the significant drop for 23 km.

	Wellington	SH2	SH59	SH1	Johnsonville	Uhnorth	Uhsouth	Tawa	Newlands	HuttCentral	PetoneWest	PetoneEast	Alicetown	Wainuiomata	EasternHills	Woburn	Waiwhetu	Waterloo	Epuni	Naenae	Boulcott	Avalon	Taita	StokeValley	Eastbourne	Seaview	PnR a	PnR b	PnR c	PnR d	PnR e	PnR 815 f	Total
Wellington	0	-20	646	351	0	260	198	278	378	354	-586	-68	128	-125	474	116	-116	48	15	458	19	19	-19	-41	-105	-95	0	0	0	0	0	0	2566
SH2	26	0	-1	-21	1	20	-30	1	2	-1	1	-3	-4	-7	-3	-1	-4	4	-2	0	-1	-1	-4	-7	-2	-4	0	0	0	0	0	0	-42
SH59	-15	-9	37	2	51	5	-6	628	-114	5	-73	-10	-1	-12	15	2	-11	-1	-1	15	-1	-2	-4	-8	-9	-11	0	0	0	0	0	0	474
SH1	-10	-136	0	0	-6	53	-58	15	-12	35	27	-23	-39	-56	19	-10	-34	100	-23	138	-9	-19	-32	-56	-23	-31	0	0	0	0	0	0	-188
Johnsonville	-463	2	76	-23	0	45	36	-164	618	-42	-257	-28	-38	-37	-29	-3	-34	-16	-16	15	-5	-7	-13	-11	-23	-30	0	0	0	0	0	0	-446
Uhnorth	21	150	-3	-68	0	216	-688	-1	1	-55	-10	-37	-71	-48	-38	-27	-53	63	-73	-5	-32	-35	-72	-208	-29	-52	0	0	0	0	0	0	-1152
Uhsouth	46	-260	-3	-69	2	-940	624	0	3	-85	-5	-55	-115	-67	-48	-38	-63	113	-111	129	-49	-12	32	126	-44	-72	0	0	0	0	0	0	-960
Tawa	318	-6	171	-8	-228	8	-1	549	104	31	-27	-3	17	-2	46	8	-6	5	3	33	2	2	0	-4	-6	-6	0	0	0	0	0	0	1000
Newlands	311	-4	13	3	483	23	15	-33	620	29	-119	-14	18	-18	62	8	-20	3	-1	56	1	0	-5	-8	-17	-17	0	0	0	0	0	0	1389
HuttCentral	42	-18	7	-96	-13	-284	-535	5	2	1450	308	98	100	-204	-631	520	-184	564	662	-63	587	86	328	-119	-106	-64	0	0	0	0	0	0	2442
PetoneWest	77	-55	15	-90	-39	-219	-340	20	62	444	1012	950	33	147	-211	53	-43	-27	-20	-142	-36	-77	-162	-255	17	80	0	0	0	0	0	0	1193
PetoneEast	-46	-8	-10	-5	-19	-21	-36	-5	-11	79	399	7	5	109	-21	24	36	42	19	4	3	1	35	-24	20	35	0	0	0	0	0	0	611
Alicetown	-60	-6	-9	117	-39	84	50	-5	-17	169	-9	9	14	-70	-34	13	-60	-6	-10	-31	-12	-15	-36	-68	-29	-20	0	0	0	0	0	0	-79
Wainuiomata	-138	-15	-9	-67	-20	-57	-71	-6	-13	-147	20	-11	-9	0	-78	-32	11	33	-79	-21	-16	0	-31	-51	-56	-67	0	0	0	0	0	0	-930
EasternHills	72	-24	1	71	-10	-6	-64	5	9	212	148	55	54	-46	-21	71	-35	94	-19	144	-19	-72	-76	-101	-32	-31	0	0	0	0	0	0	381
Woburn	89	-3	7	-4	4	-35	-51	5	5	326	38	13	13	-58	-45	-17	-64	15	31	-48	61	-24	30	-9	-29	-18	0	0	0	0	0	0	231
Waiwhetu	104	-13	11	-32	13	-67	-80	7	19	20	303	48	33	135	-24	8	-4	71	1	1	5	3	44	-61	-35	-16	0	0	0	0	0	0	494
Waterloo	38	6	7	179	0	181	43	2	4	400	101	69	15	222	57	18	196	153	5	-59	17	107	33	-80	47	74	0	0	0	0	0	0	1834
Epuni	13	-4	0	38	-2	35	-12	0	0	734	93	30	36	39	-52	94	0	62	74	24	84	-102	-18	-47	-17	-7	0	0	0	0	0	0	1097
Naenae	-66	-6	10	253	-15	62	109	-4	-11	-12	-107	30	-38	69	226	-36	106	-82	-19	-34	34	64	166	-8	-6	39	0	0	0	0	0	0	724
Boulcott	58	0	2	54	2	80	65	3	3	301	87	22	32	-1	40	48	-5	26	50	33	23	-44	-27	-43	-6	-5	0	0	0	0	0	0	798
Avalon	32	-4	0	-9	0	-33	41	1	1	6	16	-15	-43	92	-46	-34	16	77	-93	16	-69	-13	51	13	-34	-14	0	0	0	0	0	0	-43
Taita	-4	-22	0	-8	-4	-30	162	0	-1	130	4	9	-42	-6	59	34	49	-4	23	96	-29	54	51	-7	12	22	0	0	0	0	0	0	546
StokeValley	-78	-37	-4	-55	-10	-157	16	-3	-9	-212	-84	-9	-51	-26	39	-15	-15	-47	-63	-4	-47	-19	-106	168	-14	-15	0	0	0	0	0	0	-858
Eastbourne	-35	-5	-5	-21	-9	-31	-41	-2	-5	-67	79	-4	-4	20	-38	-18	-45	-37	-24	-52	-6	-23	-6	-35	-7	-29	0	0	0	0	0	0	-453
Seaview	38	-24	8	-39	-1	-93	-113	5	9	29	353	46	39	313	-8	11	25	99	26	48	11	24	137	-30	-17	10	0	0	0	0	0	0	905
PnR a	0	3	0	0	0	60	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55
PnR b	0	-1	0	0	0	-28	-20	0	0	8	0	0	0	58	-15	2	34	-6	2	-91	0	-9	2	0	0	1	0	0	0	0	0	0	-62
PnR c	0	0	0	0	0	0	0	0	0	15	0	0	1	0	64	0	-1	0	2	-3	6	20	16	-60	0	-1	0	0	0	0	0	0	60
PnR d	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	-23	0	0	0	0	0	0	0	0	-8
PnR e	0	0	0	0	0	0	0	-9	0	0	37	79	-2	48	-18	0	11	11	0	0	0	0	0	0	-3	0	0	0	0	0	0	0	154
PnR f	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Total	370	-518	969	453	142	-871	-795	1296	1647	4159	1748	1183	82	467	-256	798	-308	1357	357	658	523	-94	331	-1059	-554	-345	0	0	0	0	0	0	11740

Table 8: Sector demand comparison (absolute) – PM

Table 9 compares the prior and final demand adjusted matrix in the percentage values for the PM peak. Overall the matrix has increased by 6%.

- Trips from Waterloo has the greatest percentage increases, and they mainly go to SH1.
- Followed by trips to Boulcott, and most of them are from the most southern part of Lower Hutt including SH1.
- Trips to the Petone East sector also has significant increases, they are mostly from the internal trip, the Hutt Central and several Park and Rides, although the trips from outside Hutt City area have decreased.
- There have been some significant increases in the trips from Tawa and external sectors to Naenae, which likely contributed to the moderate increase for 24 km.

	Wellington	SH2	SH59	SH1	Johnsonville	Uhnorth	Uhsouth	Tawa	Newlands	HuttCentral	PetoneWest	PetoneEast	Alicetown	Wainuiomata	EasternHills	Woburn	Waiwhetu	Waterloo	Epuni	Naenae	Boulcott	Avalon	Taita	StockeValley	Eastbourne	Seaview	PnRa	PnRb	PnRc	PnRd	PnRe	PnR815f	Total
Wellington	0%	-9%	22%	20%	0%	78%	52%	22%	18%	39%	-36%	-31%	29%	-19%	66%	69%	-42%	20%	5%	214%	15%	12%	-12%	-18%	-57%	-48%	0%	0%	0%	0%	0%	0%	14%
SH2	14%	0%	-10%	-10%	7%	5%	-30%	10%	20%	-9%	10%	-82%	-70%	-74%	-20%	-53%	-78%	66%	-49%	4%	-41%	-40%	-46%	-40%	-93%	-92%	0%	0%	0%	0%	0%	0%	-4%
SH59	-1%	-45%	1%	1%	4%	9%	-9%	24%	-20%	18%	-52%	-49%	-3%	-40%	29%	26%	-57%	-8%	-13%	131%	-17%	-28%	-38%	-29%	-68%	-61%	0%	0%	0%	0%	0%	3%	
SH1	-1%	-46%	0%	0%	-3%	12%	-11%	8%	-13%	21%	23%	-74%	-59%	-62%	11%	-33%	-68%	128%	-30%	136%	-25%	-30%	-39%	-28%	-88%	-88%	0%	0%	0%	0%	0%	0%	-3%
Johnsonville	-40%	17%	5%	-6%	0%	128%	84%	-14%	31%	-36%	-72%	-69%	-41%	-64%	-24%	-21%	-75%	-45%	-53%	51%	-48%	-50%	-62%	-43%	-82%	-77%	0%	0%	0%	0%	0%	0%	-3%
Uhnorth	9%	18%	-13%	-19%	2%	2%	-17%	-5%	5%	-18%	-5%	-83%	-72%	-76%	-25%	-54%	-79%	61%	-53%	-5%	-51%	-46%	-52%	-50%	-93%	-93%	0%	0%	0%	0%	0%	0%	-7%
Uhsouth	17%	-73%	-10%	-15%	7%	-23%	13%	0%	11%	-15%	-1%	-82%	-71%	-69%	-20%	-50%	-60%	68%	-50%	78%	-48%	-9%	12%	16%	-93%	-90%	0%	0%	0%	0%	0%	0%	-7%
Tawa	54%	-35%	7%	-3%	-20%	21%	-2%	23%	38%	63%	-23%	-20%	53%	-8%	91%	94%	-33%	35%	19%	251%	32%	26%	-4%	-22%	-50%	-37%	0%	0%	0%	0%	0%	0%	13%
Newlands	26%	-22%	2%	2%	28%	57%	32%	-13%	50%	31%	-38%	-37%	22%	-28%	51%	54%	-47%	7%	-5%	182%	5%	1%	-22%	-17%	-61%	-51%	0%	0%	0%	0%	0%	0%	22%
HuttCentral	5%	-80%	15%	-41%	-14%	-57%	-67%	10%	3%	71%	52%	63%	50%	-26%	-52%	96%	-36%	76%	57%	-7%	139%	11%	42%	-14%	-42%	-40%	0%	0%	0%	0%	0%	0%	17%
PetoneWest	6%	-81%	6%	-38%	-8%	-58%	-66%	13%	14%	83%	48%	176%	11%	25%	-21%	35%	-9%	-7%	-9%	-33%	-46%	-46%	-56%	-69%	6%	34%	0%	0%	0%	0%	0%	0%	10%
PetoneEast	-28%	-66%	-26%	-13%	-40%	-33%	-44%	-27%	-27%	83%	112%	8%	9%	89%	-15%	81%	34%	54%	52%	4%	26%	2%	68%	-39%	31%	57%	0%	0%	0%	0%	0%	0%	31%
Alicetown	-16%	-25%	-16%	104%	-32%	53%	23%	-14%	-16%	52%	-2%	8%	5%	-31%	-8%	16%	-39%	-4%	-9%	-20%	-28%	-16%	-27%	-42%	-37%	-33%	0%	0%	0%	0%	0%	0%	-2%
Wainuiomata	-29%	-95%	-27%	-83%	-42%	-88%	-86%	-30%	-33%	-30%	6%	-14%	-6%	0%	-51%	-32%	5%	17%	-57%	-17%	-38%	0%	-47%	-76%	-42%	-32%	0%	0%	0%	0%	0%	0%	-13%
EasternHills	15%	-52%	2%	25%	-8%	-3%	-21%	10%	9%	37%	32%	63%	26%	-25%	-3%	73%	-30%	70%	-11%	64%	-17%	-41%	-46%	-53%	-40%	-36%	0%	0%	0%	0%	0%	0%	7%
Woburn	73%	-77%	76%	-15%	43%	-46%	-53%	72%	69%	84%	30%	31%	29%	-32%	-20%	-13%	-41%	10%	17%	-31%	104%	-23%	27%	-8%	-47%	-43%	0%	0%	0%	0%	0%	0%	9%
Waiwhetu	51%	-89%	54%	-64%	28%	-74%	-66%	53%	51%	10%	89%	52%	50%	42%	-15%	13%	-1%	30%	1%	0%	20%	4%	38%	-48%	-28%	-9%	0%	0%	0%	0%	0%	0%	15%
Waterloo	23%	41%	65%	238%	0%	159%	26%	22%	16%	145%	43%	126%	27%	103%	36%	35%	94%	47%	4%	-16%	54%	87%	19%	-45%	68%	83%	0%	0%	0%	0%	0%	0%	55%
Epuni	6%	-46%	-4%	49%	-14%	19%	-5%	4%	3%	89%	56%	80%	71%	21%	-19%	68%	0%	26%	21%	8%	54%	-36%	-7%	-19%	-24%	-12%	0%	0%	0%	0%	0%	0%	24%
Naenae	-44%	-22%	208%	221%	-55%	47%	55%	-42%	-48%	-2%	-37%	40%	-41%	49%	109%	-43%	48%	-20%	-8%	-7%	37%	64%	74%	-4%	-7%	35%	0%	0%	0%	0%	0%	0%	17%
Boulcott	68%	7%	55%	148%	36%	99%	60%	68%	61%	109%	154%	180%	187%	-3%	34%	123%	-13%	42%	35%	30%	59%	-40%	-26%	-42%	-32%	-27%	0%	0%	0%	0%	0%	0%	48%
Avalon	27%	-64%	-15%	-13%	5%	-29%	24%	26%	22%	1%	13%	-58%	-61%	110%	-24%	-40%	17%	43%	-29%	8%	-50%	-6%	21%	6%	-68%	-30%	0%	0%	0%	0%	0%	0%	-1%
Taita	-4%	-70%	-7%	-10%	-20%	-17%	55%	-3%	-6%	25%	2%	21%	-44%	-9%	41%	48%	43%	-2%	10%	43%	-30%	28%	18%	-2%	27%	38%	0%	0%	0%	0%	0%	0%	15%
StockeValley	-52%	-77%	-33%	-30%	-48%	-39%	2%	-22%	-52%	-41%	-39%	-22%	-50%	-46%	30%	-24%	-16%	-30%	-35%	-3%	-59%	-14%	-41%	14%	-35%	-24%	0%	0%	0%	0%	0%	0%	-17%
Eastbourne	-26%	-96%	-24%	-86%	-39%	-90%	-92%	-25%	-27%	-43%	46%	-8%	-7%	13%	-51%	-43%	-42%	-55%	-42%	-71%	-33%	-60%	-15%	-80%	-1%	-26%	0%	0%	0%	0%	0%	0%	-19%
Seaview	20%	-91%	21%	-68%	-2%	-78%	-78%	21%	19%	28%	134%	46%	89%	68%	-5%	25%	9%	53%	42%	22%	54%	35%	123%	-21%	-7%	12%	0%	0%	0%	0%	0%	0%	27%
PnRa	0%	46%	0%	0%	0%	23%	-31%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	18%
PnRb	0%	-72%	0%	0%	0%	-26%	-5%	0%	0%	141%	57%	189%	56%	38%	-33%	19%	79%	-6%	7%	-48%	-2%	-35%	39%	-56%	1%	48%	0%	0%	0%	0%	0%	0%	-5%
PnRc	0%	0%	0%	0%	0%	0%	0%	0%	0%	57%	-6%	1%	9%	-9%	74%	0%	-33%	9%	16%	-12%	75%	55%	51%	-42%	-38%	-33%	0%	0%	0%	0%	0%	0%	15%
PnRd	0%	0%	0%	0%	0%	0%	0%	0%	0%	-20%	0%	0%	0%	0%	-42%	0%	0%	-35%	107%	-13%	-51%	2%	34%	-27%	0%	0%	0%	0%	0%	0%	0%	0%	-6%
PnRe	0%	0%	4%	0%	0%	0%	0%	-5%	-10%	4%	44%	162%	-14%	32%	-9%	-1%	30%	130%	-3%	28%	2%	-16%	-61%	-13%	-8%	-3%	0%	0%	0%	0%	0%	0%	17%
PnRf	0%	0%	8%	71%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Total	3%	-24%	6%	6%	1%	-5%	-5%	14%	22%	39%	18%	54%	3%	5%	-3%	36%	-8%	29%	8%	12%	28%	-3%	8%	-16%	-19%	-16%	0%	0%	0%	0%	0%	0%	6%

Table 9: Sector demand comparison (percentage) – PM

5. Calibration and Validation Results

5.1 Calibration criteria

Only the link results of the light vehicles for the hybrid layer are compared against all these criteria listed in the sub-sections below, the exceptions are being:

- Hourly count band, XY scatter plots and RMSE are not considered for heavy vehicle demands due to its low volumes
- For static layer results, only the hourly GEH count comparison is considered
- The turn comparison results for the static layer are not considered

Figure 10 shows the seven screenlines compared for the model.

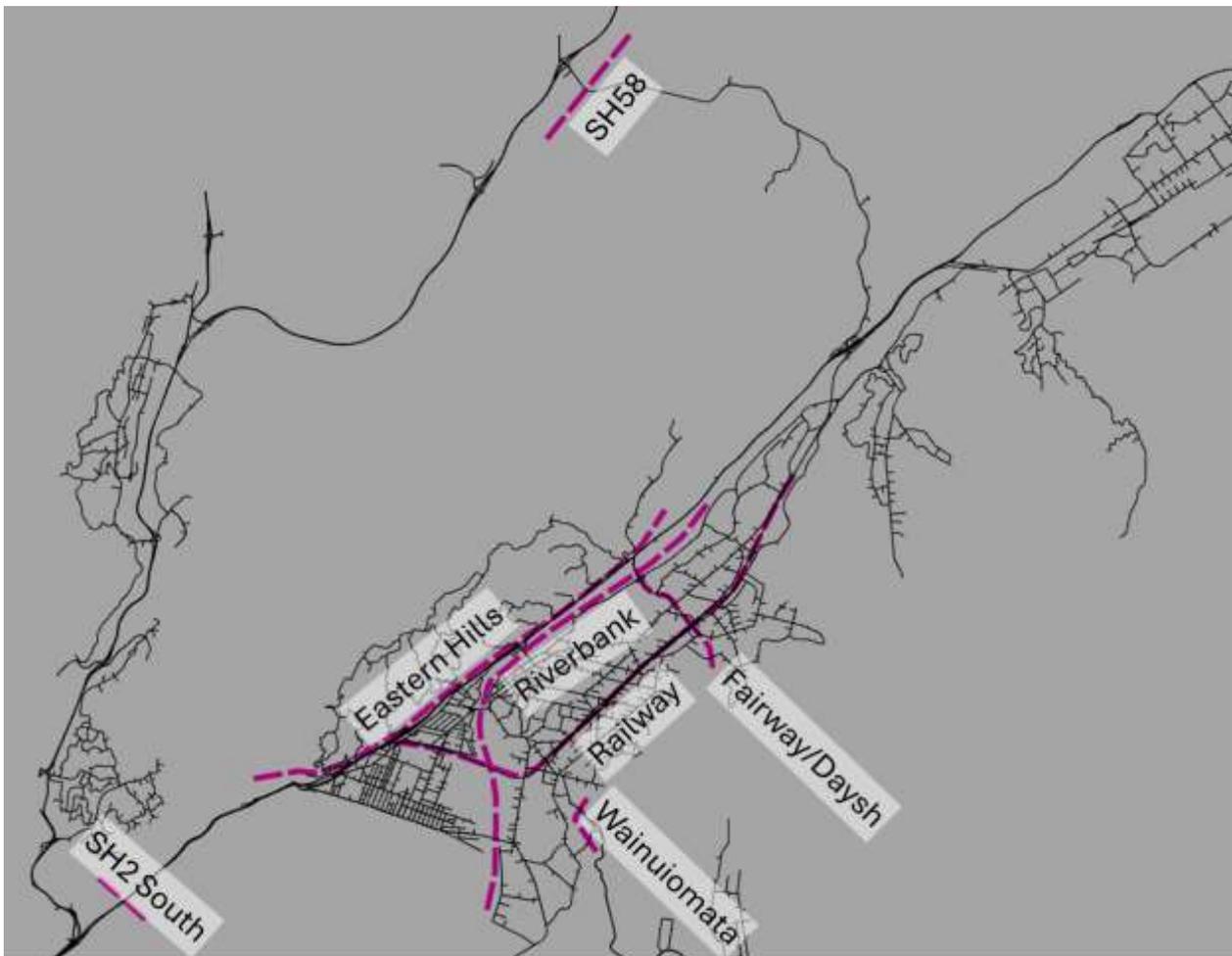


Figure 10: Screenlines used for comparisons

5.1.1 GEH and count band comparison

These criteria compare the observed and modelled count data at a section and screenline level by way of the GEH statistic. The GEH statistic is a form of Chi-squared statistic that can be used to compare observed and modelled counts. It is a useful for these comparisons because it is tolerant of relative and absolute errors, eg larger percentage differences on lower counts and larger absolute differences on higher counts. The GEH formula is given below

$$GEH = \sqrt{\frac{(m - o)^2}{\frac{(m + o)}{2}}}$$

Where *m* is the modelled count and *o* is the observed count.

Figure 11 and Figure 12 shows the screenline and count calibration criteria as per the TMDG. HAM is targeting a Category C level of calibration for both Static and Hybrid scenarios. For the Hybrid scenarios, the modelled data presented is the average of SRC replications with different simulation seed values.

COUNT COMPARISON	PURPOSE CATEGORY						
	A: REGIONAL	B: STRATEGIC NETWORK	C: URBAN AREA	D: NZ TRANSPORT AGENCY PROJECT	E: SMALL AREA /CORRIDOR	F: INTERSECTION / SHORT CORRIDOR	G: HIGH FLOW, SPEED, MULTI LANE
TOTAL DIRECTIONAL COUNT ACROSS SCREENLINE:							
GEH<5.0 (% OF SCREENLINES)	>60%	>75%	>85%	>90%	NA	NA	NA
GEH<7.5 (% OF SCREENLINES)	>75%	>85%	>90%	>95%	NA	NA	NA
GEH<10.0 (% OF SCREENLINES)	>90%	>95%	>95%	100%	NA	NA	NA
INDIVIDUAL DIRECTIONAL LINK COUNT ON SCREENLINES:							
GEH<5.0 (% OF COUNTS)	>65%	>80%	>85%	>87.5%	NA	NA	>90%
GEH<7.5 (% OF COUNTS)	>75%	>85%	>90%	>92.5%	NA	NA	>95%
GEH<10.0 (% OF COUNTS)	>85%	>90%	>95%	>97.5%	NA	NA	100%
GEH<12.0 (% OF COUNTS)	>95%	>95%	100%	100%	NA	NA	100%
INDIVIDUAL TURNING MOVEMENTS AND / OR DIRECTIONAL LINK COUNTS:							
GEH<5.0 (% OF TURNS)	NA	>75%	>80%	>82.5%	>85%	>95%	>85%
GEH<7.5 (% OF TURNS)	NA	>80%	>85%	>87.5%	>90%	100%	>90%
GEH<10.0 (% OF TURNS)	NA	>85%	>90%	>92.5%	>95%	100%	>95%

Figure 11: TMDG – Hourly GEH count comparison criteria

COUNT COMPARISON	PURPOSE CATEGORY						
	A: REGIONAL	B: STRATEGIC NETWORK	C: URBAN AREA	D: NZ TRANSPORT AGENCY PROJECT	E: SMALL AREA /CORRIDOR	F: INTERSECTION / SHORT CORRIDOR	G: HIGH FLOW, SPEED, MULTI LANE
TOTAL DIRECTIONAL SCREENLINE COUNTS:							
WITHIN 10% (% OF SCREENLINES)	>70%	>80%	>85%	>90%	NA	NA	NA
WITHIN 15% (% OF SCREENLINES)	>80%	>90%	>92.5%	>95%	NA	NA	NA
INDIVIDUAL DIRECTIONAL LINK COUNT ON SCREENLINES:							
<700VPH WITHIN 100VPH (% OF COUNTS)	>70%	>80%	>85%	>90%	NA	NA	>90%
700-2,700VPH WITHIN 15% (% OF COUNTS)	>70%	>80%	>85%	>90%	NA	NA	>95%
>2,700VPH WITHIN 400VPH (% OF COUNTS)	>70%	>80%	>85%	>90%	NA	NA	100%
INDIVIDUAL TURNING MOVEMENTS AND/OR DIRECTIONAL LINK COUNTS:							
<400VPH WITHIN 50VPH (% OF MOVEMENTS)	NA	>70%	>77.5%	>85%	>90%	>95%	>80%
400-2,000VPH WITHIN 12.5% (% OF MOVEMENTS)	NA	>70%	>77.5%	>85%	>90%	>95%	>80%
>2,000VPH WITHIN 250VPH (% OF MOVEMENTS)	NA	>70%	>77.5%	>85%	>90%	>95%	>80%

Figure 12: TMDG – Hourly count band comparison criteria

5.1.2 XY scatter plots

This criteria presents the observed vs modelled count scatter plots and associated R-Squared statistical results. These scatter plots compare all counts from the model and give an indication of how well the model fits the count dataset. The R Squared value and line of best fit are also compared to the TMDG criteria to give an indication of how well the trend line compares to the input count data; the closer these statistics are to 1, the better the match of the data compared.

Figure 13 lists the TMDG criteria for the R-Squared and line of best fit comparisons.

STATISTIC	PURPOSE CATEGORY						
	A: REGIONAL	B: STRATEGIC NETWORK	C: URBAN AREA	D: NZ TRANSPORT AGENCY PROJECT	E: SMALL AREA /CORRIDOR	F: INTERSECTION / SHORT CORRIDOR	G: HIGH FLOW, SPEED, MULTI LANE
R SQUARED VALUE	>0.85	>0.9	>0.95	>0.95	>0.95	>0.95	>0.95
LINE OF BEST FIT	$y=0.9x - 11x$	$y=0.9x - 11x$	$y=0.9x - 11x$	$y=0.925x - 1.075x$	$y=0.95x - 1.05x$	$y=0.97x - 1.03x$	$y=0.97x - 1.03x$

Figure 13: TMDG – Observed vs modelled count comparison XY scatter criteria

5.1.3 RMSE

This criteria presents the root mean square error (RMSE) comparisons for the model against the count data. RMSE is a measure of the predictive success of the model and is commonly referenced as providing an indication of the error of a model. The percentage RMSE is defined as:

$$\%RMSE = \sqrt{\frac{\sum(m - o)^2}{(N - 1)}} / \sum \frac{o}{N}$$

Where *m* is the modelled count, *o* is the observed count and *N* is the number of datapoints

Figure 14 shows the TMDG criteria for RMSE of different tiers.

STATISTIC	PURPOSE CATEGORY						
	A: REGIONAL	B: STRATEGIC NETWORK	C: URBAN AREA	D: NZ TRANSPORT AGENCY PROJECT	E: SMALL AREA /CORRIDOR	F: INTERSECTION / SHORT CORRIDOR	G: HIGH FLOW, SPEED, MULTI LANE
RMSE							
ACCEPTABLE	<30%	<25%	<20%	<17.5%	<15%	NA	NA
REQUIRES CLARIFICATION	30 -40%	25-35%	20-30%	17.5-27.5%	15-25%	NA	NA
UNLIKELY TO BE APPROPRIATE	>40%	>35%	>30%	>27.5%	>25%	NA	NA

Figure 14: TMDG – Observed vs modelled count comparison RMSE criteria

5.2 Link calibration results

5.2.1 Static layer link results

This section presents the static layer link GEH comparisons. While the static layer is not formally calibrated as part of the TMDG, given the Hybrid layer is dependent on input paths from the static layer, it is important to have a decent static layer calibration. The static layer calibration also serves to confirm the match of the demands prior to release profiles being applied. Table 10 and Table 11 shows the GEH for individual counts in the 4-hour static layer.

Table 10: GEH comparisons for light vehicles in static layer

Measure	Criteria	Target	AM	IP	PM
Total Directional Count Across Screenline	GEH<5	85%	100%	100%	93%
	GEH<7.5	90%	100%	100%	100%
	GEH<10	95%	100%	100%	100%
Individual Link Count on Screenlines	GEH<5	85%	81%	90%	88%
	GEH<7.5	90%	92%	98%	94%
	GEH<10	95%	100%	100%	96%
	GEH<12	100%	100%	100%	98%
Individual Link Counts	GEH<5	80%	68%	77%	87%
	GEH<7.5	85%	88%	92%	96%
	GEH<10	90%	97%	96%	98%

The majority of the GEHs for light vehicles have met the TMDG guidelines. For individual count across screenline, each of AM and PM has one criteria that does not meet the target however they are very close to the target. For individual link counts, the GEHs for AM and IP are lower than the target for GEH less than 5. This result has been considered reasonable as all the targets for total directional count across screenline have been met which is essential for the static layer. In the dynamic layer, re-routing would occur and it would be likely to change the results for the individual counts.

Table 11: GEH comparisons for heavy vehicles in static layer

Measure	Criteria	Target	AM	IP	PM
Total Directional Count Across Screenline	GEH<5	85%	71%	71%	86%
	GEH<7.5	90%	100%	100%	100%
	GEH<10	95%	100%	100%	100%
Individual Link Count on Screenlines	GEH<5	85%	92%	85%	96%
	GEH<7.5	90%	100%	96%	100%
	GEH<10	95%	100%	96%	100%
	GEH<12	100%	100%	100%	100%
Individual Link Counts	GEH<5	80%	86%	82%	92%
	GEH<7.5	85%	97%	94%	98%
	GEH<10	90%	99%	97%	99%

Most of the GEHs for heavy vehicles have met the TMDG targets, the only exception is for GEH less than 5 during AM and IP for total directional count across screenline. They both achieve 71% which is fairly close to the target.

5.2.2 Hybrid layer link results

This section includes the comparisons of:

- GEHs of link counts for light vehicles of the total 4-hour period and the middle 2-hour peak (Table 12, Table 13 and Table 14)
- Count bands of link counts for light vehicles of the total 4-hour period and the middle 2-hour peak are shown in Appendix
- GEH plots of all link counts (including across screenlines and individual ones) of light vehicles for the middle 2-hour peak
 - Full model extent (Figure 15, Figure 18 and Figure 21)
 - The Hutt CBD area (Figure 16, Figure 19 and Figure 22)
 - The Petone area (Figure 17, Figure 20 and Figure 23)
- GEHs of link counts for heavy vehicles of the total 4-hour period and the middle 2-hour peak (Table 15, Table 16 and Table 17)
- GEHs of the middle 2-hour peak counts for the screenlines (Table 18, Table 19 and Table 20)

Most of the counts have met the TMDG targets, and the brief comments are provided below each figure to point out the areas that have not meet the targets. In general:

- For light vehicles:
 - The inter-peak meets most targets
 - The areas that are not able to meet the targets are mostly for small GEH values, mostly for less than 5 and some for less than 7.5
- For heavy vehicles
 - Heavy vehicle counts have also met almost all the criteria, except for GEH less than 5

As for the GEH comparison for the directional counts across the screenlines, most of them are below 5 or just slightly above 5 for all the periods, and the worst ones are not more than 10. In general, the modelled counts across the screenlines are very well aligned with the observed counts during the middle 2-hour peak.

The green cells in the tables below indicate the results have achieved the TMDG targets, and the red cells have not passed the target. However, the light red cells mean they are very close to the target (i.e. 5% below the target).

For the criteria that the model struggle to meet, several factors contribute to the model's challenges in meeting certain calibration and validation criteria:

- **Data from Multiple Sources with Varying Confidence Levels**
 - The observed data come from various sources, including tube counts from city councils, survey data from Teams Traffic, and TMS counts from NZTA. Each source has different levels of accuracy and confidence and combining them introduces inconsistencies that affect the model's ability to match them closely.
- **Data Collected at Different Times and Seasons**
 - Traffic data were gathered during different periods and seasons, meaning some counts reflect summer conditions while others represent winter or off-peak traffic. Since the model typically represents a "typical" day or period, aligning it perfectly with all observed datasets is challenging.
- **Limitations of Static Assignment in Capturing Sharp Demand Profiles**
 - The static assignment approach models four-hour periods, ensuring consistency with the dynamic traffic assignment. This method provides several advantages in model development, particularly for interpeak and PM peak periods, by reducing discrepancies in demand processing and improving consistency in output analysis. However, it has limitations in accurately reflecting traffic profiles where demand in shoulder periods is significantly lower than in peak hours.
 - In such cases, static assignment tends to underestimate network congestion, which in turn affects route choice modelling. To mitigate this, the HAM has been set up so that only 60% of the dynamic assignment follows the static-tier path, allowing the remaining 40% to reroute dynamically in the microsimulation. This adjustment helps improve accuracy in congestion modelling, but it does not completely resolve the issue. As a result, the AM peak calibration and validation results remain less accurate than those for other periods.
 - One potential solution is to apply a peak factor to the delay functions in the static assignment, which would better reflect realistic travel costs at key turns and sections during the AM peak. However, implementing this approach requires additional calibration time.
- **Data Cleansing Limitations**
 - The survey data, particularly traffic counts, have not been fully cleansed due to limited availability of reference data. While some clearly incorrect counts have been removed, certain anomalies persist. For example, in some areas—especially in the northern suburbs and Upper Hutt—off-peak traffic volumes appear higher than peak-period volumes, which is counterintuitive. These inconsistencies contribute to high GEH values between observed and modelled counts.
 - A more thorough data cleansing process could improve the model's accuracy. However, this would require additional time and access to supplementary data sources to verify and refine the survey data. With these improvements, the model could better align with observed conditions and reduce unexplained discrepancies in the calibration and validation process.

Table 12: GEH comparisons for link counts of light vehicles in hybrid layer – AM

Measure	Criteria	Target	AM 4hour 0700-0900	AM Hour 2 0700-0800	AM Hour 3 0800-0900
Total Directional Count Across Screenline	GEH<5	85%	100%	64%	93%
	GEH<7.5	90%	100%	100%	100%
	GEH<10	95%	100%	100%	100%
Individual Link Count on Screenlines	GEH<5	85%	82%	82%	79%
	GEH<7.5	90%	98%	95%	88%
	GEH<10	95%	98%	96%	98%
	GEH<12	100%	100%	98%	100%
Individual Link Counts	GEH<5	80%	73%	62%	59%
	GEH<7.5	85%	88%	80%	76%
	GEH<10	90%	97%	89%	88%

AM has had difficulties of meeting criteria for mainly GEH less than 5, and some for GEH less than 7.5 although they are fairly close to the targets.



Figure 15: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer – full model extent – AM



Figure 16: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer - Hutt CBD - AM

The GEH values near the intersections along Melling Link indicate a strong alignment between observed and modelled counts. However, traffic volumes on the corridors east of the Queensgate Shopping Mall are notably low in both directions. Further refinement of centroid connections could help improve the GEHs in this area.



Figure 17: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer - Petone - AM

The traffic counts along the Esplanade, including the Petone interchange, generally align well with observed data. However, there is a slight underestimation on Jackson Street, which contributes to lower modelled traffic volumes on Hutt Road southbound. This discrepancy arises from the limitations of static assignment in accurately replicating peak-hour congestion on the Esplanade. The on-ramp of the Dowse interchange has significant high volumes, which would have impacts on the option testing for the CVL project.

Table 13: GEH comparisons for link counts of light vehicles in hybrid layer – IP

Measure	Criteria	Target	IP 4hour 1100-1300	IP Hour 2 1100-1200	IP Hour 3 1200-1300
Total Directional Count Across Screenline	GEH<5	85%	100%	100%	100%
	GEH<7.5	90%	100%	100%	100%
	GEH<10	95%	100%	100%	100%
Individual Link Count on Screenlines	GEH<5	85%	95%	93%	91%
	GEH<7.5	90%	98%	100%	98%
	GEH<10	95%	100%	100%	100%
	GEH<12	100%	100%	100%	100%
Individual Link Counts	GEH<5	80%	76%	70%	70%
	GEH<7.5	85%	90%	85%	85%
	GEH<10	90%	95%	92%	92%

Most of the criteria have been met during IP, except for the individual link counts for GEH less than 5.



Figure 18: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer – full model extent – IP



Figure 19: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer - Hutt CBD - IP

The overall GEHs within the Hutt CBD are low, especially the outbound directions of the corridors to the east of the Queensgate shopping mall. The counts in the west are also moderately low. This explains the travel times within this area are generally faster (i.e. routes between Harbour View and Waterloo, for the Harbour View side).



Figure 20: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer - Petone - IP

The Esplanade shows very decent GEHs along the corridor. However, Jackson St and the southbound direction of Hutt Rd lack significant volumes to match the observed counts. The travel times for the Petone/Jackson St part also suggest they are a bit too faster, although most of them meet the target, according to the routes of Cambridge Tce to Petone, and between Jackson St and Randwick Rd. Further refinement of centroid connections could help improve the GEHs in this area.

Table 14: GEH comparisons for link counts of light vehicles in hybrid layer – PM

Measure	Criteria	Target	PM 4hour 0700-0900	PM Hour 2 1600-1700	PM Hour 3 1700-1800
Total Directional Count Across Screenline	GEH<5	85%	93%	86%	93%
	GEH<7.5	90%	100%	93%	93%
	GEH<10	95%	100%	100%	100%
Individual Link Count on Screenlines	GEH<5	85%	91%	79%	91%
	GEH<7.5	90%	98%	95%	100%
	GEH<10	95%	100%	98%	100%
	GEH<12	100%	100%	100%	100%
Individual Link Counts	GEH<5	80%	89%	73%	80%
	GEH<7.5	85%	97%	88%	92%
	GEH<10	90%	99%	94%	94%

Most of the criteria have been met, except for IP which has had difficulties of meeting the criteria for GEH below 5.

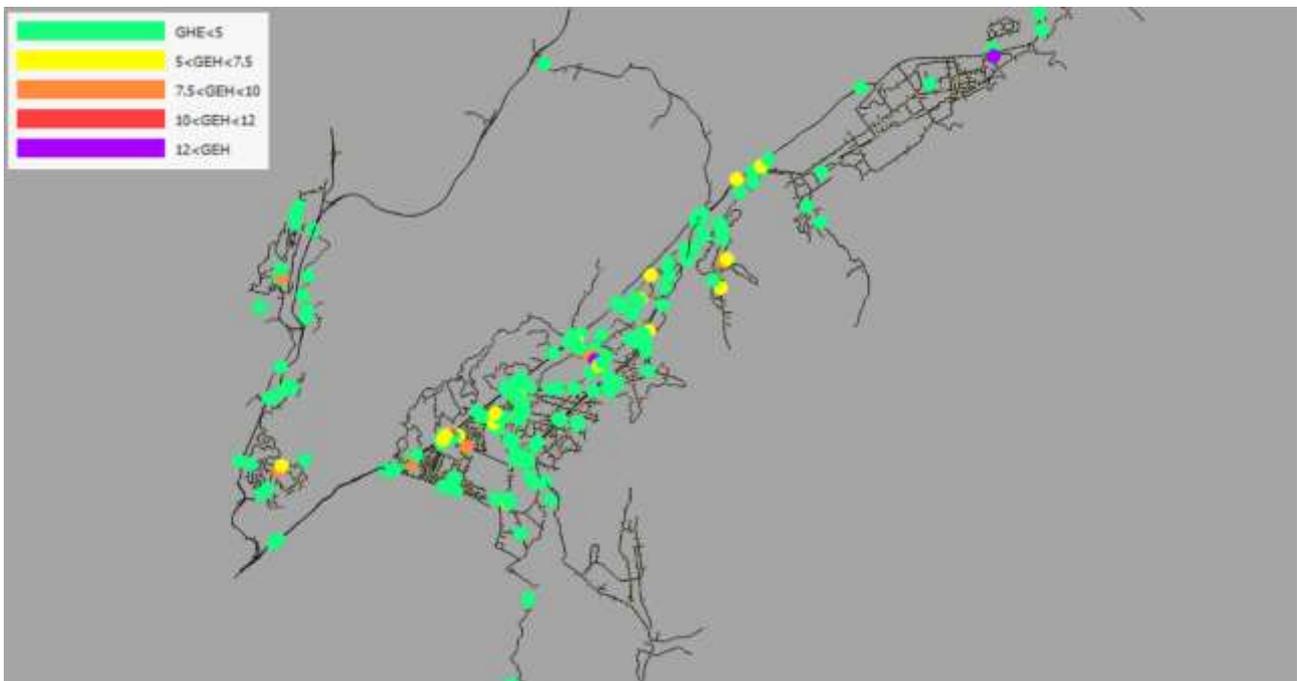


Figure 21: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer – full model extent – PM



Figure 22: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer - Hutt CBD - PM

The counts between the observed and modelled within the Hutt CBD are mostly aligned. The volumes in the northbound direction of Melling Link are slightly higher than what it should be. Other than this, all the links have GEHs lower than 7.5 in the area.



Figure 23: GEH plot of all link counts of light vehicles for the middle 2-hour peak in hybrid layer - Petone - PM

The Petone interchange and the adjacent main corridors, including The Esplanade, Hutt Rd and Jackson St. all have decent match between the observed and modelled counts.

Table 15: GEH comparisons for link counts of heavy vehicles in hybrid layer – AM

Measure	Criteria	Target	AM 4hour 0700-0900	AM Hour 2 0700-0800	AM Hour 3 0800-0900
Total Directional Count Across Screenline	GEH<5	85%	64%	57%	71%
	GEH<7.5	90%	100%	71%	100%
	GEH<10	95%	100%	100%	100%
Individual Link Count on Screenlines	GEH<5	85%	88%	84%	92%
	GEH<7.5	90%	100%	98%	100%
	GEH<10	95%	100%	100%	100%
	GEH<12	100%	100%	100%	100%
Individual Link Counts	GEH<5	80%	88%	86%	84%
	GEH<7.5	85%	99%	96%	99%
	GEH<10	90%	99%	99%	100%

Most of the criteria have been met, except for the total directional count across screenline for GEH less than 5 and 7.5.

Table 16: GEH comparisons for link counts of heavy vehicles in hybrid layer – IP

Measure	Criteria	Target	IP 4hour 1100-1300	IP Hour 2 1100-1200	IP Hour 3 1200-1300
Total Directional Count Across Screenline	GEH<5	85%	79%	79%	86%
	GEH<7.5	90%	100%	100%	100%
	GEH<10	95%	100%	100%	100%
Individual Link Count on Screenlines	GEH<5	85%	96%	96%	94%
	GEH<7.5	90%	100%	100%	100%
	GEH<10	95%	100%	100%	100%
	GEH<12	100%	100%	100%	100%
Individual Link Counts	GEH<5	80%	89%	91%	90%
	GEH<7.5	85%	99%	99%	99%
	GEH<10	90%	100%	100%	100%

Most of the criteria have been met, except for the total directional count across screenline for GEH less than 5.

Table 17: GEH comparisons for link counts of heavy vehicles in hybrid layer – PM

Measure	Criteria	Target	PM 4hour 0700-0900	PM Hour 2 1600-1700	PM Hour 3 1700-1800
Total Directional Count Across Screenline	GEH<5	85%	79%	50%	50%
	GEH<7.5	90%	100%	100%	100%
	GEH<10	95%	100%	100%	100%
Individual Link Count on Screenlines	GEH<5	85%	96%	92%	94%
	GEH<7.5	90%	100%	96%	100%
	GEH<10	95%	100%	100%	100%
	GEH<12	100%	100%	100%	100%
Individual Link Counts	GEH<5	80%	95%	93%	92%
	GEH<7.5	85%	100%	99%	100%
	GEH<10	90%	100%	100%	100%

Most of the criteria have been met, except for the total directional count across screenline for GEH less than 5.

Table 18: GEH comparisons of link counts across screenlines for light vehicles in hybrid layer – AM

Screenlines	Direction	AM Hour 2 0700-0800					AM Hour 3 0800-0900				
		Obs	Mod	Diff	% Diff	GEH	Obs	Mod	Diff	% Diff	GEH
Eastern Hills	EB	1861	1875	14	1%	0.33	2091	1841	-250	-12%	5.63
	WB	560	725	165	30%	6.53	1004	855	-149	-15%	4.90
	Total	2420	2600	180	7%	3.59	3095	2696	-399	-13%	7.41
Railway	NB	3581	3936	355	10%	5.78	4773	4496	-277	-6%	4.07
	SB	2872	3042	170	6%	3.12	3940	3703	-237	-6%	3.83
	Total	6454	6978	524	8%	6.40	8713	8199	-514	-6%	5.59
Riverbank	EB	3931	3926	-5	0%	0.07	4656	4361	-295	-6%	4.39
	WB	4047	4045	-2	0%	0.03	4065	4109	44	1%	0.69
	Total	7978	7971	-7	0%	0.07	8721	8470	-251	-3%	2.70
Fairway/Daysh	NB	1247	1431	184	15%	5.03	1809	1838	29	2%	0.68
	SB	2648	2377	-271	-10%	5.41	3095	3141	46	1%	0.82
	Total	3895	3808	-87	-2%	1.40	4904	4979	75	2%	1.06
Wainuiomata	NB	466	539	73	16%	3.26	654	575	-79	-12%	3.20
	SB	1852	1673	-179	-10%	4.27	1575	1582	7	0%	0.18
	Total	2318	2212	-106	-5%	2.24	2229	2157	-72	-3%	1.54
SH2 South	NB	2673	2410	-263	-10%	5.22	2592	2408	-184	-7%	3.69
	SB	3302	3218	-84	-3%	1.48	2983	3057	74	2%	1.35
	Total	5975	5628	-347	-6%	4.56	5575	5465	-110	-2%	1.48
SH58	NB	1145	1097	-48	-4%	1.44	875	861	-14	-2%	0.46
	SB	820	741	-79	-10%	2.83	757	791	34	5%	1.23
	Total	1965	1838	-127	-6%	2.92	1632	1652	21	1%	0.51

The majority of the GEHs of the screenlines are below 5 or near 5 during AM. Although, some links of various screenlines have the modelled counts slightly different to the observed, but most of their GEHs are only a bit above 5, and the largest is also below 7.5.

Table 19: GEH comparisons of link counts across screenlines for light vehicles in hybrid layer – IP

Screenlines	Direction	IP Hour 2 1000-1100				IP Hour 3 1100-1200					
		Obs	Mod	Diff	% Diff	GEH	Obs	Mod	Diff	% Diff	GEH
Eastern Hills	EB	763	829	66	9%	2.33	756	864	108	14%	3.80
	WB	690	751	61	9%	2.26	808	787	-21	-3%	0.74
	Total	1454	1580	126	9%	3.24	1564	1651	87	6%	2.17
Railway	NB	3132	3311	179	6%	3.15	3226	3366	140	4%	2.44
	SB	3310	3371	61	2%	1.05	3525	3454	-71	-2%	1.19
	Total	6442	6682	240	4%	2.96	6750	6820	70	1%	0.84
Riverbank	EB	3432	3507	75	2%	1.27	3571	3647	76	2%	1.27
	WB	3421	3540	119	3%	2.01	3445	3513	68	2%	1.15
	Total	6854	7047	193	3%	2.32	7016	7160	144	2%	1.71
Fairway/Daysh	NB	1377	1337	-40	-3%	1.09	1491	1305	-186	-12%	4.97
	SB	1593	1604	11	1%	0.28	1584	1528	-56	-4%	1.43
	Total	2970	2941	-29	-1%	0.53	3075	2833	-242	-8%	4.46
Wainuiomata	NB	608	677	69	11%	2.71	687	701	14	2%	0.53
	SB	646	701	55	9%	2.13	593	713	120	20%	4.71
	Total	1254	1378	124	10%	3.42	1280	1414	134	11%	3.66
SH2 South	NB	2044	2103	59	3%	1.29	2122	2201	79	4%	1.70
	SB	1998	2124	126	6%	2.78	2041	2213	172	8%	3.73
	Total	4042	4227	185	5%	2.87	4163	4414	251	6%	3.83
SH58	NB	425	407	-18	-4%	0.86	428	403	-25	-6%	1.22
	SB	419	399	-20	-5%	0.97	451	423	-28	-6%	1.34
	Total	843	806	-37	-4%	1.29	879	826	-53	-6%	1.81

The modelled counts for IP are all very well aligned with the observed counts, as the GEHs of all the screenlines are below 5.

Table 20: GEH comparisons of link counts across screenlines for light vehicles in hybrid layer – PM

Screenlines	Direction	PM Hour 2 1600-1700				PM Hour 3 1600-1700					
		Obs	Mod	Diff	% Diff	GEH	Obs	Mod	Diff	% Diff	GEH
Eastern Hills	EB	1030	1223	193	19%	5.75	1140	1474	334	29%	9.23
	WB	1635	1554	-81	-5%	2.04	1818	1667	-151	-8%	3.62
	Total	2665	2777	112	4%	2.14	2958	3141	183	6%	3.31
Railway	NB	4376	4326	-50	-1%	0.76	3968	4166	198	5%	3.10
	SB	4750	4938	188	4%	2.71	4449	4586	137	3%	2.04
	Total	9126	9264	138	2%	1.44	8417	8752	335	4%	3.62
Riverbank	EB	5028	4993	-35	-1%	0.49	4901	4924	23	0%	0.32
	WB	4696	4894	198	4%	2.86	4212	4324	112	3%	1.71
	Total	9724	9887	163	2%	1.65	9114	9248	134	1%	1.40
Fairway/Daysh	NB	2681	2572	-109	-4%	2.13	2475	2583	108	4%	2.16
	SB	2344	2362	18	1%	0.37	2162	2051	-111	-5%	2.42
	Total	5025	4934	-91	-2%	1.29	4637	4634	-3	0%	0.04
Wainuiomata	NB	1811	1681	-130	-7%	3.12	1639	1628	-11	-1%	0.26
	SB	828	737	-91	-11%	3.25	712	647	-65	-9%	2.49
	Total	2639	2418	-221	-8%	4.40	2351	2275	-76	-3%	1.57
SH2 South	NB	3287	3082	-205	-6%	3.63	2775	2922	147	5%	2.76
	SB	2910	2841	-69	-2%	1.28	2609	2465	-144	-6%	2.87
	Total	6197	5923	-274	-4%	3.52	5384	5387	3	0%	0.04
SH58	NB	923	810	-113	-12%	3.84	829	784	-45	-5%	1.58
	SB	1101	860	-241	-22%	7.70	906	847	-59	-7%	1.99
	Total	2024	1670	-354	-18%	8.24	1735	1631	-104	-6%	2.54

Most of the GEHs of the screenlines are below 5 or near 5. However, the eastbound direction of the Eastern Hills screenline and the southbound direction of the SH58 screenline are within the GEH of 7.5-10 band. The modelled counts for the eastbound direction of the Eastern Hills screenline are slightly higher than the observed for both peak hours.

5.2.3 Observed vs modelled count XY scatter plots

This section presents the observed vs modelled count scatter plots and associated R-Squared statistical results for the link counts of the light vehicles. Figure 24, Figure 25 and Figure 26 present the R-squared comparisons and the line of best fit results in hybrid level for each period, respectively.

Of all the periods, R-squared value is larger than 0.95 and the line of best fit is within the range of 0.9x-1.1x. They are all complied with the requirements stated in TMDG.

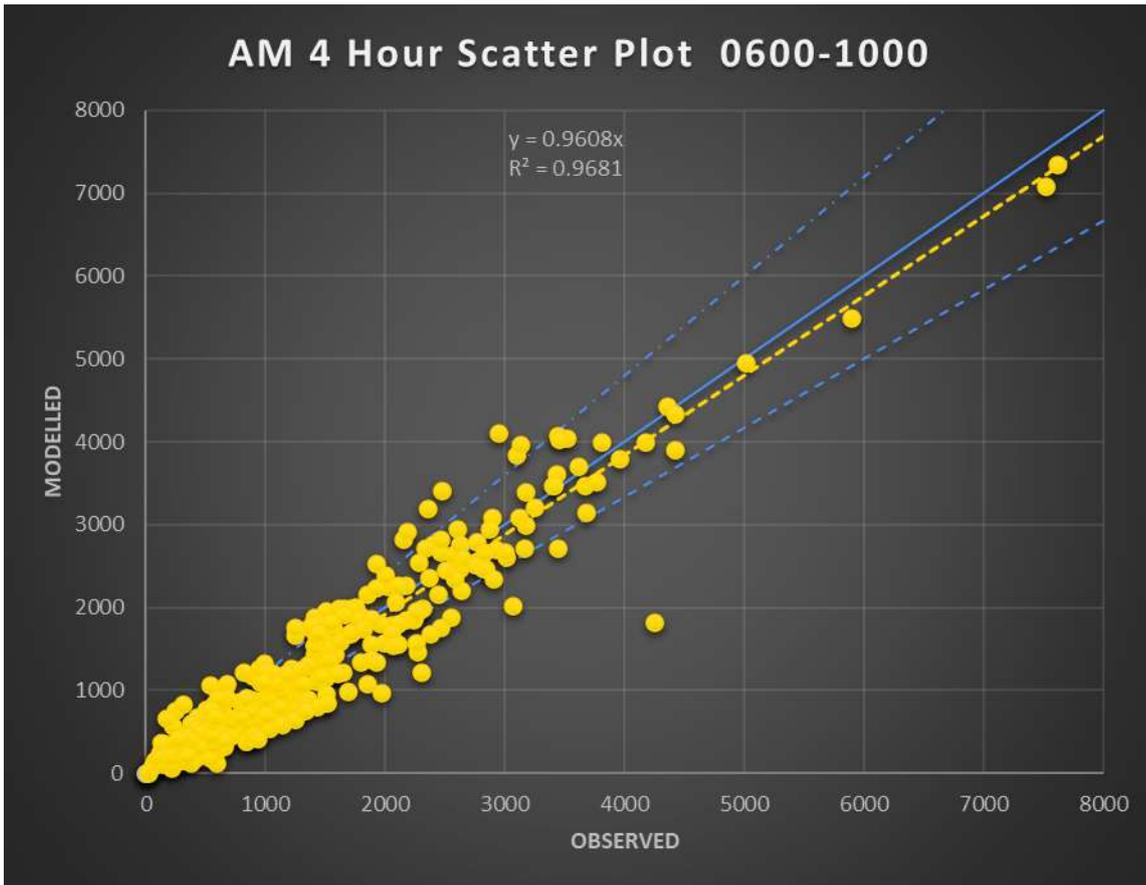


Figure 24: XY scatter plot for link counts of light vehicles in hybrid layer – AM

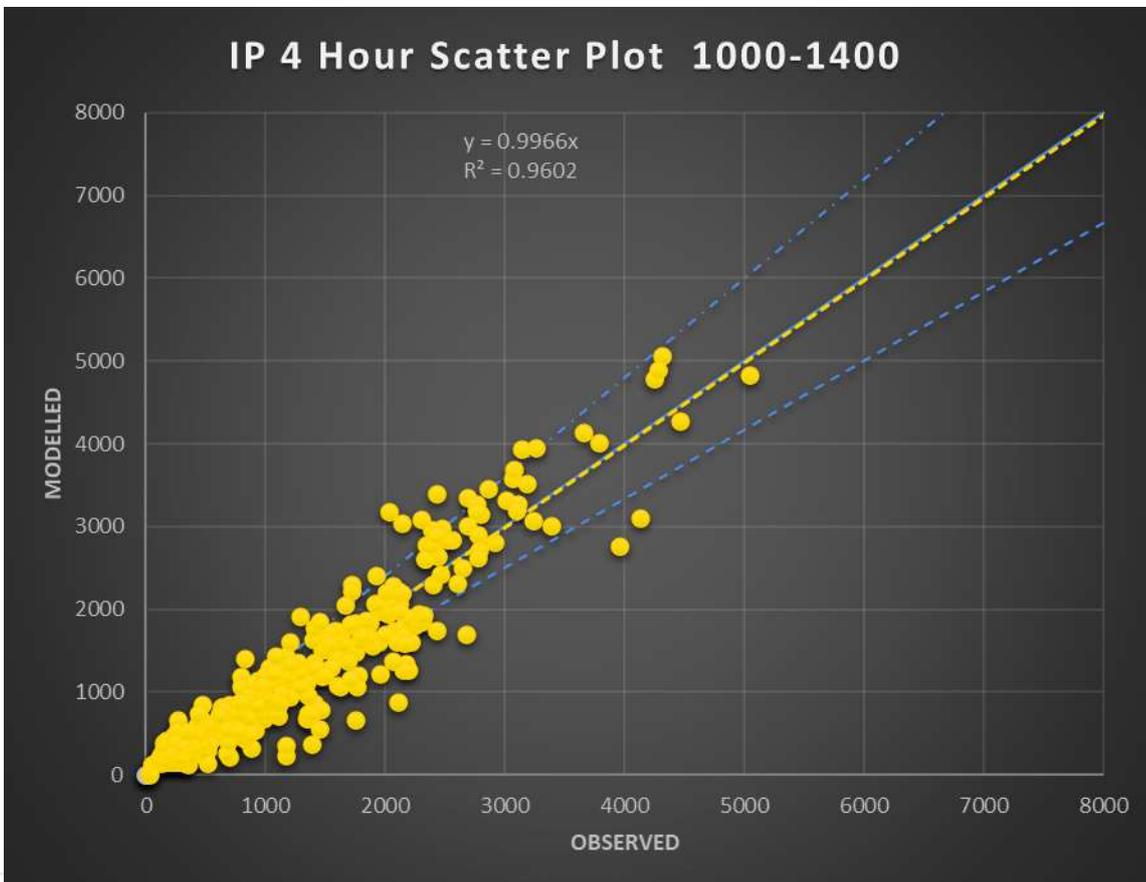


Figure 25: XY scatter plot for link counts of light vehicles in hybrid layer – IP

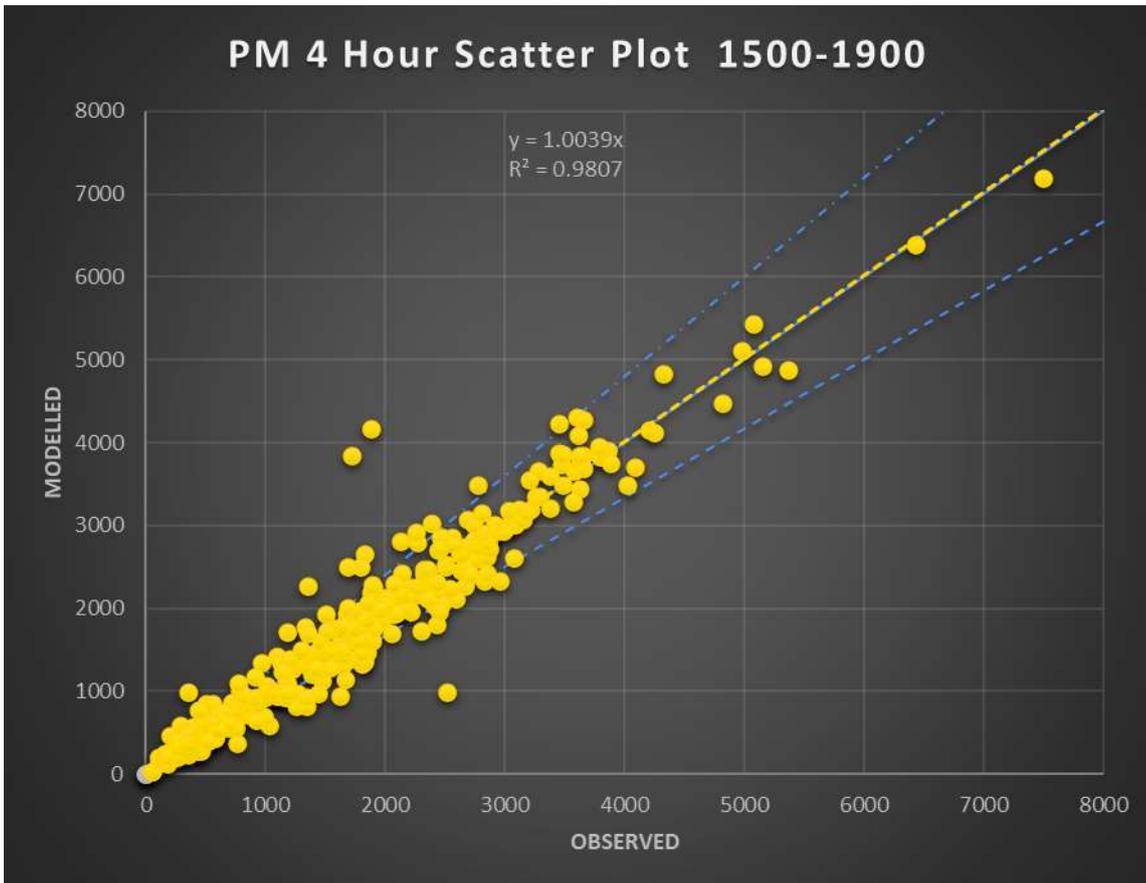


Figure 26: XY scatter plot for link counts of light vehicles in hybrid layer – PM

5.2.4 Observed vs modelled root mean square error

Table 21 presents the RMSE of the counts in hybrid layer across the time periods. Only PM are below (or near) 20% which is acceptable, and most of the other hours need clarification.

Table 21: RMSE of link counts for light vehicles in hybrid layer

%RMSE	4hour	Hour 2	Hour 3
AM	24%	29%	29%
IP	26%	28%	27%
PM	18%	21%	19%

The higher-than-expected RMSE in the model calibration is mainly due to challenges with the observed data used for validation for the reasons are explained in 5.2.2, including:

- Data from different sources with varying confidence
- Data Collected at Different Times and Seasons
- Inconsistent data durations
- Mismatch between data and model timeframes

5.3 Turn count validation results

The turn count data set was not used in the matrix estimation process and can therefore be considered a somewhat independent data set, accepting the fact that some of the link counts from which the turn counts are derived will have been used in the calibration process.

Therefore the results outlined below should be interpreted in this context.

5.3.1 Hybrid layer turn results

This section includes the comparisons of:

- GEHs of turn counts for light vehicles of the total 4-hour period and the middle 2-hour peak (Table 22, Table 23 and Table 24)
- GEHs of turn counts for heavy vehicles of the total 4-hour period and the middle 2-hour peak (Table 25, Table 26 and Table 27)

The turn validation results have been found hard to meet the targets for the low GEH values and low volumes. As for the criteria for GEH less than 7.5, most of them are able to achieve more than 80% which is quite close to the target.

Table 22: GEH comparisons for turn counts of light vehicles in hybrid layer – AM

Measure	Criteria	Target	AM 4hour 0700-0900	AM Hour 2 0700-0800	AM Hour 3 0800-0900
Individual Turn Counts	GEH<5	80%	71%	68%	60%
	GEH<7.5	85%	87%	83%	73%
	GEH<10	90%	96%	94%	85%

Table 23: GEH comparisons for turn counts of light vehicles in hybrid layer – IP

Measure	Criteria	Target	IP 4hour 1100-1300	IP Hour 2 1100-1200	IP Hour 3 1200-1300
Individual Turn Counts	GEH<5	80%	62%	66%	59%
	GEH<7.5	85%	82%	83%	79%
	GEH<10	90%	93%	95%	89%

Table 24: GEH comparisons for turn counts of light vehicles in hybrid layer – PM

Measure	Criteria	Target	PM 4hour 0700-0900	PM Hour 2 1600-1700	PM Hour 3 1700-1800
Individual Turn Counts	GEH<5	80%	82%	75%	64%
	GEH<7.5	85%	89%	89%	78%
	GEH<10	90%	94%	94%	89%

For heavy vehicles, all the turn counts have meet the GEH and count band criteria.

Table 25: GEH comparisons for turn counts of heavy vehicles in hybrid layer – AM

Measure	Criteria	Target	AM 4hour 0700-0900	AM Hour 2 0700-0800	AM Hour 3 0800-0900
Individual Turn Counts	GEH<5	80%	94%	95%	87%
	GEH<7.5	85%	99%	99%	99%
	GEH<10	90%	100%	99%	100%

Table 26: GEH comparisons for turn counts of heavy vehicles in hybrid layer – IP

Measure	Criteria	Target	IP 4hour 1100-1300	IP Hour 2 1100-1200	IP Hour 3 1200-1300
Individual	GEH<5	80%	95%	96%	96%
Turn	GEH<7.5	85%	100%	99%	99%
Counts	GEH<10	90%	100%	100%	100%

Table 27: GEH comparisons for turn counts of heavy vehicles in hybrid layer – PM

Measure	Criteria	Target	PM 4hour 0700-0900	PM Hour 2 1600-1700	PM Hour 3 1700-1800
Individual	GEH<5	80%	96%	94%	89%
Turn	GEH<7.5	85%	100%	100%	99%
Counts	GEH<10	90%	100%	100%	100%

5.3.2 Observed vs modelled count XY scatter plots

This section presents the observed vs modelled count scatter plots and associated R-Squared statistical results for the turn counts of the light vehicles. Figure 24, Figure 25 and Figure 26 present the R-squared comparisons and the line of best fit results in hybrid level for each period, respectively.

Of all the periods, the R-squared values are all slightly below 0.95 as the target (0.92, 0.89 and 0.93 for each period, respectively), but the line of best fit is within the range of 0.9x-1.1x.

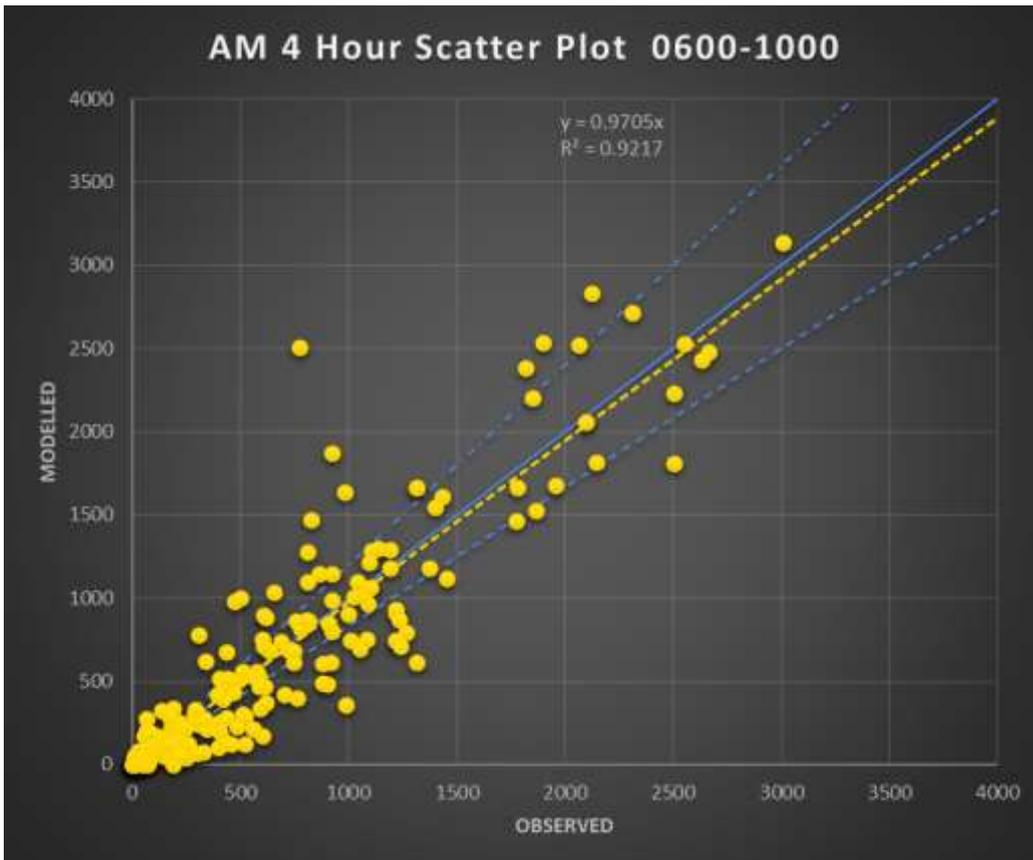


Figure 27: XY scatter plot for turn counts of light vehicles in hybrid layer – AM

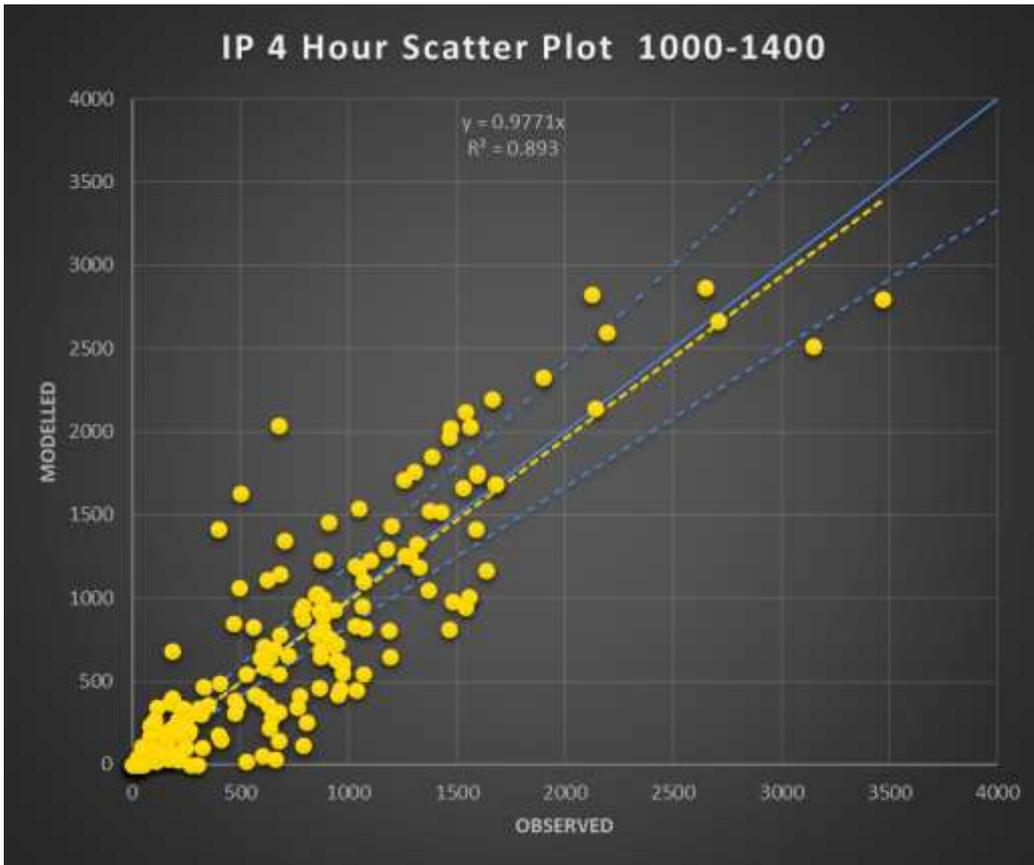


Figure 28: XY scatter plot for turn counts of light vehicles in hybrid layer – IP

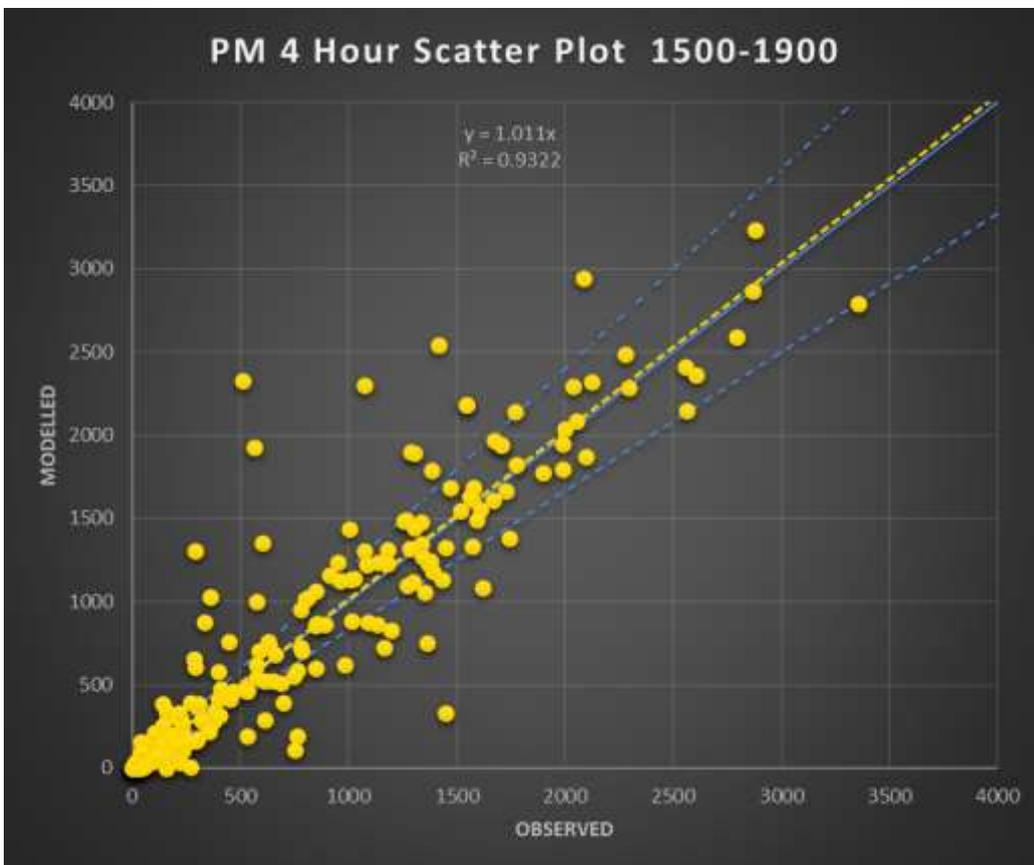


Figure 29: XY scatter plot for turn counts of light vehicles in hybrid layer – PM

5.3.3 Observed vs modelled root mean square error

Table 28 presents the RMSE of the counts in hybrid layer across the time periods. All the RMSE of the counts fall out of the target window. The failing is due to the similar reason for the link counts RMSE, as well as the turn counts have only been used for validation, therefore they have not been focused on during the calibration process.

Table 28: RMSE of turn counts for light vehicles in hybrid layer

%RMSE	4hour	Hour 2	Hour 3
AM	41%	41%	68%
IP	46%	41%	60%
PM	38%	35%	53%

5.4 Travel time validation results

Vehicle travel time data was obtained from TomTom Traffic Stats for September 2024 over 11 pairs of routes. The extraction of the travel time data is documented in TN 1 – Data Collection. Figure 30 shows the locations of the routes and each route has both directions.

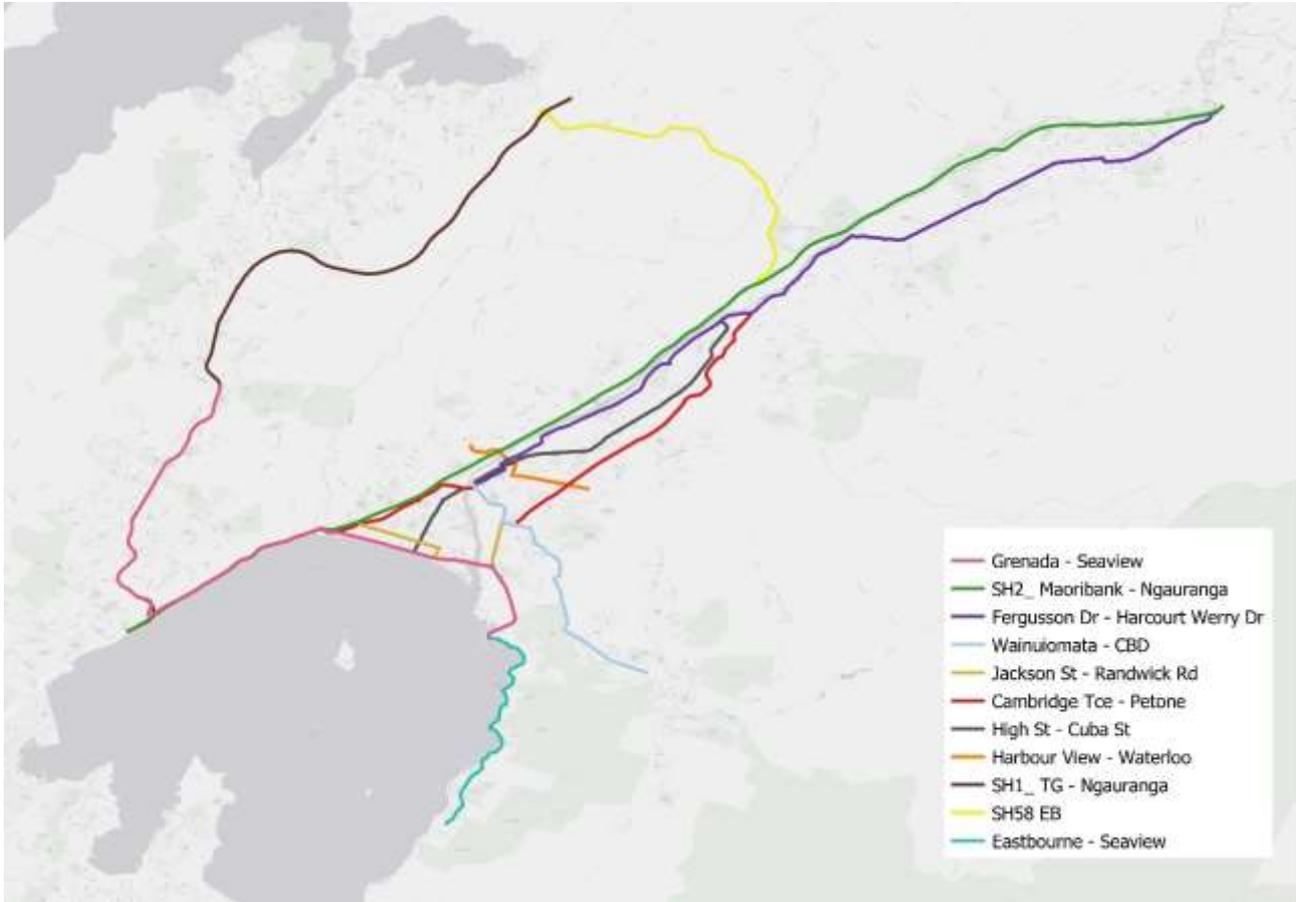


Figure 30: Locations of the travel time routes

Figure 31 shows the acceptability levels for comparing the total observed and modelled directional travel times provided by TMDG.

TOTAL ROUTE DIRECTIONAL PEAK JOURNEY TIME	PURPOSE CATEGORY						
	A: REGIONAL	B: STRATEGIC NETWORK	C: URBAN AREA	D: NZ TRANSPORT AGENCY PROJECT	E: SMALL AREA /CORRIDOR	F: INTERSECTION / SHORT CORRIDOR	G: HIGH FLOW, SPEED, MULTI LANE
WITHIN 15% OR 1 MINUTE (IF HIGHER) (% OF ROUTES)	>80%	>85%	>85%	>87.5%	>90%	>90%	>90%
WITHIN 25% OR 1.5 MINUTES (IF HIGHER) (% OF ROUTES)	>85%	>90%	>90%	>92.5%	>95%	100%	100%

Figure 31: Locations of the travel time routes

The Tier 1 criteria considers the travel time is acceptable if the difference between the observed and modelled is within 15% or 1 minute. Table 29 listed the performance of each route for the middle 2-hour peak of each period. Both hours of IP and the 1st hours of PM well pass the target which is 85%, the rest are fairly close to the target. However, the 2nd hour of AM has 8 routes (out of 22 routes) failed meeting the target, being the worst performance.

Table 29: Criteria Tier 1 for travel time comparisons

Routes	AM (7-8)	AM (8-9)	IP (11-12)	IP (12-1)	PM (4-5)	PM (5-6)
Grenada - Seaview	Fail	Pass	Pass	Pass	Pass	Pass
Seaview - Grenada	Pass	Pass	Pass	Pass	Pass	Pass
SH2: Maoribank - Ngauranga	Fail	Pass	Pass	Pass	Pass	Pass
SH2: Ngauranga - Maoribank	Pass	Fail	Pass	Pass	Pass	Pass
Fergusson Dr - Harcourt Werry Dr	Pass	Pass	Pass	Pass	Pass	Fail
Harcourt Werry Dr - Fergusson Dr	Pass	Pass	Pass	Pass	Pass	Fail
Wainuiomata - CBD	Pass	Fail	Pass	Pass	Pass	Pass
CBD - Wainuiomata	Pass	Fail	Pass	Pass	Pass	Fail
Jackson St - Randwick Rd	Pass	Pass	Pass	Pass	Pass	Pass
Randwick Rd - Jackson St	Fail	Fail	Pass	Pass	Pass	Pass
Cambridge Tce - Petone	Pass	Fail	Pass	Pass	Pass	Pass
Petone - Cambridge Tce	Pass	Pass	Pass	Pass	Pass	Pass
High St - Cuba St	Pass	Fail	Pass	Pass	Pass	Pass
Cuba St - High St	Pass	Pass	Pass	Pass	Pass	Pass
Harbour View - Waterloo	Pass	Pass	Fail	Fail	Pass	Fail
Waterloo - Harbour View	Pass	Fail	Fail	Fail	Pass	Pass
SH1: TG - Ngauranga	Fail	Pass	Pass	Pass	Pass	Pass
SH1: Ngauranga - TG	Pass	Pass	Pass	Pass	Pass	Pass
SH58 EB	Pass	Pass	Pass	Pass	Pass	Pass
SH58 WB	Pass	Pass	Pass	Pass	Pass	Pass
Eastbourne - Seaview	Pass	Fail	Pass	Fail	Pass	Pass
Seaview - Eastbourne	Pass	Pass	Pass	Pass	Fail	Fail
Target	85%					
% of routes	82%	64%	91%	86%	95%	77%

The Tier 2 criteria considers the travel time is acceptable if the difference between the observed and modelled is within 25% or 1.5 minute. Table 30 shows the passing percentage for the middle 2-hour peak of each period, as the overall results pass the target of 90%. Most of hours have all the routes achieving the Tier 2 criteria.

Table 30: Criteria Tier 2 for travel time comparisons

	AM (7-8)	AM (8-9)	IP (11-12)	IP (12-1)	PM (4-5)	PM (5-6)
Target	90%					
% of routes	100%	95%	95%	100%	100%	100%

The travel time difference between the observed and modelled is shown in Figure 32, for each route and for the middle 2-hour peak. The ones failed for the Tier 1 criteria are pointed in light blue. The travel time profiles for each route and period are attached in Appendix B. The findings are as follows:

- Most (17) of the failed ones have the modelled times faster than the observed times (i.e. negative values), whereas only 6 are slower (i.e. positive values)
- Regardless the acceptability of the results, the modelled times of most of the routes are also faster than the observed times
- The most significant differences are also being too fast (i.e. SH2: Maoribank – Ngauranga and Cambridge Tce – Petone routes)

- SH2: Maoribank – Ngauranga (during 7-8 am): the modelled time is perfectly aligned with the observed time for the first 4 km, and then it starts get fast without having to delay much at the intersections, meaning the congestions for the early traffic along the southbound direction of SH2 have not been built properly.
- Cambridge Tce – Petone (during 8-9 am): the most of the route is well matched until the Petone roundabout where there has been a significant delay in the observed time, but the modelled time indicates the condition is free-flowing.
- Waterloo – Harbour View routes has 3 hours that do not meet the target
 - Waterloo – Harbour View (and the opposite direction for both hours in IP) – the travel time comparisons suggest the fast part happens at the Harbour View side (i.e. Hutt CBD) but well matched at the Waterloo side. That means the delays within the Hutt CBD have been underestimated. The counts comparisons for IP suggest the modelled counts are all lower than the observed within the CBD area, therefore delays have been able to build up. The other reasons for the underestimated delays could be caused by some activities occurred on the streets, such as zebra crossings and parking movements. Given the Hutt CBD is highly densed commercial area, those activities are very common during lunch time. But, there is no available data for these activities to be taken into calibration.
- Randwick Rd – Jackson St (too fast), CBD – Wainuiomata (too fast), Harbour View – Waterloo (too fast), Eastbourne – Seaview (too fast) and Seaview – Eastbourne (too slow) routes have 2 hours that do not meet the target
 - Randwick Rd – Jackson St (both hours in AM) – the travel times get faster only along Jackson St. As the main landuse on either side of Jackson St is commercial and the multiple provisions of zebra crossings introduce the frequent delays due to the pedestrian crossings. Although this feature has been applied along Jackson St in the model, the pedestrian related data was not available for calibration. Additionally, the delays triggered at the zebra crossing are fairly random, therefore the level of difficulty to calibrate the zebra crossings is high.

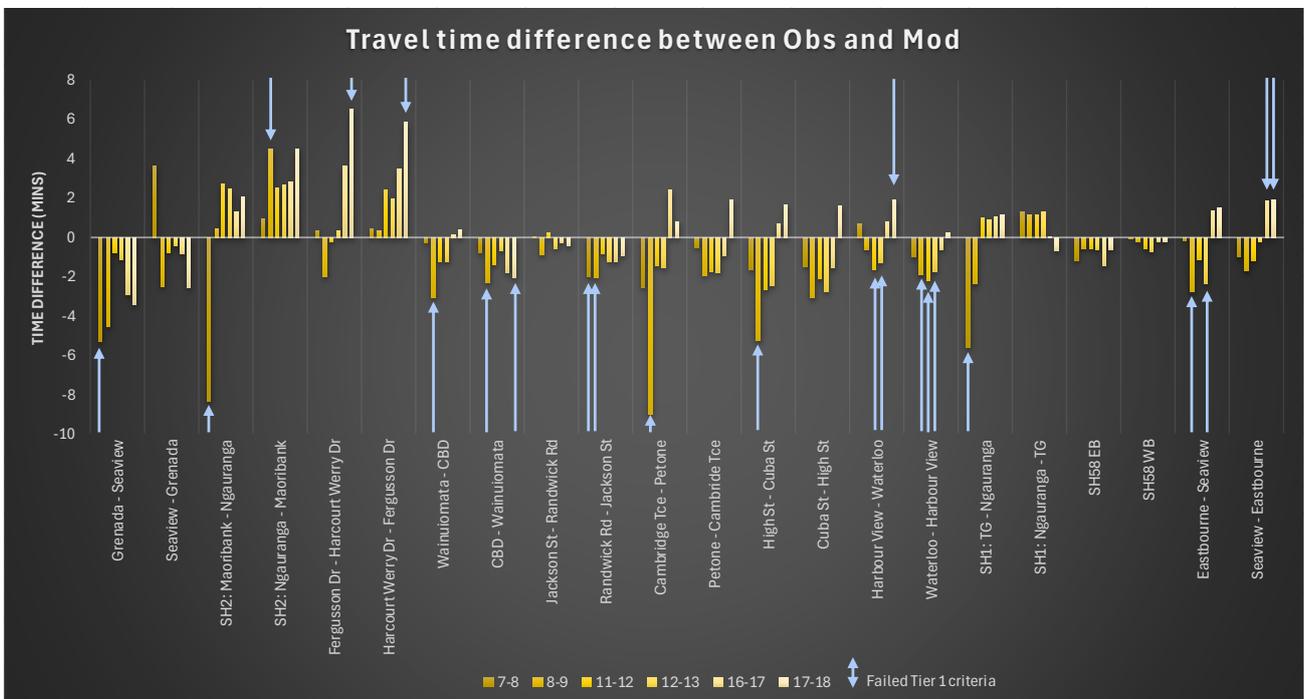


Figure 32: Travel time differences for each route

6. Summary

This report has presented the results of the calibration and validation process of HAM. In general, the calibrated model is considered fit for the purpose of HAM. The model can be used to design and assess significant transport interventions such as P2G and CVL. It is also suitable for some option testing within the Hutt City area and the adjacent State Highways, including but not limited to assessments for operational improvements, the potential network impacts relating to the construction of transport projects, and to investments in public transport and active modes, as well as for development proposals. However, there are also a number of measurements that are below the TMDG targets. These limitations and risks should be noted and aware of when HAM is being used for any future model interpretation, and careful analysis should be undertaken accordingly to the nature and/or the location of the projects.

The list below summarises the key findings and limitations during the comparison of the model results against the TMDG criteria, and what/how they could affect the future model interpretation:

- As only the link counts have been used for calibration, the comparison results for link counts are more reliable than the turn counts. The reliable link counts would be helpful for interpretation of routing assignment with an area. As the confidence in the turn counts is relatively weak, and they are likely more associated with the performance of a single intersection (or a couple of adjacent ones), other modelling tools may be more useful for this purpose.
- Since the data has been compared in separate vehicle classes, heavy vehicle has achieved more targets due to its low volumes. However, light vehicles have higher volumes and more complexity to be calibrated accurately.
- As for the link counts comparisons, screenline-related counts generally have a good match between the observed and modelled counts. The GEH comparisons for screenline counts for the middle 2-hour peak demonstrate a very reliable match as the most of them meet the target of GEH less than 5.
- But the individual counts are slightly weak in terms of meeting the criteria. This indicates that the operation of traffic moving into and out of the Lower Hutt area has high confidence. Nevertheless, the level of reliability of the individual links should be considered according to the locations of the projects. For example, the Riverlink project is located near the Melling interchange and some part of the Hutt CBD; and P2G and CVL projects would take place around the Petone area. The performance of the counts and travel times in these areas would have different significance based on the impact of the particular projects.
- The common trend has found there has been some difficulties of meeting lower GEH, however with the majority of them are able to meet the targets for the high GEH. This trend is also found in other models in the Wellington Region, that achieving criteria for the low targets would require much more efforts into calibration process and data cleansing.
- Among the three peak periods, IP is the outstandingly reliable one as it consistently has good alignment between the observed and modelled results for most of criteria. However, several worst matches (i.e. GEHs over 12) are also located in the Petone (Jackson St) area. It has fairly high importance for the P2G and CVL project. Careful consideration and analysis will be required while interpreting the messages the model express for these and similar projects.
- Although only 3 out of all 6 hours (the middle 2-hour peak for all periods) of the travel times well pass the Tier 1 target which is 85%, the rest are fairly close to the target. All of them achieved the Tier 2 criteria very confidently.
- The most of modelled travel times are faster than the observed times. The most significantly faster routes are SH2: Maoribank – Ngauranga and Cambridge Tce – Petone. This could be caused by insufficient counts along the route, and/or some activities that would potentially delay the traffic (i.e. zebra crossings and parking manoeuvres) have not been fully taken into account, however there are no particular available data for these behaviours to be calibrated against to. The possible places are the Hutt CBD and the Jackson St corridor. Projects that involve these locations should take these factors into consideration.

Appendix A

Count Related Comparisons

The following tables and figures contain the GEH comparisons and XY scatter plots for each hour of the peak periods, for link and turn counts, and for light and heavy vehicles.



May 2025 | Status: Final |

Our ref: TN4 - HAM Calibration and Validation Report - FINAL.docx

Screenline	Direction	AM Hour 0700-0900					AM Hour 1 0600-0700					AM Hour 2 0700-0800					AM Hour 3 0800-0900					AM Hour 4 0900-1000				
		Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH
Eastern Hills	EB	3,951	3,716	-235	-6%	2.69	814	872	58	7%	2.00	1,861	1,875	14	1%	0.33	2,091	1,841	-250	-12%	5.63	1,062	1,080	18	2%	0.56
	WB	1,564	1,580	16	1%	0.29	186	349	163	88%	6.99	560	725	165	30%	6.53	1,004	855	-149	-15%	4.90	719	705	-14	-2%	0.54
	Total	5,515	5,296	-219	-4%	2.11	1,000	1,221	221	22%	6.46	1,420	2,600	1180	7%	3.99	3,095	2,696	-399	-15%	7.41	1,781	1,785	4	0%	0.10
Railway	EB	8,355	8,432	77	1%	0.60	1,826	2,278	452	25%	3.98	3,581	3,936	355	10%	5.76	4,773	4,496	-277	-6%	4.07	3,241	3,688	347	10%	5.85
	WB	6,812	6,745	-67	-1%	0.58	1,407	1,613	206	15%	5.30	2,872	3,042	170	6%	3.12	3,940	3,703	-237	-6%	3.83	3,282	2,990	-292	-9%	5.22
	Total	15,167	15,177	10	0%	0.06	3,233	3,891	656	20%	10.99	6,454	6,978	524	8%	6.40	8,713	8,199	-514	-6%	5.95	6,623	6,678	55	1%	0.68
Riverbank	EB	8,586	8,287	-299	-3%	2.30	1,838	2,022	184	10%	4.19	3,931	3,926	-5	0%	0.07	4,656	4,361	-295	-6%	4.39	3,586	3,391	-195	-5%	3.30
	WB	8,112	8,154	42	1%	0.33	2,833	3,131	298	11%	5.45	4,047	4,045	-2	0%	0.03	4,065	4,109	44	1%	0.69	3,454	3,224	-221	-6%	3.82
	Total	16,698	16,441	-257	-2%	1.41	4,671	5,153	482	10%	6.87	7,978	7,971	-7	0%	0.07	8,721	8,470	-251	-3%	2.70	7,030	6,615	-415	-6%	5.03
Fairway/Daysh	NB	3,056	3,269	213	7%	2.68	660	753	93	14%	3.49	1,247	1,431	184	15%	5.03	1,809	1,838	29	2%	0.68	1,600	1,607	7	0%	0.10
	SB	5,743	5,538	-205	-4%	2.12	1,493	1,244	-249	-16%	6.49	2,648	2,377	-271	-10%	5.41	3,095	3,141	46	1%	0.80	1,863	2,163	300	16%	6.60
	Total	8,799	8,807	8	0%	0.09	2,143	1,997	-146	-7%	3.20	3,895	3,808	-87	-2%	1.40	4,904	4,979	75	2%	1.06	3,296	3,763	467	14%	7.86
Wainulomata	NB	1,120	1,114	-6	-1%	0.13	256	331	75	30%	4.40	466	338	-128	-37%	3.26	654	575	-79	-12%	3.20	585	494	-91	-16%	3.93
	SB	3,427	3,255	-172	-5%	2.11	1,354	1,276	-78	-6%	2.16	1,852	1,673	-179	-10%	4.27	1,575	1,582	7	0%	0.18	838	1,011	173	21%	5.68
	Total	4,547	4,369	-178	-4%	1.89	1,610	1,607	-3	0%	0.07	2,318	2,212	-106	-5%	2.24	2,229	2,157	-72	-3%	1.54	1,424	1,505	81	6%	2.13
SH2 South	NB	5,265	4,818	-447	-9%	4.45	1,465	1,471	6	0%	0.15	2,673	2,410	-263	-10%	5.22	2,592	2,420	-174	-7%	3.69	1,991	2,041	50	3%	1.11
	SB	6,285	6,275	-10	0%	0.09	2,704	2,821	117	4%	2.72	3,630	3,218	-412	-11%	4.48	2,983	3,057	74	2%	1.55	2,262	2,242	-18	-1%	0.38
	Total	11,550	11,093	-457	-4%	3.04	4,170	4,292	122	3%	1.88	5,975	5,628	-347	-6%	4.56	5,575	5,465	-110	-2%	1.48	4,253	4,283	32	1%	0.49
SH58	NB	2,020	1,958	-62	-3%	0.98	513	711	198	38%	3.82	1,145	1,097	-48	-4%	1.44	875	861	-14	-2%	0.46	608	547	-61	-10%	2.53
	SB	1,577	1,532	-45	-3%	0.80	541	473	-68	-13%	3.03	820	741	-79	-10%	2.83	757	791	34	5%	1.23	520	592	72	14%	3.07
	Total	3,597	3,490	-107	-3%	1.27	1,154	1,184	30	3%	0.88	1,965	1,838	-127	-6%	2.92	1,632	1,652	21	1%	0.51	1,128	1,139	12	1%	0.34

Directional counts on screenlines GEH - light vehicles - hybrid layer- AM

ID	Screenline ID	Screenline	Direction	Location	AM Hour 0700-0900					AM Hour 1 0600-0700					AM Hour 2 0700-0800					AM Hour 3 0800-0900					AM Hour 4 0900-1000					
					Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	
S1.1	875851	Eastern Hills	EB	Koroara Rd Bridge - SB	375	363	-12	-3%	0.61	87	97	10	11%	0.92	192	241	49	26%	2.00	200	203	3	1%	0.61	154	8	5%	0.56		
S1.2	875850	Eastern Hills	WB	Koroara Rd Bridge - NB	380	362	-18	-5%	0.66	51	166	115	226%	2.11	180	208	28	16%	2.04	200	154	-46	-23%	3.48	131	100	-31	-24%	2.91	
S1.1	875918	Eastern Hills	WB	Doune Dr - SB	1,837	1,643	-194	-11%	1.50	282	219	-63	-22%	1.13	505	515	10	2%	0.46	515	501	-14	-3%	0.76	273	276	3	1%	0.56	
S1.2	875919	Eastern Hills	WB	Doune Dr - NB	260	314	54	21%	2.26	45	73	28	62%	1.63	102	140	38	38%	3.49	158	174	16	10%	1.12	164	144	-20	-13%	1.58	
S1.1	875859	Eastern Hills	EB	Normandale Rd - SB	451	414	-37	-8%	1.32	73	333	260	347%	4.73	185	210	25	14%	1.78	266	202	-64	-24%	4.16	129	122	-7	-5%	0.62	
S1.2	875920	Eastern Hills	WB	Normandale Rd - NB	158	114	-44	-28%	1.67	18	243	225	1250%	6.88	56	59	3	5%	2.82	161	80	-81	-50%	4.71	62	77	15	24%	0.47	
S1.1	875936	Eastern Hills	EB	Harbour View Rd - SB	307	216	-91	-30%	1.97	46	666	620	4	0%	0.55	161	115	-46	-29%	3.18	145	101	-44	-31%	1.99	66	58	-8	-12%	1.02
S1.2	875935	Eastern Hills	WB	Harbour View Rd - NB	109	98	-11	-10%	3.08	10	666	656	0%	0.15	88	238	150	171%	4.18	53	39	-14	-26%	2.02	51	31	-20	-39%	3.04	
S1.1	875937	Eastern Hills	WB	Trotroara Rd - SB	281	144	-137	-49%	1.78	14	279	265	14	5%	0.78	138	117	-21	-15%	1.52	160	136	-24	-18%	3.97	70	0	0%	0.00	
S1.2	875938	Eastern Hills	WB	Trotroara Rd - NB	162	152	-10	-6%	0.56	3	333	330	3	1%	5.30	30	65	35	114%	5.02	132	87	-45	-34%	4.27	58	73	15	25%	1.81
S1.1	875939	Eastern Hills	WB	Hill Rd - SB	233	286	53	23%	2.33	39	99	60	77%	4.08	94	100	6	6%	1.07	139	136	-3	-2%	0.26	72	77	5	7%	0.62	
S1.2	875921	Eastern Hills	WB	Hill Rd - NB	113	137	24	21%	1.54	6	333	332	26	8%	0.86	25	96	71	284%	4.07	88	81	-7	-8%	0.78	85	86	1	1%	0.67
S1.1	875970	Eastern Hills	EB	Major Dr - SB	408	317	-91	-22%	3.22	14	333	330	3	1%	1.54	205	170	-35	-17%	2.58	203	151	-52	-25%	3.88	92	90	-2	-2%	0.17
S1.2	875971	Eastern Hills	WB	Major Dr - NB	92	114	22	24%	1.56	25	333	331	2	0%	1.08	31	47	16	53%	2.82	161	67	94	56%	0.75	62	77	15	24%	0.47
S1.1	875972	Eastern Hills	EB	Major Dr - SB	176	808	632	359%	1.65	19	667	207	7	4%	0.51	421	383	-38	-9%	0.91	455	423	-32	-7%	1.70	218	244	26	12%	2.42
S1.2	875973	Eastern Hills	WB	Major Dr - NB	290	303	13	4%	0.52	28	63	35	125%	5.18	80	130	50	63%	4.88	210	173	-37	-18%	2.70	116	155	39	34%	3.68	
S1.1	875910	Railway	NB	Hurt Rd Overbridge - NB	144	147	3	2%	0.60	12	243	232	-11	-5%	4.20	370	344	-26	-7%	3.28	443	545	102	23%	4.58	462	393	-69	-15%	3.45
S1.2	875911	Railway	SB	Hurt Rd Overbridge - SB	1,452	1,619	167	12%	1.01	367	333	-34	-9%	0.45	673	711	38	5%	2.18	779	888	109	14%	1.78	802	773	-29	-4%	1.02	
S1.1	875912	Railway	NB	Cuba St Bridge - NB	1,262	1,297	35	3%	0.79	271	333	62	22%	3.82	594	588	-6	-1%	1.06	669	729	60	9%	2.28	547	559	12	2%	0.51	
S1.2	875913	Railway	SB	Cuba St Bridge - SB	1,133	1,023	-110	-10%	2.37	125	246	121	97%	8.88	444	465	21	5%	0.97	689	658	-31	-4%	2.24	533	476	-57	-11%	3.32	
S1.1	875906	Railway	NB	Ludlum Cres from White Lines RAB	2,178	2,361	183	8%	2.02	724	727	3	0%	9.18	1150	212	23%	6.56	1,240	1,111	-129	-11%	0.83	777	953	176	23%	5.98		
S1.2	875907	Railway	SB	Ludlum Cres Approach	1,537	1,443	-94	-6%	1.78	399	391	-8	-2%	0.60	700	644	-56	-8%	2.18	810	799	-11	-1%	0.39	657	680	23	4%	2.27	
S1.1	875860	Railway	NB	Waterloo Rd Bridge - WB	1,846	1,497	-349	-19%	4.04	346	666	320	92%	5.11	783	677	-106	-14%	3.25											

Screenline	Direction	IP Hour 1100-1300					IP Hour 1 1000-1200					IP Hour 2 1100-1200					IP Hour 3 1200-1300					IP Hour 4 1300-1400				
		Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH
Eastern Hills	EB	1,519	1,653	134	9%	2.37	782	767	-15	-2%	0.53	763	808	45	6%	1.59	756	845	89	12%	3.15	716	785	69	10%	2.51
	WB	1,498	1,470	-28	-2%	0.52	602	691	89	15%	3.43	690	709	19	3%	0.71	808	761	-47	-6%	1.68	818	775	-43	-5%	1.52
	Total	3,016	3,123	107	3%	1.95	1,384	1,458	74	5%	1.96	1,454	1,517	63	4%	1.64	1,564	1,606	42	3%	1.06	1,534	1,560	26	2%	0.65
Railway	NB	6,358	6,553	195	3%	1.72	2,987	3,077	90	3%	1.64	3,132	3,263	131	4%	2.32	3,236	3,200	-36	-1%	1.12	3,077	3,369	292	9%	5.14
	SB	6,835	6,710	-125	-2%	1.07	3,068	2,225	-843	-28%	0.43	2,310	3,355	25	1%	0.43	3,525	3,375	-150	-4%	2.55	3,437	3,404	-33	-1%	0.56
	Total	13,193	13,263	70	1%	0.43	6,055	6,302	247	4%	3.14	6,442	6,598	156	2%	1.93	6,750	6,665	-85	-1%	1.04	6,514	6,773	259	4%	3.18
Riverbank	EB	7,003	6,993	-10	0%	0.08	3,270	3,343	73	2%	1.28	3,342	3,454	112	3%	1.37	3,571	3,539	-32	-1%	0.53	3,670	3,608	-62	-2%	1.03
	WB	6,866	6,754	-112	-2%	0.96	3,089	3,164	75	2%	1.34	3,421	3,388	-33	-1%	0.57	3,445	3,366	-79	-2%	1.35	3,369	3,419	50	1%	0.86
	Total	13,869	13,747	-122	-1%	0.74	6,359	6,507	148	2%	1.85	6,854	6,842	-12	0%	0.14	7,016	6,905	-111	-2%	1.33	7,039	7,027	-12	0%	0.14
Fairway/Daysh	NB	2,868	2,534	-334	-12%	4.54	1,298	1,198	-100	-8%	2.83	1,277	1,264	-13	-1%	0.86	3,111	4,091	980	31%	5.94	3,127	1,258	-269	-18%	7.21
	SB	3,177	3,236	59	2%	1.84	1,577	1,605	28	2%	0.78	1,593	1,678	85	5%	2.12	1,584	1,648	64	4%	1.58	1,595	1,612	17	1%	0.42
	Total	6,045	5,860	-185	-3%	1.70	2,875	2,804	-71	-2%	1.32	2,970	2,942	-28	-1%	0.52	3,075	2,918	-157	-5%	2.87	3,222	2,970	-252	-8%	4.61
Wainuiomata	NB	1,295	1,378	83	6%	1.60	525	641	116	22%	4.80	608	676	68	11%	2.67	687	702	15	2%	0.57	727	714	-13	-2%	0.48
	SB	1,238	1,308	142	11%	2.77	668	604	-64	-10%	2.54	646	683	37	6%	1.45	503	697	104	18%	4.11	628	749	121	19%	4.62
	Total	2,533	2,786	225	9%	3.09	1,193	1,245	52	4%	1.49	1,254	1,359	105	8%	2.91	1,280	1,399	119	9%	3.26	1,355	1,463	108	8%	2.88
SH2 South	NB	4,166	4,297	131	3%	1.42	1,882	2,016	134	7%	3.04	2,044	2,103	59	3%	1.29	2,122	2,194	72	3%	1.55	2,158	2,188	30	1%	0.65
	SB	4,039	4,139	100	2%	1.11	2,014	1,911	-103	-5%	2.33	1,998	2,055	57	3%	1.27	2,041	2,084	43	2%	0.95	2,017	2,174	157	8%	3.43
	Total	8,205	8,436	231	3%	1.79	3,896	3,927	31	1%	0.56	4,042	4,158	116	3%	1.81	4,163	4,278	115	3%	1.77	4,175	4,362	187	4%	2.87
SH58	NB	852	804	-48	-6%	1.19	404	447	47	10%	2.18	425	404	-21	-5%	1.03	498	400	-98	-24%	1.37	451	450	-1	0%	0.04
	SB	870	837	-33	-4%	0.79	425	408	-17	-4%	0.83	419	407	-12	-3%	0.57	451	430	-21	-5%	1.00	487	393	-94	-19%	4.47
	Total	1,722	1,641	-81	-5%	1.40	829	855	26	3%	2.16	843	811	-32	-4%	1.12	879	830	-49	-6%	1.67	938	843	-95	-10%	3.17

Directional counts on screenlines GEH- light vehicles - hybrid layer- IP

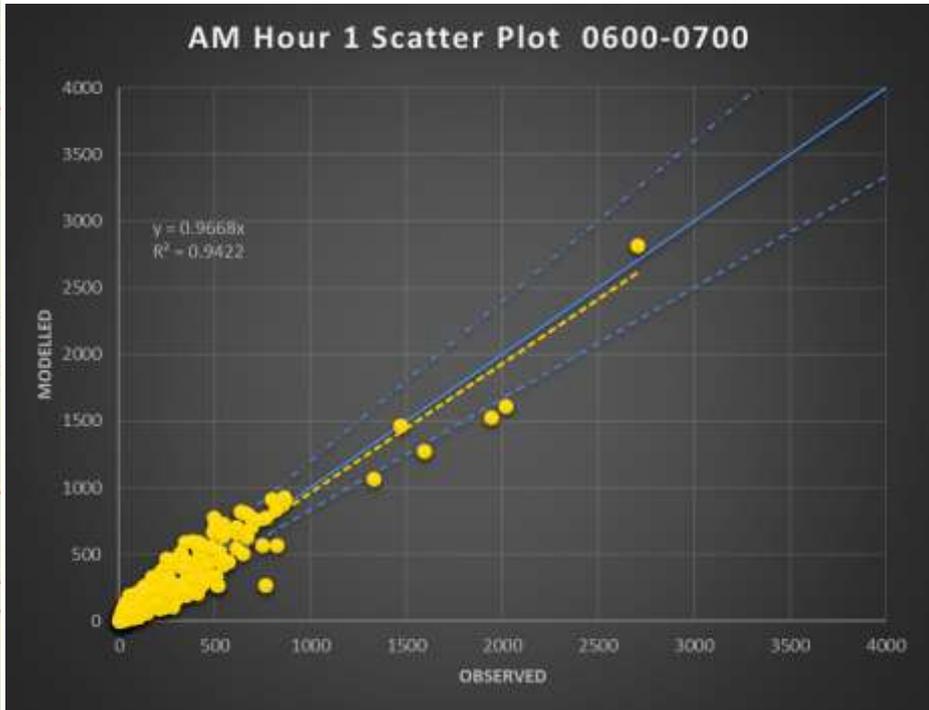
ID	Screenline	Direction	Location	IP Hour 1100-1300					IP Hour 1 1000-1200					IP Hour 2 1100-1200					IP Hour 3 1200-1300					IP Hour 4 1300-1400					
				Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	
S1_1	8758550 Eastern Hills	EB	Korokoro Rd Bridge - SB	279	271	-8	-3%	0.58	119	133	17	8%	0.6	136	100	-6	-4%	0.32	153	151	-2	-1%	0.42	135	147	12	9%	1.61	
S1_2	8758540 Eastern Hills	WB	Korokoro Rd Bridge - NB	213	226	13	6%	0.80	97	116	19	20%	1.84	89	106	17	20%	1.76	135	130	-5	-4%	0.42	117	133	6	5%	0.55	
S1_1	8758515 Eastern Hills	EB	Dowse Dr - SB	383	441	58	15%	2.58	184	167	-17	-9%	0.83	185	213	28	15%	2.08	178	228	50	28%	3.51	183	205	43	23%	3.19	
S1_2	8758185 Eastern Hills	WB	Dowse Dr - NB	380	405	25	6%	0.86	147	133	-15	-8%	2.02	182	193	11	6%	0.78	198	212	14	7%	0.88	200	205	5	3%	0.35	
S1_1	8758500 Eastern Hills	EB	Normanville Rd - SB	181	171	-10	-6%	0.57	82	90	8	10%	0.86	77	85	8	11%	0.83	84	86	2	2%	0.32	70	86	16	23%	1.81	
S1_2	8758520 Eastern Hills	WB	Normanville Rd - NB	129	143	14	11%	1.88	68	66	-2	-3%	0.44	100	78	-22	-22%	0.48	100	78	-22	-22%	0.48	88	78	-10	-11%	0.16	
S1_1	8759365 Eastern Hills	EB	Harbour View Rd - SB	183	183	0	0%	1.01	56	63	7	13%	2.22	51	40	-11	-18%	1.21	47	40	-7	-14%	1.01	47	39	-8	-17%	1.22	
S1_2	8759365 Eastern Hills	WB	Harbour View Rd - NB	107	80	-27	-25%	2.00	58	66	8	14%	0.21	51	40	-11	-22%	1.83	36	40	4	16%	0.99	236	53	11	2%	0.42	
S1_1	8759261 Eastern Hills	EB	Tirohanga Rd - SB	109	109	0	0%	1.01	56	63	7	13%	2.22	51	40	-11	-18%	1.21	47	40	-7	-14%	1.01	47	39	-8	-17%	1.22	
S1_2	9951428 Eastern Hills	WB	Tirohanga Rd - NB	106	133	27	26%	1.77	43	66	27	63%	1.88	47	64	17	36%	2.38	59	69	10	18%	1.29	57	65	8	14%	1.02	
S1_1	8759261 Eastern Hills	EB	Hill Rd - SB	85	151	66	78%	4.38	46	66	20	43%	2.58	44	67	23	52%	4.78	41	69	28	68%	3.78	34	70	36	94%	4.44	
S1_2	8759223 Eastern Hills	WB	Hill Rd - NB	81	114	33	41%	2.39	32	48	16	50%	2.53	39	56	17	44%	2.47	42	58	16	39%	2.31	44	51	7	16%	1.01	
S1_1	8759787 Eastern Hills	EB	Park Rd - SB	155	112	-43	-28%	2.63	70	73	3	4%	2.90	88	54	-34	-39%	4.04	67	58	-9	-13%	1.14	77	45	-32	-41%	4.06	
S1_2	8759787 Eastern Hills	WB	Park Rd - NB	141	89	-52	-37%	3.49	63	66	3	5%	2.88	66	41	-25	-38%	3.38	75	48	-27	-36%	3.48	86	43	-43	-50%	5.39	
S1_1	8759730 Eastern Hills	EB	Major Dr - SB	279	305	26	9%	1.08	157	141	-16	-10%	1.31	142	151	9	7%	0.77	137	154	17	12%	1.38	144	131	-13	-9%	0.91	
S1_2	8759730 Eastern Hills	WB	Major Dr - NB	287	274	-13	-4%	0.53	113	207	141	28	24%	2.46	133	138	5	4%	0.43	154	136	-18	-11%	1.47	173	159	-14	-8%	1.06
S1_1	8759180 Eastern Hills	NB	Hutt Rd Overbridge - NB	1,237	1,309	82	7%	1.15	522	667	145	28%	2.49	571	681	112	20%	1.47	666	745	50	7%	1.88	651	671	20	3%	0.37	
S1_2	8759180 Eastern Hills	SB	Hutt Rd Overbridge - SB	1,418	1,380	-38	-3%	0.92	586	645	63	4%	1.70	694	680	-14	-2%	0.53	724	700	-24	-3%	0.91	659	711	52	8%	2.00	
S1_1	8759180 Eastern Hills	NB	Cuba St Bridge - NB	1,095	1,082	-13	-1%	0.57	520	506	-14	-3%	1.11	520	583	63	12%	1.50	540	549	9	2%	0.16	447	571	141	30%	4.09	
S1_2	8431278 Eastern Hills	SB	Cuba St Bridge - SB	1,331	1,198	-133	-10%	2.44	576	592	16	3%	0.48	637	612	-25	-4%	0.68	688	586	-102	-15%	4.27	692	600	-92	-13%	0.60	
S1_1	8759068 Eastern Hills	NB	Ludlow Cres from White Lines RAB	1,436	1,468	32	2%	0.59	696	882	144	21%	2.03	727	716	-11	-2%	0.41	709	752	43	6%	1.59	661	784	123	19%	4.58	
S1_2	8759068 Eastern Hills	SB	Ludlow Cres Approach	1,425	1,508	203	14%	3.70	610	744	134	22%	5.18	692	791	99	14%	1.64	713	837	104	15%	3.76	745	807	62	8%	2.23	
S1_1	8758553 Eastern Hills	NB	Waturoo Rd Bridge - WB	1,043	939	-104	-10%	2.34	525	435	-90	-17%	4.11	534	486	-48	-9%	2.12	509	453	-56	-11%	3.37	483	420	-23	-5%	1.04	
S1_2	8758553 Eastern Hills	SB	Waturoo Rd Bridge - EB	1,115	891	-224	-20%	5.02	463	333	-145	-9%	0.44	532	456	-76	-14%	0.43	583	445									

Screenline	Direction	PM Hour 1600-1800					PM Hour 1 1500-1600					PM Hour 2 1600-1700					PM Hour 3 1700-1800					PM Hour 4 1800-1900				
		Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH
Eastern Hills	EB	2,170	2,697	527	24%	7.55	1,089	1,145	56	5%	1.77	1,030	1,223	193	19%	5.75	1,140	1,474	334	29%	9.23	866	1,027	161	19%	5.23
	WB	3,453	3,221	-232	-7%	2.84	1,392	1,308	-84	-6%	2.67	1,659	1,554	-105	-6%	2.04	1,818	1,667	-151	-8%	3.62	1,275	1,257	-18	3%	0.98
	Total	5,623	5,918	295	5%	2.74	2,481	2,453	-28	-1%	0.56	2,689	2,777	88	3%	2.14	2,958	3,141	183	6%	3.34	2,089	2,284	195	9%	4.18
Railway	NB	8,345	8,492	147	2%	1.14	3,953	4,135	182	5%	0.12	4,376	4,336	-40	-1%	0.76	3,959	4,155	196	5%	3.10	2,890	3,178	288	10%	5.24
	SB	9,398	9,524	126	1%	2.38	4,455	4,585	130	3%	2.15	4,750	4,938	188	4%	2.71	4,449	4,586	137	3%	2.04	3,864	3,624	-240	-6%	4.39
	Total	17,543	18,016	473	3%	2.51	8,415	8,338	-77	-1%	0.84	9,126	9,264	138	2%	1.44	8,417	8,752	335	4%	3.62	6,254	6,802	548	9%	6.78
Riverbank	EB	9,929	9,917	-12	0%	0.09	4,615	4,583	-33	-1%	0.49	5,028	4,993	-35	-1%	0.49	4,901	4,924	23	0%	0.32	3,530	3,931	401	11%	6.57
	WB	8,908	9,218	310	3%	2.30	4,368	4,485	117	3%	1.76	4,976	4,894	-82	-2%	0.84	4,212	4,324	112	3%	1.71	3,238	3,449	211	7%	3.65
	Total	18,837	19,135	298	2%	1.53	8,984	9,068	84	1%	0.88	9,724	9,887	163	2%	1.65	9,114	9,248	134	1%	1.40	6,776	7,380	613	9%	7.28
Fairway/Daysh	NB	5,156	5,155	-1	0%	0.01	2,313	2,544	231	10%	4.68	2,681	2,572	-109	-4%	2.13	2,475	2,583	108	4%	2.16	1,680	2,062	382	23%	8.83
	SB	4,506	4,423	-83	-2%	0.99	2,139	2,080	-59	-3%	1.27	2,344	2,262	-82	-4%	0.37	2,162	2,051	-111	-5%	2.43	1,495	1,730	235	16%	5.05
	Total	9,662	9,578	-84	-1%	0.68	4,452	4,624	172	4%	2.56	5,025	4,934	-91	-2%	1.29	4,637	4,634	-3	0%	0.04	3,175	3,792	617	19%	10.45
Wainuiomata	NB	3,450	3,309	-141	-4%	1.71	1,330	1,380	50	4%	1.37	1,811	1,681	-130	-7%	3.12	1,639	1,628	-11	-1%	0.26	1,007	1,166	159	16%	4.83
	SB	1,540	1,384	-156	-10%	2.88	715	656	-59	-8%	2.27	828	737	-91	-11%	3.25	712	647	-65	-9%	2.49	576	571	-5	-1%	0.21
	Total	4,990	4,693	-297	-6%	3.02	2,045	2,036	-9	0%	0.20	2,639	2,418	-221	-8%	4.40	2,351	2,275	-76	-3%	1.57	1,583	1,737	154	10%	3.79
SH2 South	NB	6,062	6,004	-58	-1%	0.52	3,060	3,020	-40	-1%	0.73	3,287	3,082	-205	-6%	3.63	2,775	2,922	147	5%	2.76	2,337	2,336	-1	0%	0.03
	SB	5,519	5,306	-213	-4%	2.05	2,580	2,514	-66	-3%	0.70	2,910	2,841	-69	-2%	1.28	2,609	2,465	-144	-6%	2.87	1,872	2,004	132	7%	3.00
	Total	11,581	11,310	-271	-2%	1.79	5,440	5,534	94	2%	1.26	6,197	5,923	-274	-4%	3.52	5,384	5,387	3	0%	0.04	4,209	4,340	131	3%	2.00
SH58	NB	1,752	1,594	-158	-9%	2.73	689	668	-21	-3%	0.82	923	810	-113	-12%	3.84	829	794	-35	-5%	1.58	394	559	165	42%	7.54
	SB	2,007	1,707	-300	-15%	4.93	756	799	43	6%	1.53	1,101	860	-241	-22%	7.70	906	847	-59	-7%	1.90	412	656	244	59%	10.54
	Total	3,759	3,301	-458	-12%	5.45	1,446	1,467	21	1%	0.56	2,024	1,670	-354	-18%	8.24	1,735	1,631	-104	-6%	2.54	807	1,215	408	51%	12.84

Directional counts on screenlines GEH - light vehicles - hybrid layer- PM

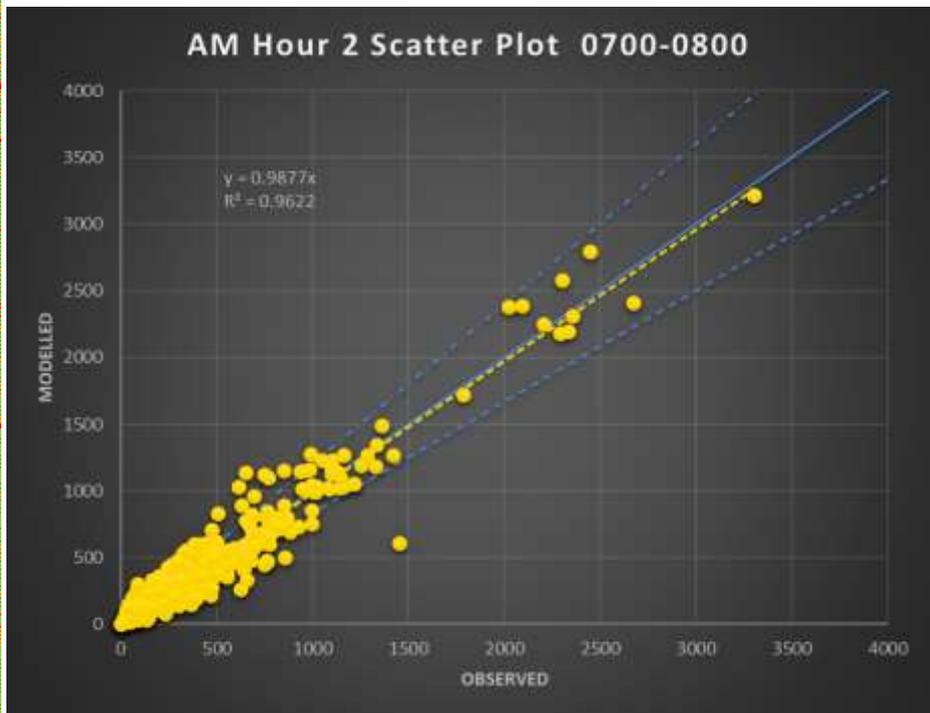
ID	Screenline	Direction	Location	PM Hour 1600-1800					PM Hour 1 1500-1600					PM Hour 2 1600-1700					PM Hour 3 1700-1800					PM Hour 4 1800-1900					
				Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	
S1_1	8758550 Eastern Hills	EB	Korokoro Rd Bridge - SB	463	526	63	14%	1.89	119	126	7	6%	1.27	241	209	-32	-13%	0.74	242	317	75	31%	4.29	341	315	-26	-8%	0.84	
S1_2	8758540 Eastern Hills	WB	Korokoro Rd Bridge - NB	342	433	91	27%	3.77	145	133	-12	-8%	1.17	170	200	30	18%	2.31	172	233	61	35%	4.29	107	155	48	45%	4.19	
S1_1	8758515 Eastern Hills	EB	Douay Dr - SB	512	737	225	44%	6.08	242	267	25	10%	1.58	226	242	16	7%	1.08	286	395	109	38%	5.58	214	233	19	9%	1.25	
S1_2	8758189 Eastern Hills	WB	Douay Dr - NB	954	860	-94	-10%	2.21	331	371	40	12%	2.14	453	408	-45	-10%	3.15	502	452	-50	-10%	2.27	335	331	-4	-1%	0.35	
S1_1	8758509 Eastern Hills	EB	Normanside Rd - SB	236	233	-3	-1%	0.99	108	667	130	20%	1.95	98	114	16	16%	1.52	137	119	-18	-13%	1.36	107	103	-4	-4%	0.39	
S1_2	8758623 Eastern Hills	WB	Normanside Rd - NB	438	433	-5	-1%	0.98	166	667	151	23%	1.95	98	114	16	16%	1.52	137	119	-18	-13%	1.36	107	103	-4	-4%	0.39	
S1_1	8759365 Eastern Hills	EB	Harbour View Rd - SB	129	154	25	19%	1.49	58	78	20	34%	2.48	61	76	15	24%	1.77	68	78	10	15%	1.31	60	64	4	7%	0.51	
S1_2	8759366 Eastern Hills	WB	Harbour View Rd - NB	237	160	-77	-33%	3.86	68	667	65	94	34%	3.72	113	83	-30	-27%	3.06	134	77	-57	-38%	4.66	85	62	-23	-27%	2.72
S1_1	8759263 Eastern Hills	EB	Tirohanga Rd - SB	136	228	92	67%	2.49	105	83	-22	-22%	2.27	65	111	46	71%	4.90	71	117	46	64%	6.91	61	54	-7	-11%	1.86	
S1_2	8759142 Eastern Hills	WB	Tirohanga Rd - NB	237	143	-94	-40%	4.88	118	667	68	51	43%	5.24	106	70	-36	-34%	3.84	131	79	-52	-44%	5.77	84	16	-19%	1.80	
S1_1	8759269 Eastern Hills	EB	Hill Rd - SB	113	216	103	91%	5.66	95	88	-7	-7%	0.78	58	96	38	65%	2.08	55	29	-26	-48%	6.56	45	116	71	156%	3.69	
S1_2	8759723 Eastern Hills	WB	Hill Rd - NB	174	170	-4	-2%	0.23	60	648	69	22	24%	2.42	81	87	6	7%	0.62	93	83	-10	-11%	1.07	69	71	2	3%	0.24
S1_1	8759787 Eastern Hills	EB	Park Rd - SB	167	181	14	8%	0.75	76	333	77	1	1%	0.08	80	81	1	1%	0.07	87	100	13	15%	1.38	95	70	-25	-26%	2.72
S1_2	8759780 Eastern Hills	WB	Park Rd - NB	388	307	-81	-21%	3.08	156	333	231	25	16%	2.18	175	163	-12	-7%	1.74	219	154	-65	-30%	4.84	117	128	11	9%	2.47
S1_1	8759720 Eastern Hills	EB	Major Dr - SB	395	422	27	7%	0.89	211	667	205	6	3%	0.39	200	194	-6	-3%	0.40	195	228	33	17%	2.35	150	156	6	4%	0.51
S1_2	8759720 Eastern Hills	WB	Major Dr - NB	682	715	33	5%	0.89	284	333	282	2	1%	0.14	339	343	4	1%	0.24	343	373	29	8%	1.54	268	296	28	11%	1.69
S1_1	8759180 Eastern Hills	NB	Hutt Rd Overbridge - NB	1,831	1,831	0	0%	1.00	900	900	0	0%	1.00	900	900	0	0%	1.00	900	900	0	0%	1.00	900	900	0	0%	1.00	
S1_2	8759180 Eastern Hills	SB	Hutt Rd Overbridge - SB	1,350	1,605	255	19%	6.64	666	974	676	9	1%	0.35	616	808	192	31%	7.21	634	797	163	26%	6.08	539	572	33	6%	1.39
S1_1	8759180 Eastern Hills	NB	Cuba St Bridge - NB	1,112	1,271	159	14%	2.25	517	568	170	33%	3.08	539	662	123	23%	3.01	573	609	36	6%	1.49	438	462	24	5%	1.12	
S1_2	8432748 Eastern Hills	SB	Cuba St Bridge - SB	1,671	1,233	-438	-26%	6.19	775	594	-610	-66	-11%	6.29	977	664	-313	-31%	6.84	569	125	-18%	4.97	509	488	-21	-4%	0.94	
S1_1	8759066 Eastern Hills	NB	Ludlow Cres from White Lines RAB	2,092	1,867	-225	-11%	3.58	861	881	20	2%	0.68	1,145	967	-178	-16%	5.48	947	900	-47	-5%	1.55	672	704	32	5%	1.22	
S1_2	8759066 Eastern Hills	SB	Ludlow Cres Approach	1,862	2,108	246	13%	3.00	919	927	8	1%	0.56	934	1078	144	15%	4.54	938	1000	102	11%	3.26	842	761	-81	-10%	2.86	
S1_1	8758659 Eastern Hills	NB	Waturoo Rd Bridge - WB	1,270	1,281	11	1%	0.22	560	310	594	-66	-10%	2.65	644	671	27	4%	1.07	626	610	-16	-3%	0.64	493	445	-48	-10	

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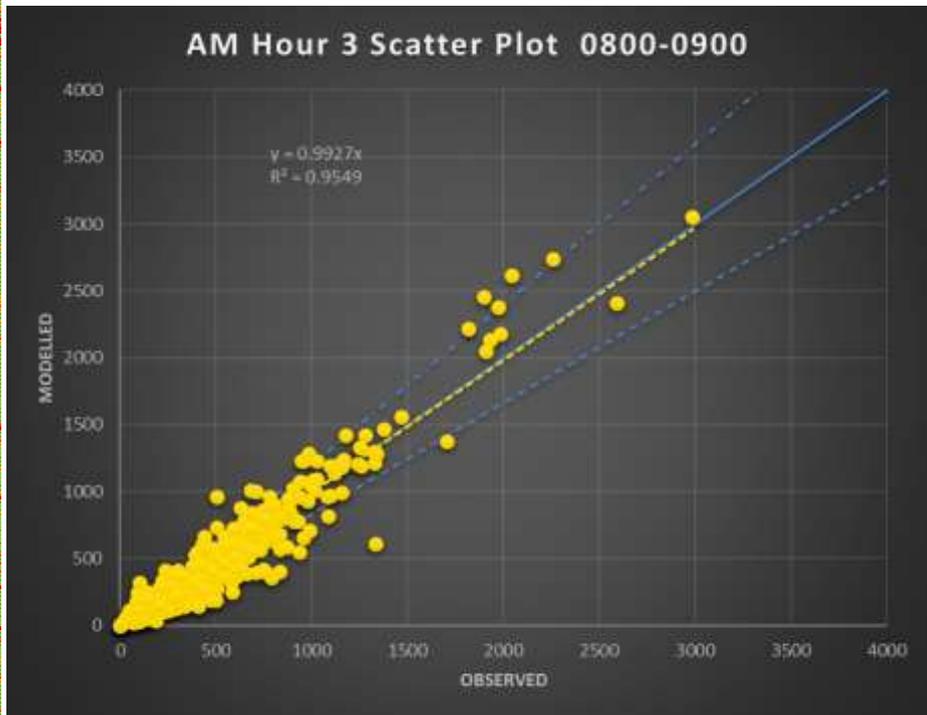
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- AM Hour 1

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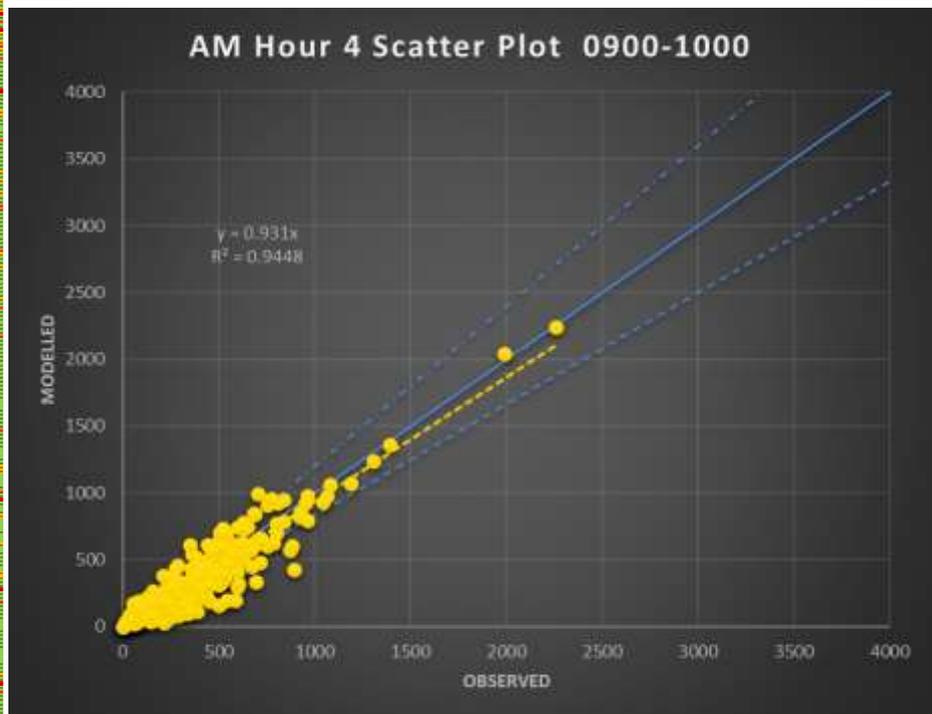
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- AM Hour 2

Link ID	Link Name	Observed	Modelled	Ratio	Color
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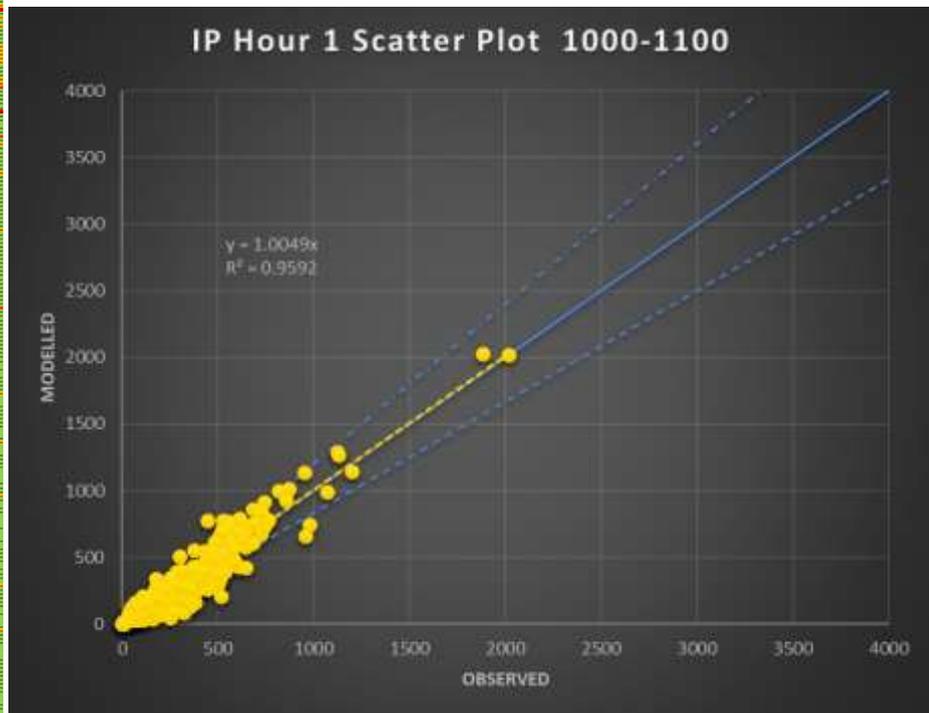
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- AM Hour 3

Link ID	Link Name	Observed	Modelled	Ratio	Color
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1000000011
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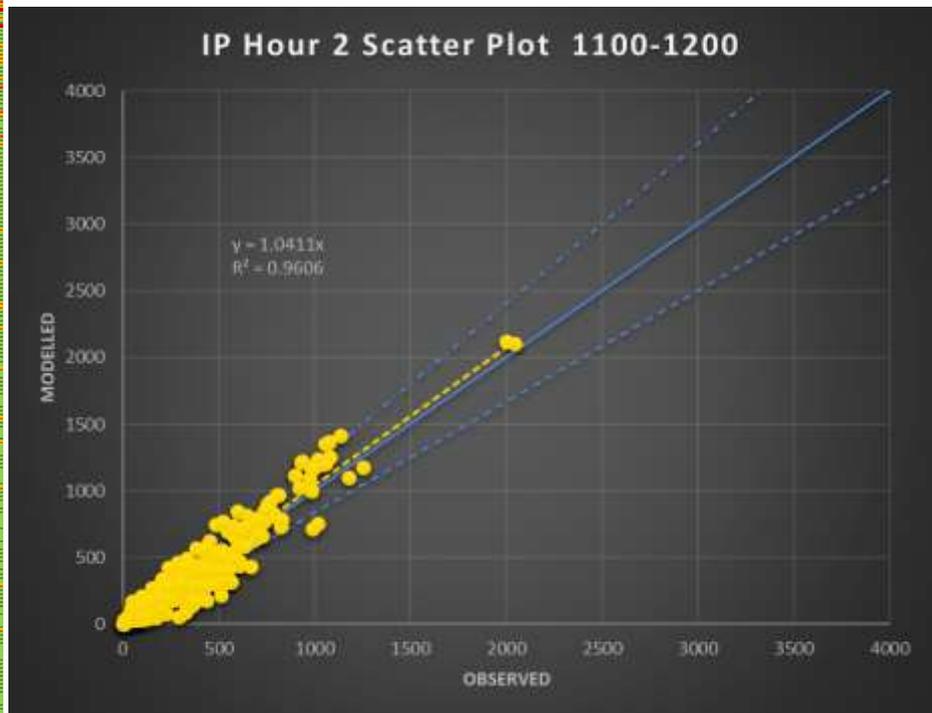
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- AM Hour 4

Link ID	Link Name	Observed	Modelled	Ratio	Color
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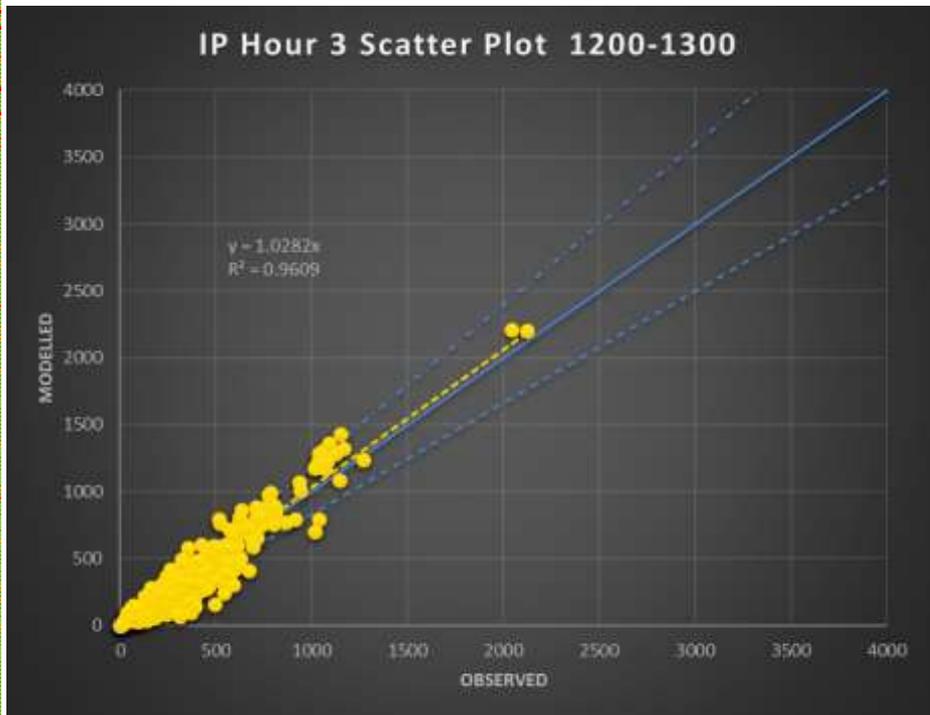
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- IP Hour 1

Link ID	Link Name	Observed	Modelled	Ratio
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10000002
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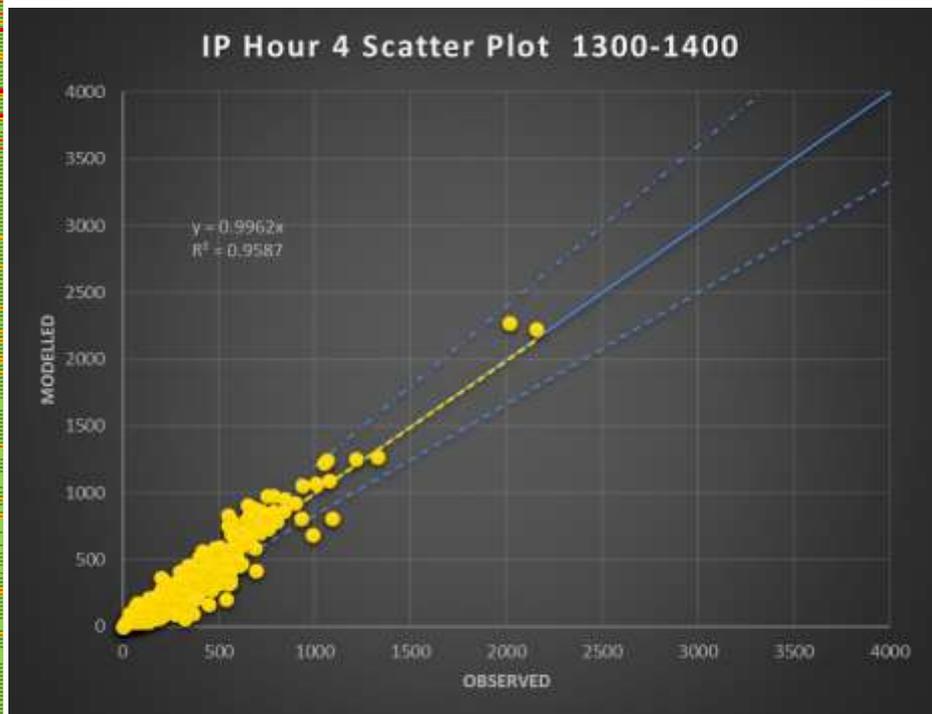
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- IP Hour 2

Link ID	Link Name	Observed	Modelled	Ratio
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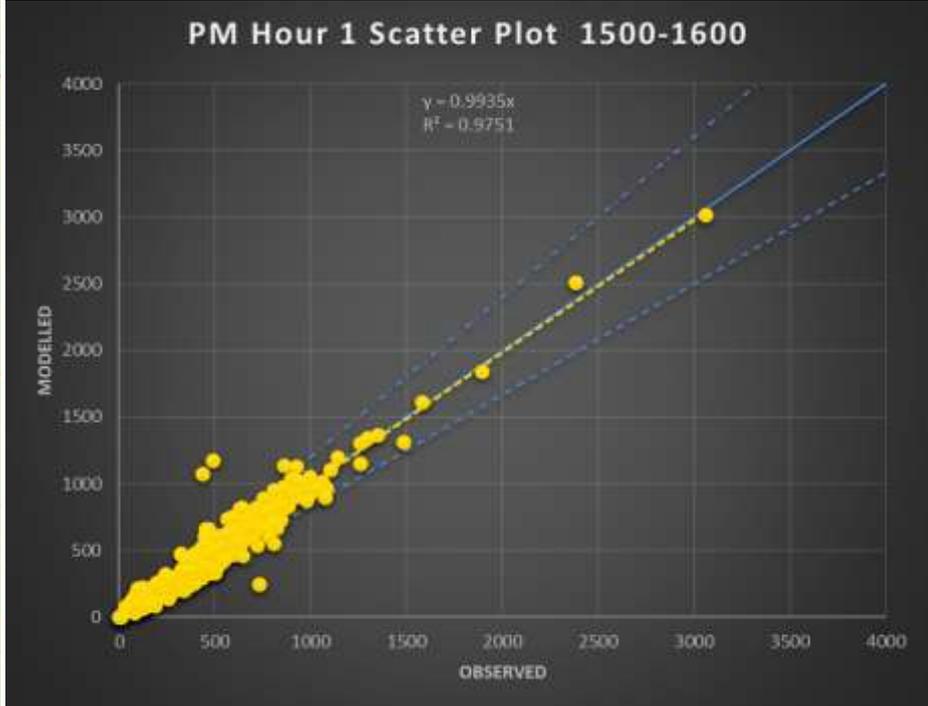
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- IP Hour 3

Link ID	Link Name	Observed	Modelled	Ratio	Color
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1000000003	Green
1000000004	Green
1000000005	Green
1000000006	Green
1000000007	Green
1000000008	Green
1000000009	Green
1000000010	Green
1000000011	Green
1000000012	Green
1000000013	Green
1000000014	Green
1000000015	Green
1000000016	Green
1000000017	Green
1000000018	Green
1000000019	Green
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1000000021	Green
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1000000200	Green



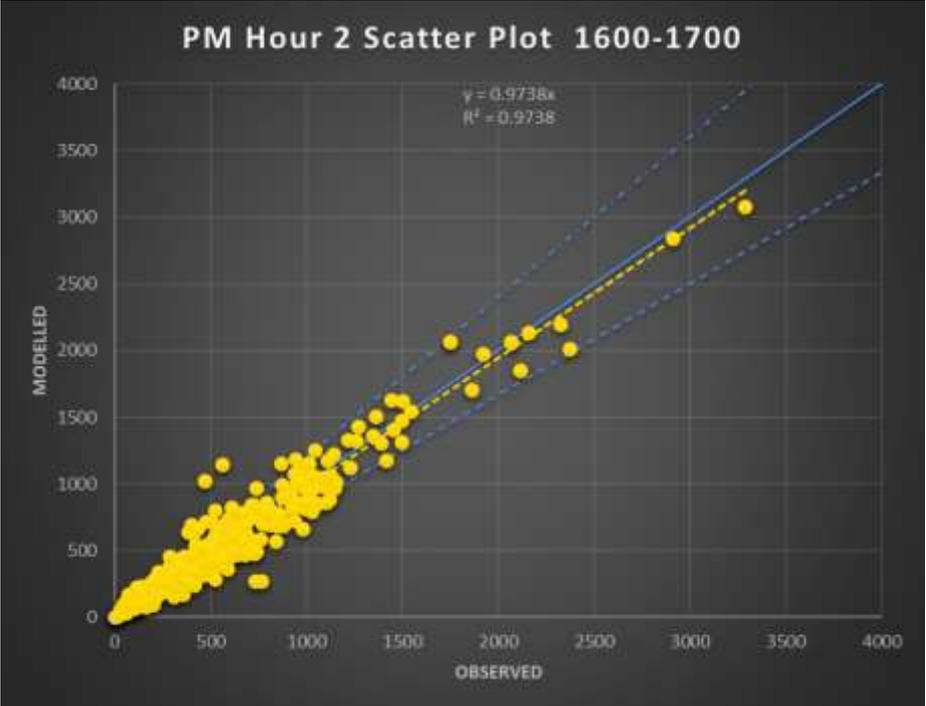
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- IP Hour 4

Link ID	Link Name	Observed	Modelled	Ratio	Color
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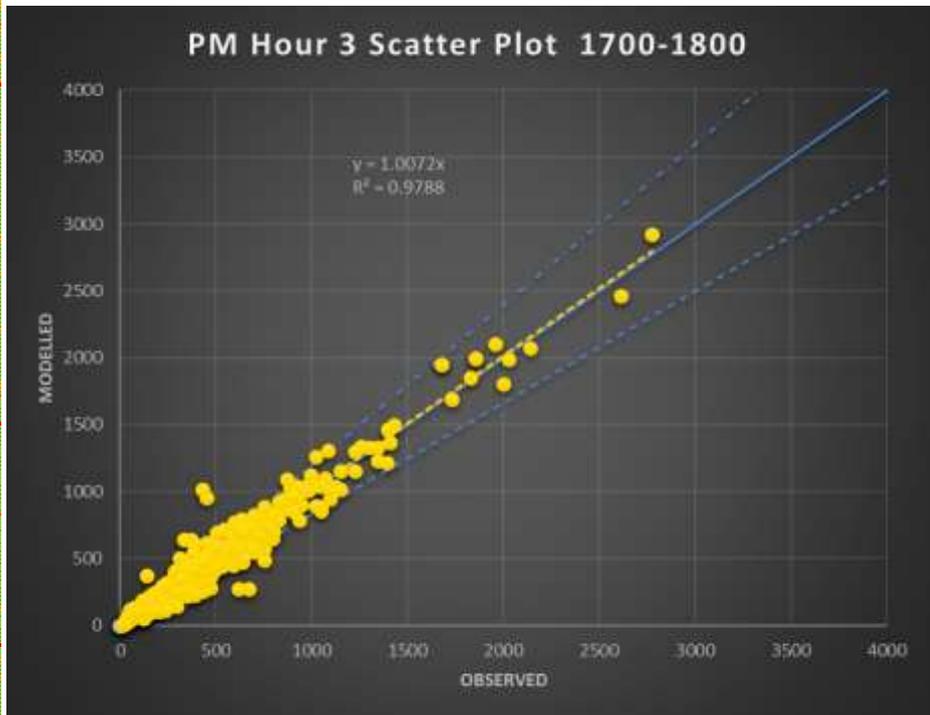
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- PM Hour 1

Link ID	Link Name	Observed	Modelled	Ratio	Color
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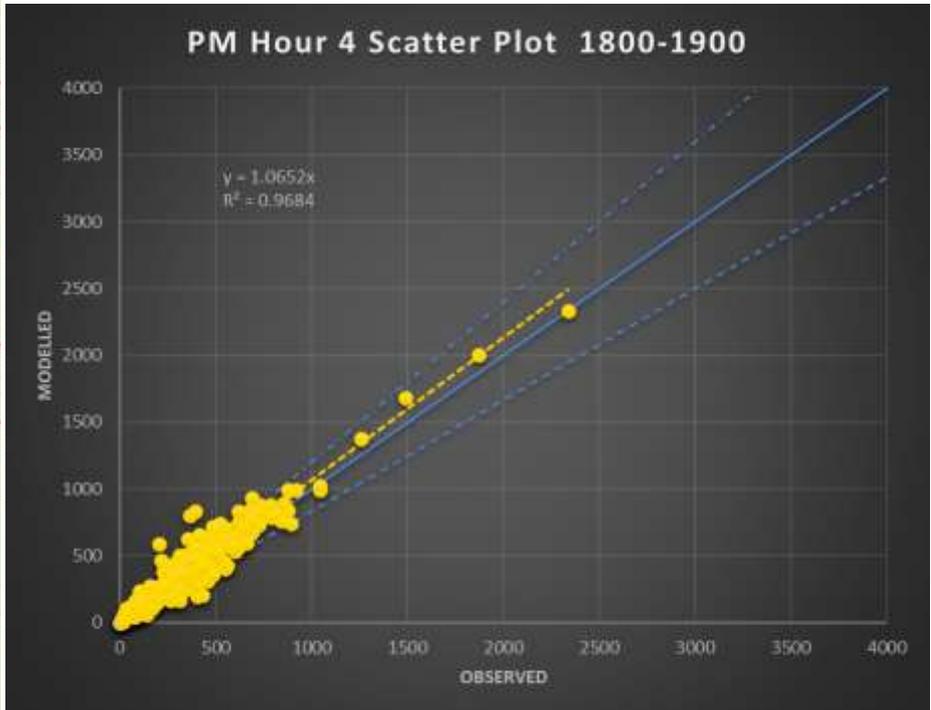
Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- PM Hour 2

Link ID	Link Name	Observed	Modelled	Ratio	Color
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Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- PM Hour 3

Link ID	Link Name	Observed	Modelled	Ratio	Color
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Individual link counts GEH & XY scatter plot - light vehicles - hybrid layer- PM Hour 4

Screenline	Direction	AM Hour 0700-0900					AM Hour 1 0600-0700					AM Hour 2 0700-0800					AM Hour 3 0800-0900					AM Hour 4 0900-1000				
		Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH
Eastern Hills	EB	222	83	-139	-63%	7.95	77	21	-56	-73%	7.97	125	47	-78	-63%	8.44	96	36	-60	-63%	7.03	78	36	-42	-54%	5.61
	WB	109	68	-41	-38%	3.11	24	21	-3	-14%	0.70	50	30	-20	-40%	3.21	59	38	-21	-36%	3.02	62	43	-19	-31%	2.67
	Total	331	151	-180	-54%	8.21	101	42	-59	-58%	6.98	176	77	-99	-56%	8.29	155	74	-81	-52%	7.61	141	79	-62	-44%	5.89
Railway	NB	728	467	-261	-36%	7.54	232	141	-91	-39%	6.64	360	211	-149	-41%	8.85	367	256	-111	-30%	6.31	398	245	-153	-39%	3.20
	SB	576	437	-139	-24%	4.36	166	117	-49	-29%	4.09	288	194	-94	-33%	6.03	288	243	-45	-16%	2.77	299	231	-68	-23%	4.19
	Total	1,303	904	-399	-31%	8.50	397	258	-139	-35%	7.69	648	405	-243	-37%	10.58	656	499	-157	-24%	6.52	597	476	-121	-20%	5.22
Riverbank	EB	597	504	-93	-16%	2.79	134	152	18	14%	1.53	254	236	-18	-7%	1.13	343	268	-75	-22%	4.29	307	275	-32	-10%	1.88
	WB	655	685	30	5%	0.81	202	220	17	14%	1.86	306	305	-1	0%	0.08	349	380	31	9%	1.62	279	347	68	24%	3.84
	Total	1,252	1,189	-63	-5%	1.28	335	381	46	14%	2.41	560	541	-19	-3%	0.81	692	648	-44	-6%	1.70	586	622	36	6%	1.46
Fairway/Days	NB	255	143	-112	-44%	6.04	69	42	-27	-39%	6.53	126	67	-59	-47%	5.97	139	76	-63	-46%	6.11	140	92	-48	-34%	4.65
	SB	320	125	-195	-61%	9.25	122	39	-83	-68%	9.22	170	54	-116	-68%	10.58	150	71	-79	-53%	7.52	108	58	-50	-46%	5.51
	Total	585	268	-317	-54%	10.66	191	81	-110	-58%	9.42	296	121	-175	-59%	12.14	290	147	-143	-49%	9.65	248	150	-98	-40%	6.96
Wainuiomata	NB	95	105	10	10%	0.68	24	31	7	29%	1.32	46	44	-2	-5%	0.35	49	61	12	24%	1.61	63	67	4	6%	0.45
	SB	278	128	-150	-54%	7.43	148	50	-98	-66%	8.73	162	59	-103	-64%	9.79	116	69	-47	-40%	4.86	82	79	-3	-4%	0.34
	Total	373	233	-140	-38%	5.69	172	90	-82	-48%	7.15	208	103	-105	-51%	8.44	165	130	-35	-21%	2.86	145	146	1	0%	0.05
SH2 South	NB	384	414	30	8%	1.06	112	129	17	15%	1.55	185	193	8	4%	0.56	199	221	22	11%	1.54	207	230	23	11%	1.56
	SB	341	442	101	30%	3.61	148	136	-12	-8%	1.03	154	196	44	29%	3.36	187	244	57	30%	3.07	199	267	68	34%	4.65
	Total	725	856	131	18%	3.30	260	265	5	2%	0.29	339	391	52	15%	2.72	386	465	79	21%	3.84	405	497	91	22%	4.28
SH58	NB	110	144	34	31%	2.14	28	51	23	82%	3.66	53	70	17	31%	2.12	57	74	18	31%	2.17	50	63	13	26%	1.73
	SB	119	192	73	61%	4.14	30	53	23	79%	3.63	57	86	29	52%	3.47	62	106	44	70%	4.76	57	104	47	82%	5.22
	Total	229	336	107	47%	4.51	58	104	46	80%	5.15	110	156	46	42%	3.99	119	180	61	51%	5.00	107	167	60	56%	5.11

Directional counts on screenlines GEH - heavy vehicles - hybrid layer- AM

ID	Almsun ID	Screenline	Direction	Location	AM Hour 0700-0900					AM Hour 1 0600-0700					AM Hour 2 0700-0800					AM Hour 3 0800-0900					AM Hour 4 0900-1000				
					Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH
S1.1	8758510	Eastern Hills	EB	Korokoro Rd Bridge - SB	22	24	2	7%	0.24	3	5	2	67%	1.00	11	13	2	18%	0.57	11	11	0	-0%	0.11	16	10	-6	-36%	1.40
S1.2	8758540	Eastern Hills	WB	Korokoro Rd Bridge - NB	24	16	-8	-34%	1.31	3,333.33	5	0	-6%	0.15	13	6	-7	-54%	2.27	11	10	-1	-12%	0.41	15	8	-7	-47%	2.06
S1.1	8759181	Eastern Hills	EB	Dowse Dr - NB	67	14	-53	-79%	5.82	6,666.67	3	24	80%	6.14	44	7	-37	-84%	7.27	22	7	-15	-68%	4.03	17	4	-13	-76%	2.22
S1.2	8759183	Eastern Hills	WB	Dowse Dr - NB	17	11	-6	-34%	1.08	6,666.67	3	-3	-47%	1.28	8	5	-3	-38%	1.18	9	6	-3	-31%	0.99	14	9	-5	-34%	1.40
S1.1	8758509	Eastern Hills	EB	Normandale Rd - SB	31	10	-21	-67%	3.04	10	1	-9	-90%	3.84	14	6	-8	-58%	2.44	17	4	-13	-76%	4.01	11	4	-7	-63%	2.65
S1.2	8758510	Eastern Hills	WB	Normandale Rd - NB	15	11	-4	-27%	1.42	3,333.33	3	67	2100%	7	3	-4	-57%	1.67	8	1	-7	-88%	3.39	5	1	-4	-80%	2.31	
S1.1	8759360	Eastern Hills	EB	Hairbourn View Rd - SB	19	2	-17	-89%	2.52	6,666.67	1	5	500%	2.56	7	3	-4	-57%	1.67	8	1	-7	-88%	3.39	5	1	-4	-80%	2.31
S1.2	8759360	Eastern Hills	WB	Hairbourn View Rd - NB	10	2	-8	-80%	2.32	3,333.33	0	0	0%	0.02	5	1	-4	-79%	2.19	5	1	-4	-80%	2.44	5	0	-5	-100%	3.84
S1.1	8759631	Eastern Hills	EB	Tirohanga Rd - SB	20	5	-15	-75%	2.95	3	2	-1	-33%	0.63	10	3	-7	-71%	2.64	9	2	-7	-79%	4.08	6	1	-5	-84%	2.79
S1.2	9931428	Eastern Hills	WB	Tirohanga Rd - NB	0	0	0	0%	0	0	0	0%	0.00	0	0	0	0%	0.00	0	0	0	0%	0.00	0	0	0	0%	0.00	
S1.1	8759723	Eastern Hills	EB	Hill Rd - NB	12	13	1	11%	0.37	3,333.33	3	0	-100%	0.19	3	7	4	133%	1.79	9	6	-3	-31%	0.98	6	5	-1	-21%	0.56
S1.2	8759707	Eastern Hills	WB	Park Rd - SB	18	4	-14	-78%	3.03	6,666.67	2	4	66%	1.87	11	3	-8	-72%	2.93	8	1	-7	-87%	3.30	4	0	-4	-100%	2.83
S1.1	8759709	Eastern Hills	EB	Park Rd - NB	8	6	-2	-25%	0.62	2	2	0	0%	0.00	4	3	-1	-25%	0.58	4	3	-1	-25%	0.70	4	1	-3	-75%	2.04
S1.2	8759730	Eastern Hills	WB	Major Dr - NB	37	13	-24	-65%	3.88	6,666.67	5	14	273%	3.97	22	7	-15	-68%	3.88	15	6	-9	-60%	2.79	14	7	-7	-51%	2.35
S1.1	8759736	Eastern Hills	WB	Major Dr - NB	23	13	-10	-43%	1.42	3,333.33	5	1	-15%	0.31	10	5	-5	-52%	1.89	12	8	-4	-33%	1.37	13	13	0	0%	0.00
S1.2	8759736	Eastern Hills	NB	Hutt Rd Overbridge - NB	98	88	-10	-10%	0.92	3,333.33	21	-7	-28%	1.48	45	41	-4	-9%	0.61	53	47	-6	-12%	0.87	60	43	-17	-28%	7.33
S1.2	8759180	Railway	SB	Hutt Rd Overbridge - SB	171	106	-65	-38%	3.00	47,333.33	26	21	45%	3.52	84	44	-40	-47%	4.06	88	62	-26	-29%	2.97	79	52	-27	-34%	3.30
S1.1	8759181	Railway	NB	Cuba St Bridge - NB	117	52	-65	-56%	3.00	28	14	-14	-50%	3.08	64	28	-36	-57%	2.57	55	24	-31	-56%	4.01	45	22	-23	-52%	4.88
S1.2	8431748	Railway	SB	Cuba St Bridge - SB	93	59	-34	-37%	3.16	3,333.33	14	-3	-19%	0.88	37	21	-16	-43%	2.64	56	29	-27	-48%	4.11	57	27	-30	-52%	4.58
S1.1	8759066	Railway	NB	Ludlum Cres From White Lines RAB	138	182	24	17%	1.39	44	60	16	36%	2.22	65	75	10	15%	1.20	73	87	14	19%	1.57	54	106	52	96%	5.81
S1.2	8759066	Railway	SB	Ludlum Cres Approach	104	123	20	20%	1.80	24	39	15	63%	2.67	59	63	4	7%	0.39	45	71	26	58%	3.41	60	72	12	20%	1.48
S1.1	8758859	Railway	NB	Walterloo Rd Bridge - NB	99	49	-50	-50%	4.00	28,666.67	13	17	56%	3.61	54	20	-34	-63%	5.59	25	87	62	188%	2.88	26	18	-8	-30%	1.44
S1.2	8758854	Railway	SB	Walterloo Rd Bridge - SB	25	23	-2	-9%	0.84	3,333.33	5	-4	-80%	1.62	13	10	-3	-23%	0.88	12	13	1	9%	0.10	20	12	-8	-39%	1.93
S1.1	8758854	Railway	NB	Daysch St Bridge - NB	176	93	-83	-47%	5.04	76	26	-50	-66%	7.00	87	38	-49	-57%	6.24	88	55	-33	-38%	3.02	72	47	-25	-35%	3.22
S1.2	8758854	Railway	WB	Daysch St Bridge - WB	140	89	-51	-36%	3.38	16,666.67	25	-32	-56%	4.96	80	42	-38	-47%	4.84	60	47	-13	-22%	1.78	58	48	-10	-17%	1.33
S1.1	87																												

Screenline	Direction	IP 2hour 1100-1300					IP Hour 1 1000-1100					IP Hour 2 1100-1200					IP Hour 3 1200-1300					IP Hour 4 1300-1400				
		Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH
Eastern Hills	EB	129	81	-48	-37%	3.34	72	39	-33	-46%	4.39	68	43	-25	-37%	4.40	61	38	-23	-38%	3.27	57	30	-27	-48%	4.14
	WB	117	55	-62	-53%	4.73	58	35	-23	-40%	3.42	55	25	-30	-55%	4.79	62	30	-32	-51%	4.68	63	25	-38	-61%	5.77
	Total	246	136	-110	-45%	5.65	130	74	-56	-43%	5.56	124	68	-56	-45%	5.69	123	68	-55	-45%	5.66	127	55	-66	-54%	7.01
Railway	EB	578	373	-205	-36%	6.60	282	196	-86	-31%	5.58	290	186	-104	-36%	6.73	286	186	-102	-36%	6.05	287	179	-108	-38%	7.01
	SB	581	383	-198	-34%	6.39	281	198	-83	-30%	5.39	287	198	-89	-31%	5.72	294	185	-109	-37%	7.05	296	180	-116	-39%	7.53
	Total	1,159	756	-404	-35%	9.24	564	394	-170	-30%	7.76	577	384	-193	-33%	8.80	583	371	-212	-36%	9.69	583	359	-224	-38%	10.33
Riverbank	EB	594	429	-165	-28%	1.95	308	257	-51	-17%	3.03	284	273	-11	-4%	0.66	310	256	-54	-18%	3.23	294	253	-41	-14%	2.46
	WB	573	468	-105	-18%	3.25	279	242	-37	-13%	2.27	281	229	-52	-18%	3.24	292	239	-53	-18%	3.27	286	219	-67	-23%	4.20
	Total	1,167	897	-270	-23%	3.66	587	499	-88	-15%	3.76	565	502	-63	-11%	2.71	603	495	-108	-18%	4.60	579	472	-107	-19%	4.68
Fairway/Daysh	EB	256	132	-124	-49%	6.71	135	64	-71	-52%	7.09	130	64	-66	-51%	5.47	127	68	-59	-47%	5.99	152	65	-87	-57%	8.33
	SB	215	114	-102	-47%	5.61	118	64	-54	-46%	5.67	104	56	-48	-46%	5.34	112	58	-54	-48%	5.88	118	68	-50	-43%	7.65
	Total	482	246	-236	-49%	8.73	253	128	-125	-49%	5.90	242	120	-122	-50%	9.09	239	126	-113	-47%	8.38	270	133	-137	-50%	11.33
Wainuiomata	EB	128	109	-19	-15%	1.26	59	46	-13	-22%	1.84	66	52	-14	-21%	1.79	63	57	-6	-9%	0.74	54	45	-9	-17%	1.28
	WB	136	108	-28	-21%	1.80	74	54	-20	-27%	2.46	71	54	-17	-24%	2.16	65	54	-11	-17%	1.43	75	40	-35	-47%	4.67
	Total	265	217	-48	-18%	2.17	133	100	-33	-25%	3.06	137	106	-31	-22%	2.79	128	111	-17	-13%	1.54	129	85	-44	-34%	4.29
SH2 South	EB	425	481	56	13%	1.85	207	222	15	7%	1.00	236	241	5	2%	1.74	234	219	-14	-6%	1.36	216	247	31	15%	2.06
	WB	354	428	74	21%	2.85	195	224	29	15%	1.86	222	36	20%	10%	1.68	206	38	23%	27%	1.77	198	21	-12%	1.53	
	Total	779	909	130	17%	3.17	403	446	43	11%	3.92	463	71	15%	3.45	387	446	59	15%	2.88	393	445	52	13%	2.55	
SH58	EB	85	112	27	32%	1.94	47	64	17	37%	2.30	40	50	10	26%	1.54	36	53	17	49%	2.60	50	48	-2	-4%	0.51
	WB	82	111	29	36%	2.11	46	67	21	46%	2.82	43	55	12	27%	1.69	39	56	18	45%	2.55	45	41	-4	-8%	0.51
	Total	167	223	57	34%	2.86	93	131	38	41%	3.62	88	117	29	32%	2.83	78	106	28	36%	2.90	80	101	21	26%	2.19

Directional counts on screenlines GEH - heavy vehicles - hybrid layer- IP

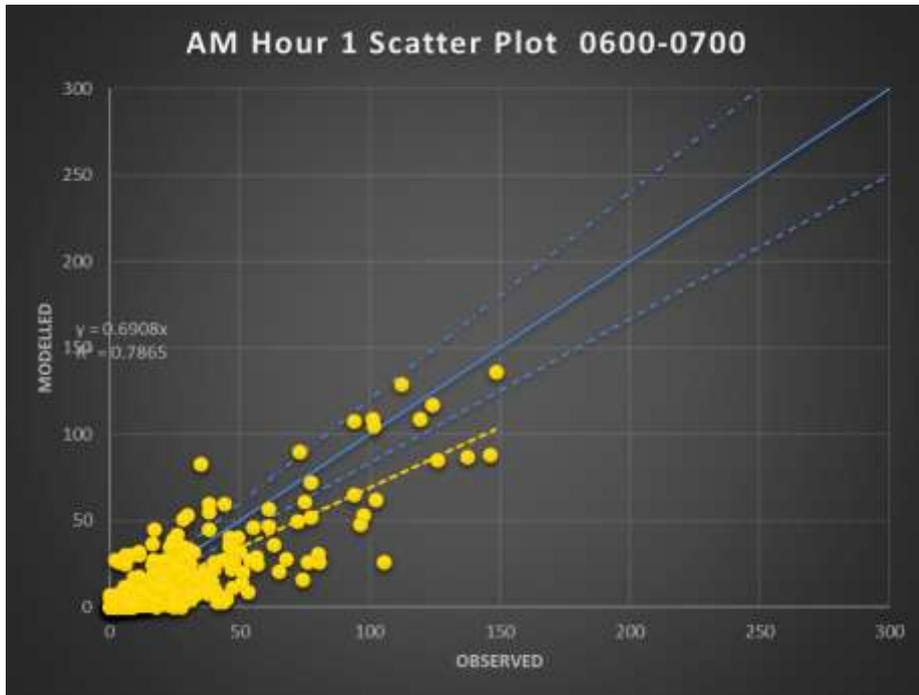
ID	Amson ID	Screenline	Direction	Location	IP 2hour 1100-1300					IP Hour 1 1000-1100					IP Hour 2 1100-1200					IP Hour 3 1200-1300					IP Hour 4 1300-1400					
					Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	
S1.1	875885D	Eastern Hills	EB	Korokoro Rd Bridge - SB	32	21	-11	-35%	1.95	15	6,666,667	9	-7	-43%	1.90	18	11	-7	-40%	1.91	14	10	-4	-29%	1.15	10	7	-3	-30%	1.03
S1.2	875885D	Eastern Hills	WB	Korokoro Rd Bridge - NB	30	11	-19	-63%	2.93	12	6	-6	-50%	2.00	14	5	-9	-64%	2.92	16	6	-10	-62%	2.94	13	4	-9	-70%	3.17	
S1.1	87591819	Eastern Hills	EB	Dowse Dr - SB	29	15	-14	-48%	2.07	15	6,666,667	10	-7	-40%	1.82	14	7	-7	-50%	2.16	15	8	-7	-46%	1.90	14	4	-10	-71%	3.38
S1.2	87591819	Eastern Hills	WB	Dowse Dr - NB	24	10	-14	-58%	2.40	12	2,666,667	7	-6	-45%	1.81	12	5	-7	-58%	2.40	12	5	-7	-58%	2.40	13	6	-7	-53%	2.18
S1.1	875885D	Eastern Hills	EB	Normandale Rd - SB	20	9	-11	-55%	2.04	8	4	-4	-50%	1.63	9	6	-3	-31%	1.68	11	3	-8	-74%	3.11	7	2	-5	-72%	0.94	
S1.2	875885D	Eastern Hills	WB	Normandale Rd - NB	15	8	-7	-47%	1.89	6	3	-3	-50%	1.41	3	2	-1	-50%	0.44	3	3	0	0%	0.00	4	2	-2	-50%	1.15	
S1.1	87593685	Eastern Hills	EB	Hairour View Rd - SB	6	2	-4	-68%	1.89	1,666,667	0	-4	-100%	2.71	3	1	-2	-62%	1.13	4	1	-3	-75%	1.75	3	2	-1	-40%	0.82	
S1.2	87593685	Eastern Hills	WB	Hairour View Rd - NB	0	2	-2	-100%	1,666,667	1	-2	-62%	1.23	2	0	-2	-100%	2.00	3	0	-3	-100%	0.00	0	2	-2	-100%	1.40		
S1.1	87596131	Eastern Hills	EB	Tirohanga Rd - SB	6	5	-1	-17%	1.00	6	3	-3	-50%	1.41	3	2	-1	-50%	0.44	3	3	0	0%	0.00	4	2	-2	-50%	1.15	
S1.2	87596131	Eastern Hills	WB	Tirohanga Rd - NB	0	0	0	0%	0.00	0	0	0	0%	0.00	0	0	0	0%	0.00	0	0	0	0%	0.00	0	0	0	0%	0.00	
S1.1	87596988	Eastern Hills	EB	Hill Rd - SB	6	13	7	128%	1.69	3	6	3	100%	1.41	3	7	4	200%	1.60	2	6	4	150%	1.79	2	4	2	100%	1.65	
S1.2	87597231	Eastern Hills	WB	Hill Rd - NB	8	10	2	20%	0.99	3,333,333	6	1	13%	0.28	4	5	1	38%	0.64	5	5	0	0%	0.15	4	3	-1	-18%	0.37	
S1.1	87597071	Eastern Hills	EB	Park Rd - SB	10	4	-6	-60%	1.60	6	2	-4	-67%	2.00	5	2	-3	-57%	1.46	5	2	-3	-62%	1.74	7	1	-6	-85%	2.88	
S1.2	87597071	Eastern Hills	WB	Park Rd - NB	8	3	-7	-87%	2.36	3,333,333	2	-3	-62%	1.28	5	1	-4	-79%	2.18	5	0	-3	-100%	2.45	6	1	-5	-82%	2.84	
S1.1	87597300	Eastern Hills	EB	Major Dr - SB	21	12	-9	-42%	1.52	2,666,667	5	-8	-61%	2.58	14	7	-7	-50%	2.16	7	5	-2	-29%	1.00	10	5	-5	-50%	1.88	
S1.2	87597300	Eastern Hills	WB	Major Dr - NB	28	13	-15	-54%	2.34	14,376	7	-7	-100%	2.26	14	6	-8	-58%	2.44	14	7	-7	-50%	2.25	15	5	-10	-68%	3.08	
S1.1	87596988	Railway	EB	Hutt Rd Overbridge - NB	121	85	-36	-30%	2.83	8,666,667	95	6	13%	0.88	65	43	-22	-34%	0.89	56	42	-14	-25%	2.00	60	49	-11	-18%	1.45	
S1.2	87591810	Railway	SB	Hutt Rd Overbridge - SB	133	79	-54	-41%	3.71	79,035,511	51	-28	-35%	3.48	68	38	-30	-44%	4.16	65	41	-24	-37%	3.26	66	38	-28	-43%	3.93	
S1.1	87591810	Railway	EB	Cuba St Bridge - NB	86	41	-45	-52%	3.96	24,049,566	22	-20	-88%	3.94	41	21	-20	-49%	4.66	44	20	-24	-55%	6.20	29	18	-11	-39%	2.84	
S1.2	84312748	Railway	SB	Cuba St Bridge - SB	126	51	-74	-59%	5.89	59,724,881	22	-38	-63%	5.90	63	29	-34	-54%	4.68	63	29	-34	-54%	4.68	70	21	-49	-70%	7.27	
S1.1	87593685	Railway	EB	Ludlum Cres from White Lines RAB	102	135	33	32%	2.14	59	61	2	3%	0.26	55	68	13	24%	1.66	47	67	20	43%	2.65	60	58	-2	-3%	0.26	
S1.2	87593685	Railway	WB	Ludlum Cres Approach	104	104	0	0%	0.00	46	55	9	20%	1.27	49	48	-1	-2%	0.14	55	56	1	2%	0.13	42	47	5	12%	0.35	
S1.1	875885D	Railway	EB	Waiatarua Rd Bridge - WB	58	27	-31	-53%	3.96	28	14	-14	-100%	3.06	27	13	-14	-51%	3.04	24	14	-10	-42%	3.64	29	14	-15	-52%	3.23	
S1.2	875885D	Railway	WB	Waiatarua Rd Bridge - EB	45	32	-13	-29%	1.49	3,333,333	17	-11	-77%	0.32	22	20	-2	-9%	0.44	23	12	-11	-48%	2.63	23	18	-5	-22%	1.10	
S1.1	875885D	Railway	EB	Daysh St Bridge - NB	127	64	-63	-50%	4.54	3,333,333	35	-25	-42%	3.67	63	32	-31	-49%	4.50	64	32	-32	-50%	4.50	68	32	-36	-53%	5.08	

Screenline	Direction	PM Hour 1600-1800				PM Hour 1 1500-1600				PM Hour 2 1600-1700				PM Hour 3 1700-1800				PM Hour 4 1800-1900								
		Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH					
Eastern Hills	EB	111	38	-73	-66%	5.97	67	41	-26	-39%	3.50	57	21	-36	-63%	5.73	54	17	-37	-69%	6.22	48	19	-29	-60%	5.01
	WB	184	71	-113	-62%	7.10	79	57	-22	-28%	2.67	93	36	-57	-61%	7.07	92	35	-57	-62%	7.13	61	26	-35	-57%	5.31
	Total	295	109	-186	-63%	9.26	146	98	-48	-33%	4.32	146	87	-59	-41%	6.40	146	52	-94	-65%	9.48	109	45	-64	-59%	7.20
Railway	NB	457	390	-67	-15%	2.31	291	271	-20	-7%	1.20	258	215	-43	-17%	2.70	195	175	-24	-12%	1.77	127	107	-20	-15%	1.37
	SB	454	293	-161	-36%	5.90	301	235	-66	-22%	4.06	264	167	-97	-37%	6.63	190	126	-64	-34%	5.10	137	95	-42	-31%	3.93
	Total	912	683	-229	-25%	5.72	593	506	-87	-15%	3.69	522	382	-140	-27%	6.59	389	301	-88	-23%	4.76	259	202	-57	-22%	3.76
Riverbank	EB	368	461	93	25%	3.24	279	354	75	27%	4.20	197	252	55	28%	3.65	170	209	39	23%	2.81	102	164	62	60%	5.34
	WB	446	446	0	0%	0.01	238	314	76	32%	4.55	267	259	-8	-3%	0.47	179	187	8	4%	0.59	61	93	32	52%	3.65
	Total	813	907	94	12%	2.26	518	668	150	29%	6.17	464	511	47	10%	2.13	349	396	47	13%	2.42	163	257	94	57%	6.46
Fairway/Days	NB	249	174	-75	-30%	3.64	139	131	-8	-6%	0.57	130	88	-42	-32%	4.71	111	86	-25	-22%	2.69	72	54	-18	-25%	2.23
	SB	190	80	-110	-58%	6.71	116	45	-71	-61%	9.02	107	45	-62	-58%	7.08	84	35	-49	-58%	6.37	54	26	-28	-52%	4.48
	Total	439	254	-185	-42%	7.03	255	176	-79	-31%	5.37	245	133	-112	-46%	8.13	194	121	-73	-38%	5.85	126	80	-46	-37%	4.55
Wainuiomata	NB	158	87	-71	-45%	4.52	74	75	1	1%	0.11	84	51	-33	-39%	3.99	74	36	-38	-51%	5.13	46	26	-20	-43%	3.29
	SB	119	51	-68	-57%	5.20	70	46	-24	-35%	3.19	68	31	-37	-55%	5.31	50	20	-30	-60%	5.12	38	9	-29	-76%	5.94
	Total	277	138	-139	-50%	6.80	144	121	-23	-16%	2.03	152	82	-70	-46%	6.48	124	56	-68	-55%	7.20	83	35	-48	-58%	6.29
SH2 South	NB	217	240	23	11%	1.08	215	194	-21	-10%	1.47	121	128	7	6%	0.63	96	117	16	17%	1.57	106	0	0%	0.03	
	SB	171	236	65	38%	3.20	146	181	35	24%	2.76	101	139	38	38%	3.51	71	97	26	37%	2.86	53	69	16	29%	2.00
	Total	388	476	88	23%	2.86	361	375	14	4%	2.74	222	267	45	21%	2.91	167	209	42	25%	3.08	159	175	16	10%	1.24
SH58	NB	68	68	0	0%	0.00	44	43	-1	-3%	0.20	41	37	-4	-9%	0.61	27	31	4	14%	0.71	15	18	3	20%	0.74
	SB	70	156	86	123%	5.72	41	65	24	59%	3.30	37	83	46	126%	5.99	33	73	40	119%	5.44	16	40	24	153%	4.57
	Total	138	224	86	62%	4.52	85	108	23	27%	2.31	78	120	43	55%	4.28	61	104	44	72%	4.80	31	58	27	88%	4.08

Directional counts on screenlines GEH - heavy vehicles - hybrid layer- PM

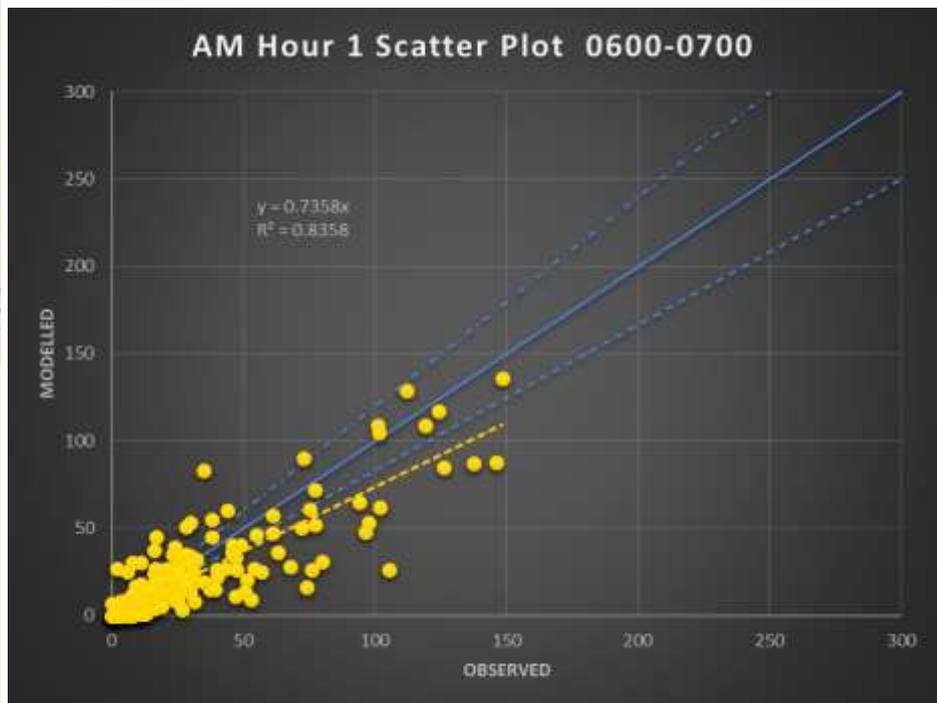
ID	Amsun ID	Screenline	Direction	Location	PM Hour 1600-1800				PM Hour 1 1500-1600				PM Hour 2 1600-1700				PM Hour 3 1700-1800				PM Hour 4 1800-1900									
					Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH	Observed	Modelled	Diff	% Diff	GEH						
S1.1	875865D	Eastern Hills	EB	Korokoro Rd Bridge - SB	13	9	-4	-29%	0.79	14	7007	10	-5	-32%	1.36	6	5	-1	-21%	0.57	5	4	-1	-25%	0.62					
S1.2	875865D	Eastern Hills	WB	Korokoro Rd Bridge - NB	19	15	-4	-22%	0.76	15	3333	8	-7	-48%	2.15	11	7	-4	-34%	1.23	9	8	-1	-8%	0.23	6	3	-3	-50%	1.41
S1.1	8759189	Eastern Hills	EB	Dawes Dr - SB	27	10	-17	-63%	2.21	14	8	-6	-43%	1.81	11	6	-5	-45%	1.72	15	4	-11	-74%	1.72	12	3	-9	-75%	3.28	
S1.2	8759189	Eastern Hills	WB	Dawes Dr - NB	56	9	-47	-84%	5.86	21	5	-16	-76%	4.44	27	3	-24	-89%	6.25	29	6	-23	-79%	5.50	17	5	-12	-70%	3.34	
S1.1	875865D	Eastern Hills	EB	Normandale Rd - SB	17	3	-14	-82%	3.08	2,666,667	4	-4	-48%	1.52	9	2	-7	-77%	2.89	8	1	-7	-88%	3.90	7	1	-6	-86%	3.13	
S1.2	875865D	Eastern Hills	WB	Normandale Rd - NB	11	3	-8	-73%	1,446,666,667	3	-4	-133%	1.67	8	2	-6	-75%	2.68	3	1	-2	-67%	1.41	3	1	-2	-63%	1.23		
S1.1	8759365	Eastern Hills	EB	Hairour View Rd - SB	5	0	-5	-100%	2.33	3,333,333	2	-2	-54%	1.31	1	0	-1	-100%	1.41	4	0	-4	-100%	2.94	3	0	-3	-100%	0.20	
S1.2	8759365	Eastern Hills	WB	Hairour View Rd - NB	9	1	-7	-78%	2,000	4	2	-2	-50%	1.15	4	1	-3	-75%	1.75	4	0	-4	-100%	2.83	4	1	-3	-75%	1.75	
S1.1	9951426E	Eastern Hills	WB	Tirohanga Rd - NB	0	0	0	0%	0.00	0	0	0	0%	0.00	0	0	0	0%	0.00	0	0	0	0%	0.00	0	0	0	0%	0.00	
S1.1	8759223	Eastern Hills	EB	Hill Rd - SB	6	2	-4	-67%	1.51	4	5	1	25%	0.47	3	2	-1	-40%	0.82	3	0	-3	-100%	2.46	4	3	-1	-25%	0.62	
S1.2	8759223	Eastern Hills	WB	Hill Rd - NB	20	11	-9	-44%	1.57	5,300,515	11	6	56%	1.98	12	6	-6	-50%	2.00	8	5	-3	-38%	1.06	5	0	-5	-100%	0.16	
S1.1	8759707	Eastern Hills	EB	Park Rd - SB	10	4	-6	-60%	1,866,667	1	-4	-79%	2.18	5	1	-4	-80%	2.44	5	3	-2	-40%	1.01	6	1	-5	-82%	2.56		
S1.2	8759707	Eastern Hills	WB	Park Rd - NB	14	4	-10	-71%	2,86	3,333,333	4	1	20%	0.35	5	3	-2	-40%	1.14	9	1	-8	-89%	3.49	7	2	-5	-71%	2.36	
S1.1	8759730	Eastern Hills	EB	Major Dr - SB	22	7	-15	-68%	2,77	3,666,667	8	-3	-25%	0.87	13	3	-10	-77%	1.54	9	4	-5	-54%	1.85	9	3	-6	-65%	2.35	
S1.2	8759730	Eastern Hills	WB	Major Dr - NB	47	24	-23	-49%	2.00	3,333,333	19	-1	-7%	0.36	24	12	-12	-50%	2.90	23	12	-11	-48%	2.64	16	7	-9	-55%	2.58	
S1.1	8759696	Railway	NB	Hutt Rd Overbridge - NB	100	69	-31	-31%	1.41	3,333,333	45	-7	-14%	1.68	55	36	-19	-35%	2.87	45	33	-12	-27%	1.92	31	27	-4	-13%	0.34	
S1.2	8759181	Railway	SB	Hutt Rd Overbridge - SB	73	54	-19	-26%	1,66	2,029,667	46	-16	-36%	2.18	45	29	-16	-36%	2.68	27	25	-2	-9%	0.66	27	16	-11	-41%	2.43	
S1.1	8759181	Railway	NB	Cuba St Bridge - SB	44	100	56	125%	4.76	14,103,85	75	41	100%	5.34	59	55	-4	-7%	1,836	25	47	22	90%	3.72	16	31	15	98%	3.87	
S1.2	8431278E	Railway	SB	Cuba St Bridge - NB	106	75	-31	-29%	1,44	6,000,000	17	-46	-73%	7.28	64	16	-48	-75%	7.62	41	9	-32	-78%	6.44	27	7	-20	-74%	4.85	
S1.1	8759365	Railway	NB	Ludlam Cres from White Lines RAB	59	76	17	29%	1.46	42	67	25	60%	3.39	33	43	10	30%	1,62	26	33	7	27%	1.29	8	15	7	88%	2.06	
S1.2	8759365	Railway	SB	Ludlam Cres Approach	61	71	10	16%	0.87	56	67	11	20%	1.48	42	42	0	0%	0.00	19	29	10	53%	2.94	20	19	-1	-5%	0.28	
S1.1	875865D	Railway	NB	Waiatarua Rd Bridge - WB	60	34	-26	-44%	2.71	35,680,222	27	-9	-24%	1.55	29	19	-10	-33%	2.10	31	15	-16	-52%	3.34	17	11	-6	-34%	1.52	
S1.2	875865D	Railway	SB	Waiatarua Rd Bridge - EB	63	38	-25	-39%	2,47	31,348,289	29	-2	-7%	0.43	28	21	-7	-25%	1,42	35	17	-18	-51%	3.48	18	13	-5	-29%	1.35	
S1.1	875865E	Railway	NB	Daysch St Bridge - NB	110	91	-19	-17%	1,35	36,949,79	46	-22	-33%	2.96	67	54	-13	-19%	1,67	43	37	-6	-14%	0.96	32	18	-14	-44%	2.88	
S1.2	875865E	Railway	SB	Daysch St Bridge - SB	120	54	-66	-55%	5.03	58,691,51	38	-26	-40%	3.60	64	30	-34	-53%	5.00	56	24	-32	-57%	5.06	31	21	-10	-32%	1.96	
S1.1	875865E	Railway	NB	Wingate Bridge - WB	83	18	-65	-78%	4,68	58,593,14	11	-48	-81%	8.07	54	8	-46	-85%</												

Link ID	Observed	Modelled	Ratio
1	10	12	1.2
2	15	18	1.2
3	20	25	1.25
4	25	30	1.2
5	30	35	1.17
6	35	40	1.14
7	40	45	1.125
8	45	50	1.11
9	50	55	1.1
10	55	60	1.09
11	60	65	1.083
12	65	70	1.077
13	70	75	1.071
14	75	80	1.067
15	80	85	1.062
16	85	90	1.059
17	90	95	1.056
18	95	100	1.053
19	100	105	1.05
20	105	110	1.047
21	110	115	1.045
22	115	120	1.043
23	120	125	1.042
24	125	130	1.04
25	130	135	1.038
26	135	140	1.036
27	140	145	1.034
28	145	150	1.032
29	150	155	1.03
30	155	160	1.028
31	160	165	1.026
32	165	170	1.024
33	170	175	1.022
34	175	180	1.02
35	180	185	1.018
36	185	190	1.016
37	190	195	1.014
38	195	200	1.012
39	200	205	1.01
40	205	210	1.008
41	210	215	1.006
42	215	220	1.004
43	220	225	1.002
44	225	230	1.001
45	230	235	1.0005
46	235	240	1.0002
47	240	245	1.0001
48	245	250	1.00005
49	250	255	1.00002
50	255	260	1.00001
51	260	265	1.000005
52	265	270	1.000002
53	270	275	1.000001
54	275	280	1.0000005
55	280	285	1.0000002
56	285	290	1.0000001
57	290	295	1.00000005
58	295	300	1.00000002
59	300	305	1.00000001
60	305	310	1.000000005
61	310	315	1.000000002
62	315	320	1.000000001
63	320	325	1.0000000005
64	325	330	1.0000000002
65	330	335	1.0000000001
66	335	340	1.00000000005
67	340	345	1.00000000002
68	345	350	1.00000000001
69	350	355	1.000000000005
70	355	360	1.000000000002
71	360	365	1.000000000001
72	365	370	1.0000000000005
73	370	375	1.0000000000002
74	375	380	1.0000000000001
75	380	385	1.00000000000005
76	385	390	1.00000000000002
77	390	395	1.00000000000001
78	395	400	1.000000000000005
79	400	405	1.000000000000002
80	405	410	1.000000000000001
81	410	415	1.0000000000000005
82	415	420	1.0000000000000002
83	420	425	1.0000000000000001
84	425	430	1.00000000000000005
85	430	435	1.00000000000000002
86	435	440	1.00000000000000001
87	440	445	1.000000000000000005
88	445	450	1.000000000000000002
89	450	455	1.000000000000000001
90	455	460	1.0000000000000000005
91	460	465	1.0000000000000000002
92	465	470	1.0000000000000000001
93	470	475	1.00000000000000000005
94	475	480	1.00000000000000000002
95	480	485	1.00000000000000000001
96	485	490	1.000000000000000000005
97	490	495	1.000000000000000000002
98	495	500	1.000000000000000000001
99	500	505	1.0000000000000000000005
100	505	510	1.0000000000000000000002



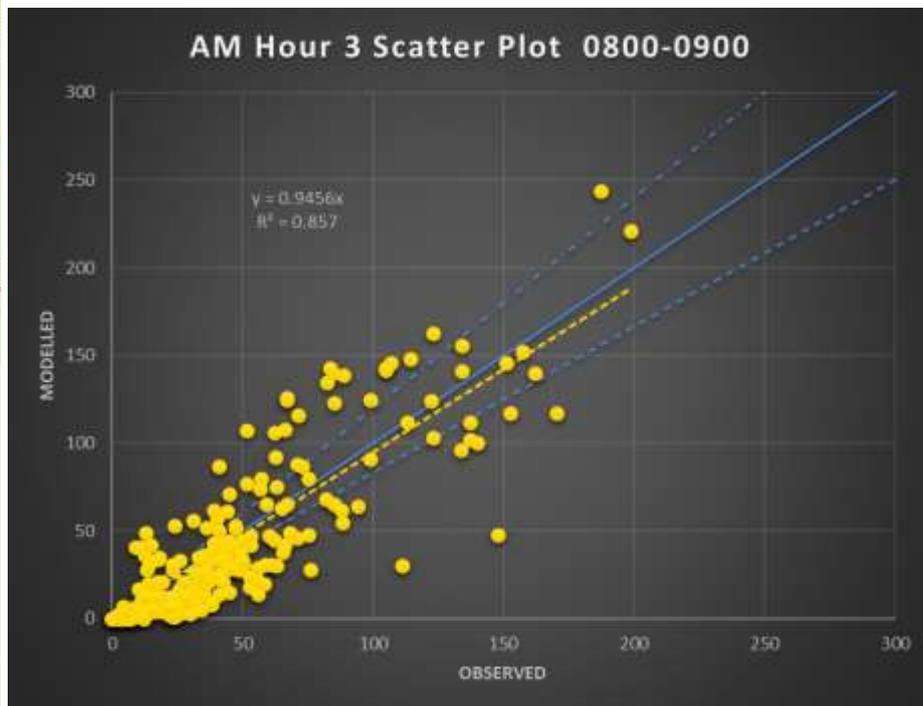
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- AM Hour 1

Link ID	Link Name	Observed	Modelled
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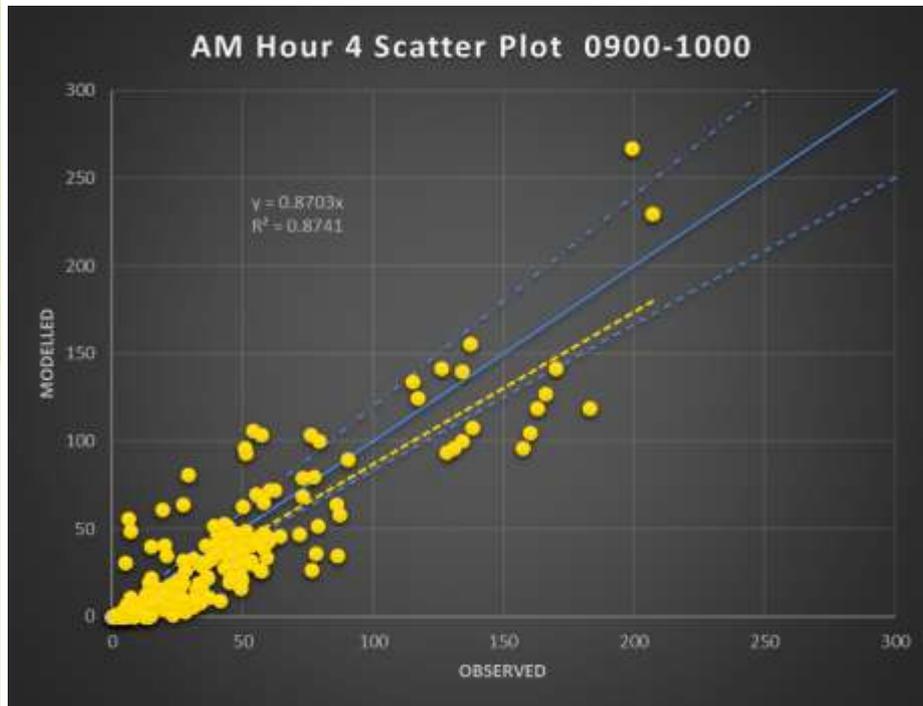
Individual link counts GEH & XY scatter plot – heavy vehicles – hybrid layer– AM Hour 2

Link ID	Observed	Modelled	Diff	Rel Diff
1	10	12	2	20%
2	15	18	3	20%
3	20	25	5	25%
4	25	30	5	20%
5	30	35	5	17%
6	35	40	5	14%
7	40	45	5	13%
8	45	50	5	11%
9	50	55	5	10%
10	55	60	5	9%
11	60	65	5	8%
12	65	70	5	8%
13	70	75	5	7%
14	75	80	5	7%
15	80	85	5	6%
16	85	90	5	6%
17	90	95	5	6%
18	95	100	5	5%
19	100	105	5	5%
20	105	110	5	5%
21	110	115	5	5%
22	115	120	5	4%
23	120	125	5	4%
24	125	130	5	4%
25	130	135	5	4%
26	135	140	5	4%
27	140	145	5	4%
28	145	150	5	3%
29	150	155	5	3%
30	155	160	5	3%
31	160	165	5	3%
32	165	170	5	3%
33	170	175	5	3%
34	175	180	5	3%
35	180	185	5	3%
36	185	190	5	3%
37	190	195	5	3%
38	195	200	5	3%
39	200	205	5	3%
40	205	210	5	3%
41	210	215	5	3%
42	215	220	5	3%
43	220	225	5	3%
44	225	230	5	3%
45	230	235	5	3%
46	235	240	5	3%
47	240	245	5	3%
48	245	250	5	3%
49	250	255	5	3%
50	255	260	5	3%
51	260	265	5	3%
52	265	270	5	3%
53	270	275	5	3%
54	275	280	5	3%
55	280	285	5	3%
56	285	290	5	3%
57	290	295	5	3%
58	295	300	5	3%
59	300	305	5	3%
60	305	310	5	3%
61	310	315	5	3%
62	315	320	5	3%
63	320	325	5	3%
64	325	330	5	3%
65	330	335	5	3%
66	335	340	5	3%
67	340	345	5	3%
68	345	350	5	3%
69	350	355	5	3%
70	355	360	5	3%
71	360	365	5	3%
72	365	370	5	3%
73	370	375	5	3%
74	375	380	5	3%
75	380	385	5	3%
76	385	390	5	3%
77	390	395	5	3%
78	395	400	5	3%
79	400	405	5	3%
80	405	410	5	3%
81	410	415	5	3%
82	415	420	5	3%
83	420	425	5	3%
84	425	430	5	3%
85	430	435	5	3%
86	435	440	5	3%
87	440	445	5	3%
88	445	450	5	3%
89	450	455	5	3%
90	455	460	5	3%
91	460	465	5	3%
92	465	470	5	3%
93	470	475	5	3%
94	475	480	5	3%
95	480	485	5	3%
96	485	490	5	3%
97	490	495	5	3%
98	495	500	5	3%
99	500	505	5	3%
100	505	510	5	3%



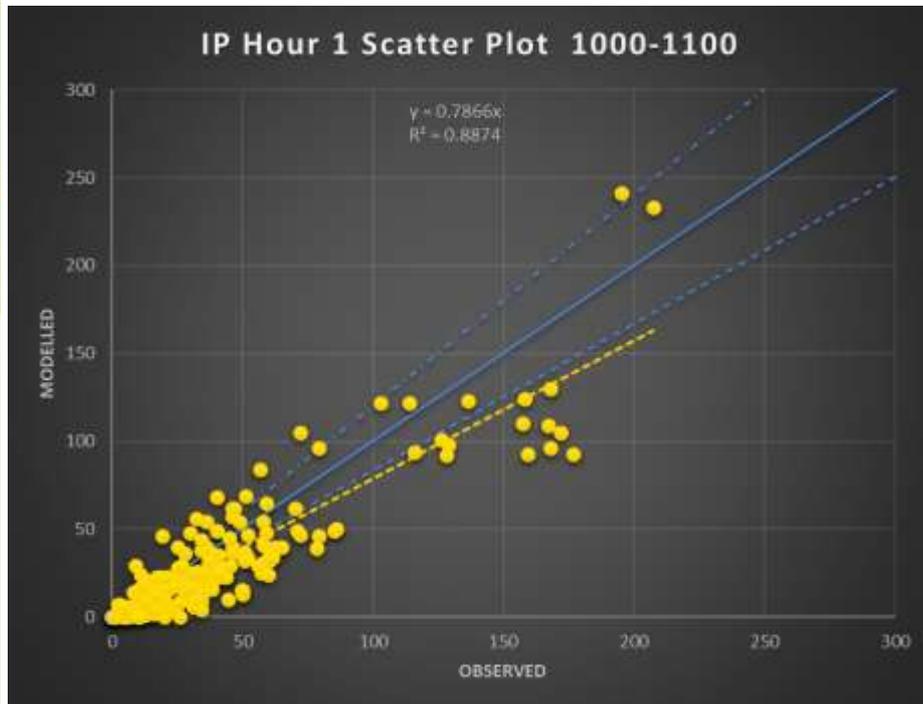
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- AM Hour 3

Link ID	Observed	Modelled
1	10	12
2	15	18
3	20	25
4	25	30
5	30	35
6	35	40
7	40	45
8	45	50
9	50	55
10	55	60
11	60	65
12	65	70
13	70	75
14	75	80
15	80	85
16	85	90
17	90	95
18	95	100
19	100	105
20	105	110
21	110	115
22	115	120
23	120	125
24	125	130
25	130	135
26	135	140
27	140	145
28	145	150
29	150	155
30	155	160
31	160	165
32	165	170
33	170	175
34	175	180
35	180	185
36	185	190
37	190	195
38	195	200
39	200	205
40	205	210
41	210	215
42	215	220
43	220	225
44	225	230
45	230	235
46	235	240
47	240	245
48	245	250
49	250	255
50	255	260
51	260	265
52	265	270
53	270	275
54	275	280
55	280	285
56	285	290
57	290	295
58	295	300
59	300	305
60	305	310
61	310	315
62	315	320
63	320	325
64	325	330
65	330	335
66	335	340
67	340	345
68	345	350
69	350	355
70	355	360
71	360	365
72	365	370
73	370	375
74	375	380
75	380	385
76	385	390
77	390	395
78	395	400
79	400	405
80	405	410
81	410	415
82	415	420
83	420	425
84	425	430
85	430	435
86	435	440
87	440	445
88	445	450
89	450	455
90	455	460
91	460	465
92	465	470
93	470	475
94	475	480
95	480	485
96	485	490
97	490	495
98	495	500
99	500	505
100	505	510



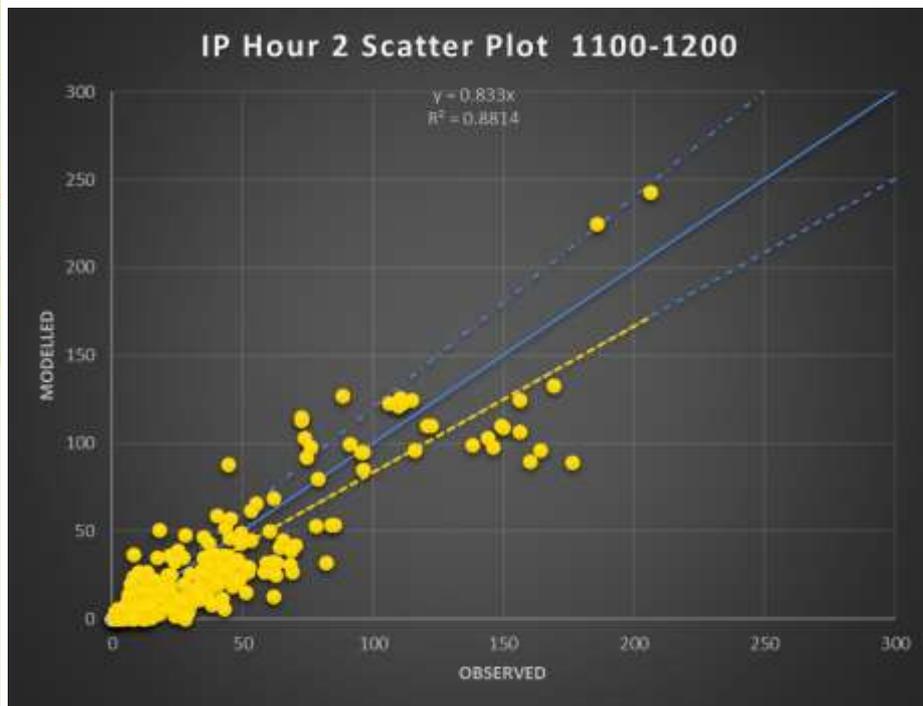
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- AM Hour 4

Link ID	Observed	Modelled
1	10	12
2	15	18
3	20	25
4	25	30
5	30	35
6	35	40
7	40	45
8	45	50
9	50	55
10	55	60
11	60	65
12	65	70
13	70	75
14	75	80
15	80	85
16	85	90
17	90	95
18	95	100
19	100	105
20	105	110
21	110	115
22	115	120
23	120	125
24	125	130
25	130	135
26	135	140
27	140	145
28	145	150
29	150	155
30	155	160
31	160	165
32	165	170
33	170	175
34	175	180
35	180	185
36	185	190
37	190	195
38	195	200
39	200	205
40	205	210
41	210	215
42	215	220
43	220	225
44	225	230
45	230	235
46	235	240
47	240	245
48	245	250
49	250	255
50	255	260
51	260	265
52	265	270
53	270	275
54	275	280
55	280	285
56	285	290
57	290	295
58	295	300
59	300	305
60	305	310
61	310	315
62	315	320
63	320	325
64	325	330
65	330	335
66	335	340
67	340	345
68	345	350
69	350	355
70	355	360
71	360	365
72	365	370
73	370	375
74	375	380
75	380	385
76	385	390
77	390	395
78	395	400
79	400	405
80	405	410
81	410	415
82	415	420
83	420	425
84	425	430
85	430	435
86	435	440
87	440	445
88	445	450
89	450	455
90	455	460
91	460	465
92	465	470
93	470	475
94	475	480
95	480	485
96	485	490
97	490	495
98	495	500
99	500	505
100	505	510



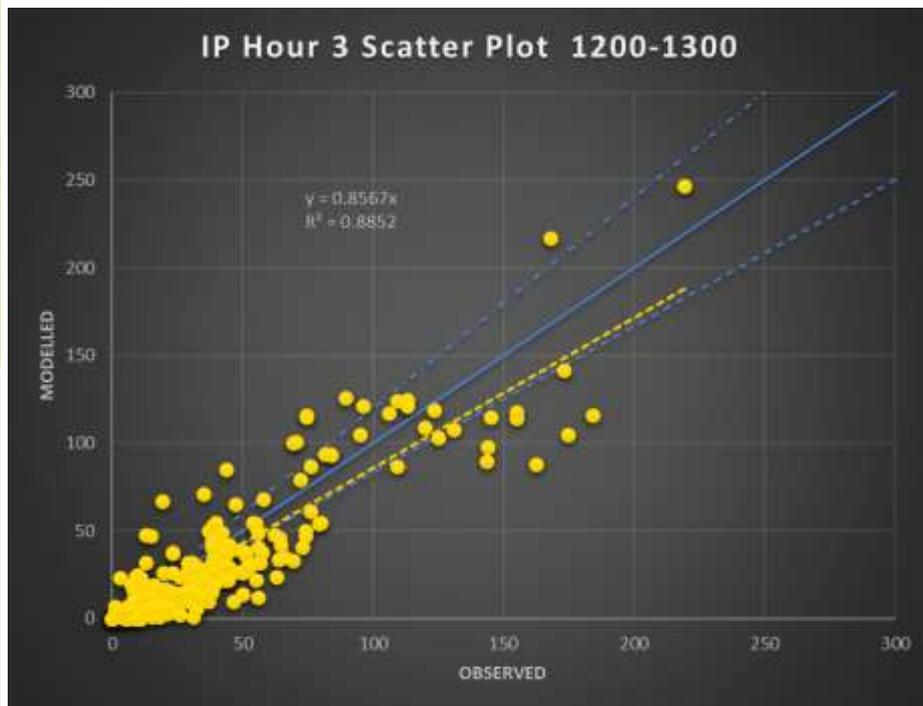
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- IP Hour 1

Link ID	Observed	Modelled
1	10	12
2	15	18
3	20	25
4	25	30
5	30	35
6	35	40
7	40	45
8	45	50
9	50	55
10	55	60
11	60	65
12	65	70
13	70	75
14	75	80
15	80	85
16	85	90
17	90	95
18	95	100
19	100	105
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32	165	170
33	170	175
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35	180	185
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37	190	195
38	195	200
39	200	205
40	205	210
41	210	215
42	215	220
43	220	225
44	225	230
45	230	235
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47	240	245
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51	260	265
52	265	270
53	270	275
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60	305	310
61	310	315
62	315	320
63	320	325
64	325	330
65	330	335
66	335	340
67	340	345
68	345	350
69	350	355
70	355	360
71	360	365
72	365	370
73	370	375
74	375	380
75	380	385
76	385	390
77	390	395
78	395	400
79	400	405
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90	455	460
91	460	465
92	465	470
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94	475	480
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96	485	490
97	490	495
98	495	500
99	500	505
100	505	510



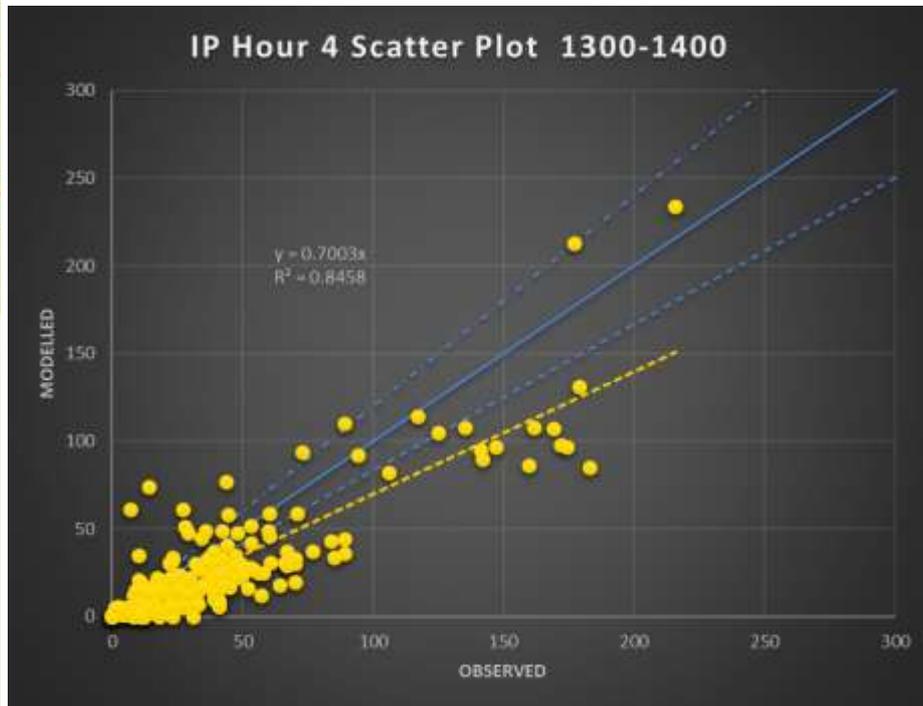
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- IP Hour 2

Link ID	Observed	Modelled
1	10	12
2	15	18
3	20	25
4	25	30
5	30	35
6	35	40
7	40	45
8	45	50
9	50	55
10	55	60
11	60	65
12	65	70
13	70	75
14	75	80
15	80	85
16	85	90
17	90	95
18	95	100
19	100	105
20	105	110
21	110	115
22	115	120
23	120	125
24	125	130
25	130	135
26	135	140
27	140	145
28	145	150
29	150	155
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35	180	185
36	185	190
37	190	195
38	195	200
39	200	205
40	205	210
41	210	215
42	215	220
43	220	225
44	225	230
45	230	235
46	235	240
47	240	245
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51	260	265
52	265	270
53	270	275
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55	280	285
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91	460	465
92	465	470
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100	505	510



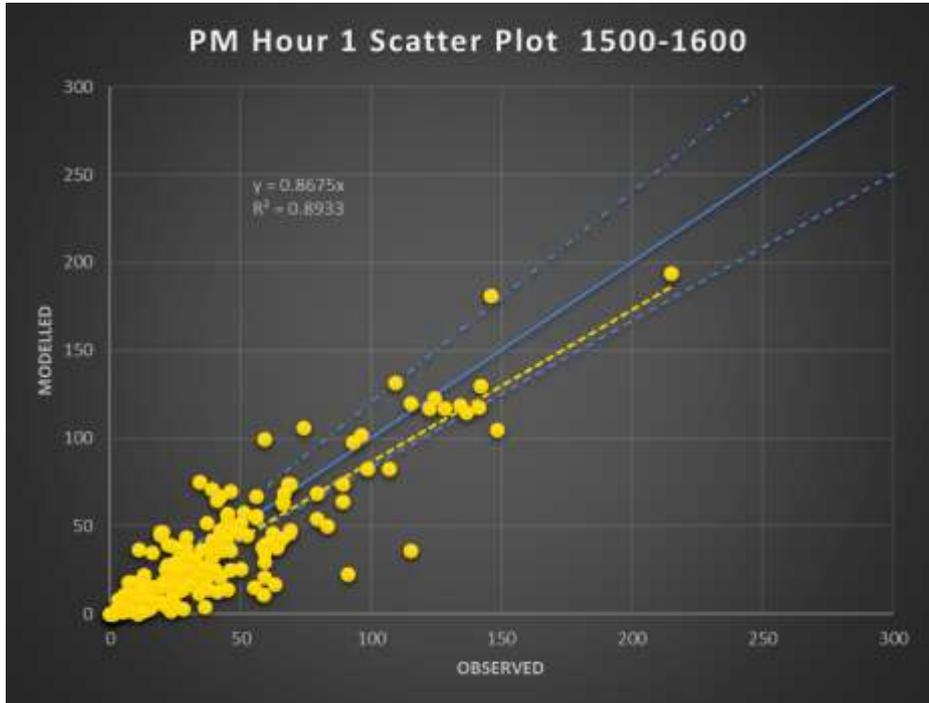
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- IP Hour 3

Link ID	Observed	Modelled
1	10	15
2	20	25
3	30	35
4	40	45
5	50	55
6	60	65
7	70	75
8	80	85
9	90	95
10	100	105
11	110	115
12	120	125
13	130	135
14	140	145
15	150	155
16	160	165
17	170	175
18	180	185
19	190	195
20	200	205
21	210	215
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24	240	245
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27	270	275
28	280	285
29	290	295
30	300	305



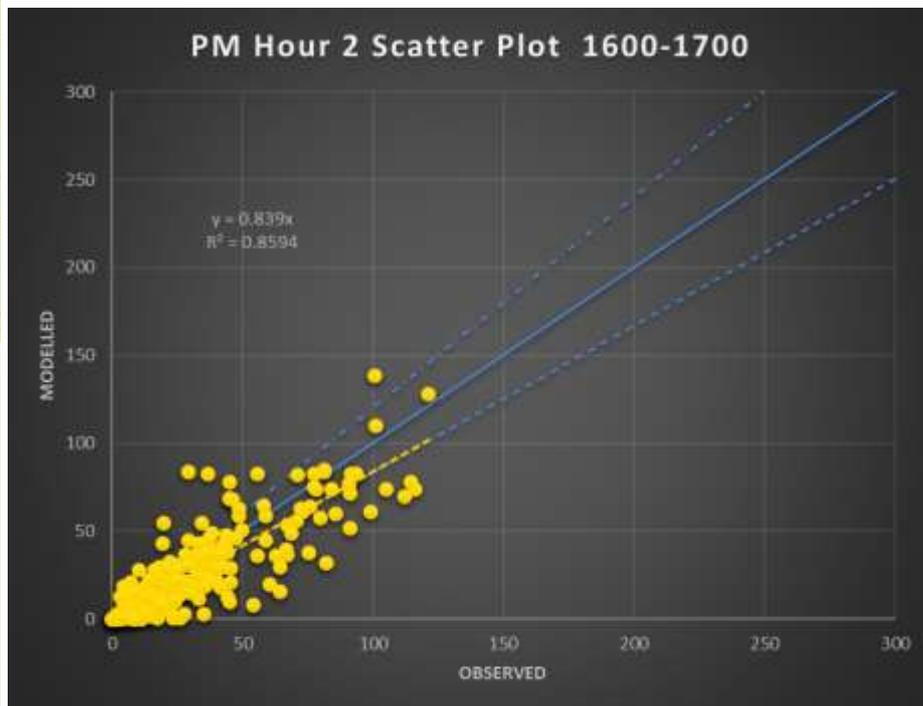
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- IP Hour 4

Link ID	Observed	Modelled
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3	20	25
4	25	30
5	30	35
6	35	40
7	40	45
8	45	50
9	50	55
10	55	60
11	60	65
12	65	70
13	70	75
14	75	80
15	80	85
16	85	90
17	90	95
18	95	100
19	100	105
20	105	110
21	110	115
22	115	120
23	120	125
24	125	130
25	130	135
26	135	140
27	140	145
28	145	150
29	150	155
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33	170	175
34	175	180
35	180	185
36	185	190
37	190	195
38	195	200
39	200	205
40	205	210
41	210	215
42	215	220
43	220	225
44	225	230
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51	260	265
52	265	270
53	270	275
54	275	280
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56	285	290
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58	295	300
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69	350	355
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91	460	465
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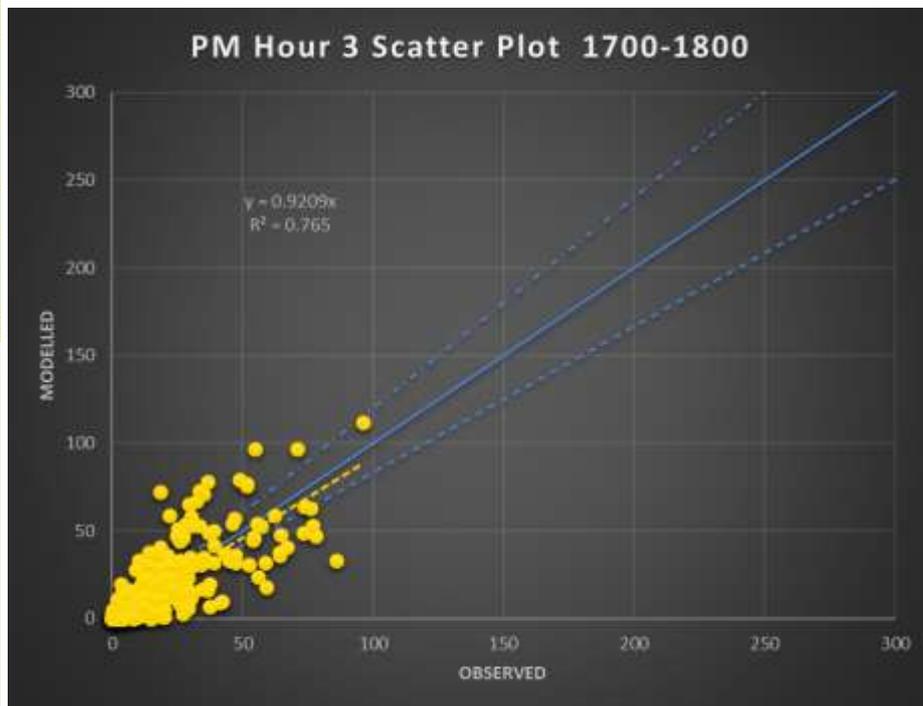
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- PM Hour 1

Link ID	Observed	Modelled
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4	25	30
5	30	35
6	35	40
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11	60	65
12	65	70
13	70	75
14	75	80
15	80	85
16	85	90
17	90	95
18	95	100
19	100	105
20	105	110
21	110	115
22	115	120
23	120	125
24	125	130
25	130	135
26	135	140
27	140	145
28	145	150
29	150	155
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100	505	510



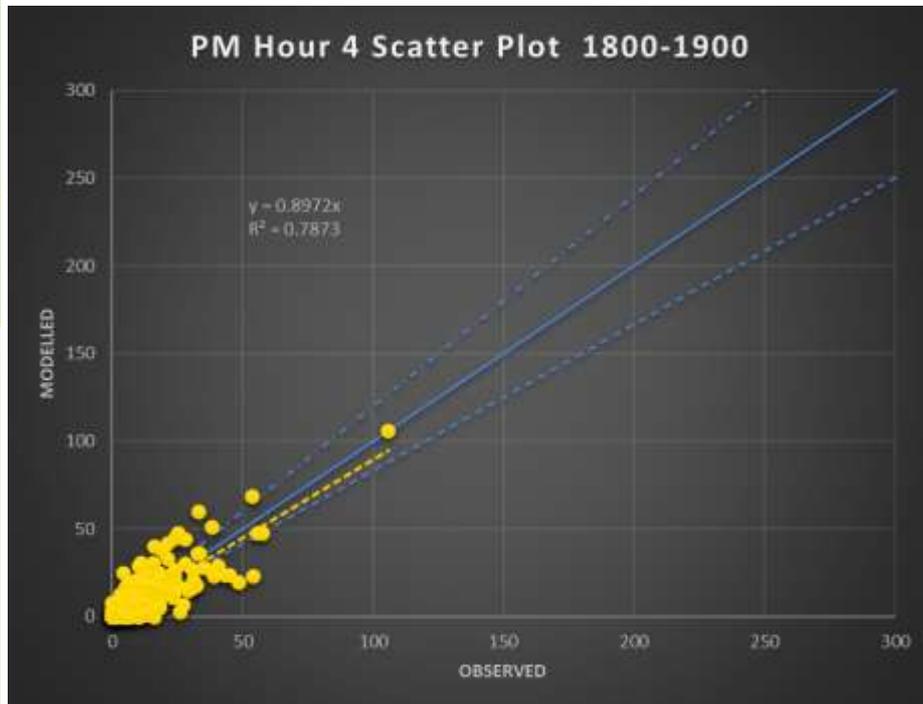
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- PM Hour 2

Link ID	Observed	Modelled
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4	25	30
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11	60	65
12	65	70
13	70	75
14	75	80
15	80	85
16	85	90
17	90	95
18	95	100
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100	505	510



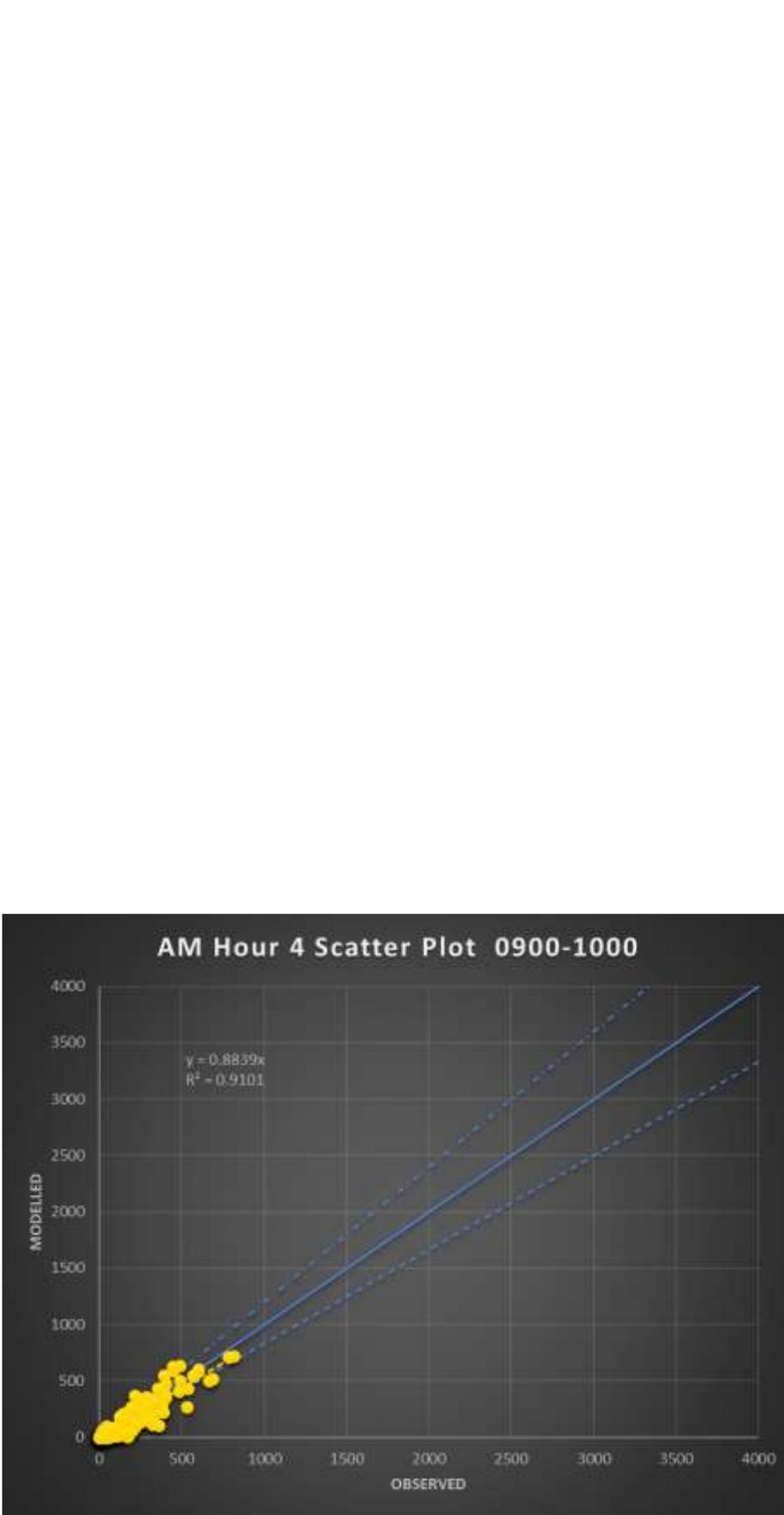
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- PM Hour 3

Link ID	Observed	Modelled
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10	55	60
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29	150	155
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90	455	460
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97	490	495
98	495	500
99	500	505
100	505	510



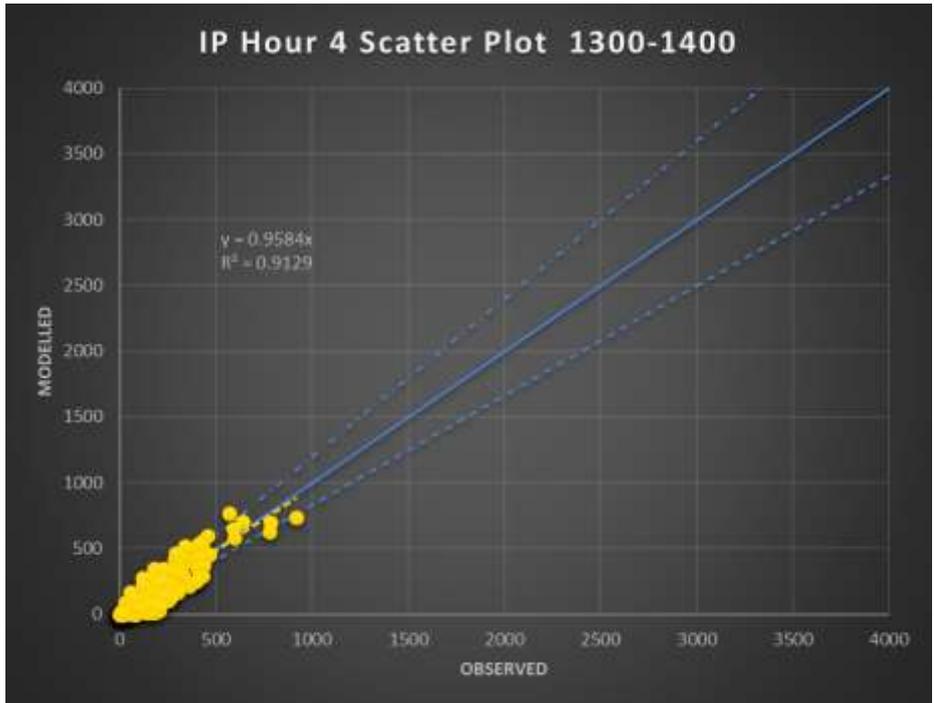
Individual link counts GEH & XY scatter plot - heavy vehicles - hybrid layer- PM Hour 4

Location	Turn/Subturn	Vehicle ID	Obs	Mod	Mod - Obs	% Diff	Acc
AMH000002_C4	Turn	8709119	151	141	-10	-6.6%	4.0
AMH000002_C4	Turn	8709120	150	141	-9	-6.0%	4.0
AMH000002_C4	Turn	8709121	149	141	-8	-5.4%	4.0
AMH000002_C4	Turn	8709122	148	141	-7	-4.7%	4.0
AMH000002_C4	Turn	8709123	147	141	-6	-4.1%	4.0
AMH000002_C4	Turn	8709124	146	141	-5	-3.4%	4.0
AMH000002_C4	Turn	8709125	145	141	-4	-2.8%	4.0
AMH000002_C4	Turn	8709126	144	141	-3	-2.1%	4.0
AMH000002_C4	Turn	8709127	143	141	-2	-1.4%	4.0
AMH000002_C4	Turn	8709128	142	141	-1	-0.7%	4.0
AMH000002_C4	Turn	8709129	141	141	0	0.0%	4.0
AMH000002_C4	Turn	8709130	140	141	1	0.7%	4.0
AMH000002_C4	Turn	8709131	139	141	2	1.4%	4.0
AMH000002_C4	Turn	8709132	138	141	3	2.1%	4.0
AMH000002_C4	Turn	8709133	137	141	4	2.9%	4.0
AMH000002_C4	Turn	8709134	136	141	5	3.6%	4.0
AMH000002_C4	Turn	8709135	135	141	6	4.4%	4.0
AMH000002_C4	Turn	8709136	134	141	7	5.2%	4.0
AMH000002_C4	Turn	8709137	133	141	8	6.0%	4.0
AMH000002_C4	Turn	8709138	132	141	9	6.8%	4.0
AMH000002_C4	Turn	8709139	131	141	10	7.6%	4.0
AMH000002_C4	Turn	8709140	130	141	11	8.4%	4.0
AMH000002_C4	Turn	8709141	129	141	12	9.3%	4.0
AMH000002_C4	Turn	8709142	128	141	13	10.1%	4.0
AMH000002_C4	Turn	8709143	127	141	14	11.0%	4.0
AMH000002_C4	Turn	8709144	126	141	15	11.9%	4.0
AMH000002_C4	Turn	8709145	125	141	16	12.8%	4.0
AMH000002_C4	Turn	8709146	124	141	17	13.7%	4.0
AMH000002_C4	Turn	8709147	123	141	18	14.6%	4.0
AMH000002_C4	Turn	8709148	122	141	19	15.6%	4.0
AMH000002_C4	Turn	8709149	121	141	20	16.4%	4.0
AMH000002_C4	Turn	8709150	120	141	21	17.5%	4.0
AMH000002_C4	Turn	8709151	119	141	22	18.5%	4.0
AMH000002_C4	Turn	8709152	118	141	23	19.5%	4.0
AMH000002_C4	Turn	8709153	117	141	24	20.5%	4.0
AMH000002_C4	Turn	8709154	116	141	25	21.5%	4.0
AMH000002_C4	Turn	8709155	115	141	26	22.6%	4.0
AMH000002_C4	Turn	8709156	114	141	27	23.7%	4.0
AMH000002_C4	Turn	8709157	113	141	28	24.8%	4.0
AMH000002_C4	Turn	8709158	112	141	29	25.9%	4.0
AMH000002_C4	Turn	8709159	111	141	30	27.0%	4.0
AMH000002_C4	Turn	8709160	110	141	31	28.2%	4.0
AMH000002_C4	Turn	8709161	109	141	32	29.4%	4.0
AMH000002_C4	Turn	8709162	108	141	33	30.6%	4.0
AMH000002_C4	Turn	8709163	107	141	34	31.8%	4.0
AMH000002_C4	Turn	8709164	106	141	35	33.0%	4.0
AMH000002_C4	Turn	8709165	105	141	36	34.3%	4.0
AMH000002_C4	Turn	8709166	104	141	37	35.6%	4.0
AMH000002_C4	Turn	8709167	103	141	38	36.9%	4.0
AMH000002_C4	Turn	8709168	102	141	39	38.2%	4.0
AMH000002_C4	Turn	8709169	101	141	40	39.6%	4.0
AMH000002_C4	Turn	8709170	100	141	41	41.0%	4.0
AMH000002_C4	Turn	8709171	99	141	42	42.4%	4.0
AMH000002_C4	Turn	8709172	98	141	43	43.9%	4.0
AMH000002_C4	Turn	8709173	97	141	44	45.4%	4.0
AMH000002_C4	Turn	8709174	96	141	45	46.9%	4.0
AMH000002_C4	Turn	8709175	95	141	46	48.4%	4.0
AMH000002_C4	Turn	8709176	94	141	47	50.0%	4.0
AMH000002_C4	Turn	8709177	93	141	48	51.6%	4.0
AMH000002_C4	Turn	8709178	92	141	49	53.3%	4.0
AMH000002_C4	Turn	8709179	91	141	50	55.0%	4.0
AMH000002_C4	Turn	8709180	90	141	51	56.7%	4.0
AMH000002_C4	Turn	8709181	89	141	52	58.4%	4.0
AMH000002_C4	Turn	8709182	88	141	53	60.2%	4.0
AMH000002_C4	Turn	8709183	87	141	54	62.0%	4.0
AMH000002_C4	Turn	8709184	86	141	55	63.9%	4.0
AMH000002_C4	Turn	8709185	85	141	56	65.8%	4.0
AMH000002_C4	Turn	8709186	84	141	57	67.8%	4.0
AMH000002_C4	Turn	8709187	83	141	58	69.8%	4.0
AMH000002_C4	Turn	8709188	82	141	59	71.9%	4.0
AMH000002_C4	Turn	8709189	81	141	60	74.0%	4.0
AMH000002_C4	Turn	8709190	80	141	61	76.2%	4.0
AMH000002_C4	Turn	8709191	79	141	62	78.4%	4.0
AMH000002_C4	Turn	8709192	78	141	63	80.6%	4.0
AMH000002_C4	Turn	8709193	77	141	64	82.9%	4.0
AMH000002_C4	Turn	8709194	76	141	65	85.3%	4.0
AMH000002_C4	Turn	8709195	75	141	66	87.7%	4.0
AMH000002_C4	Turn	8709196	74	141	67	90.1%	4.0
AMH000002_C4	Turn	8709197	73	141	68	92.6%	4.0
AMH000002_C4	Turn	8709198	72	141	69	95.1%	4.0
AMH000002_C4	Turn	8709199	71	141	70	97.6%	4.0
AMH000002_C4	Turn	8709200	70	141	71	100.1%	4.0
AMH000002_C4	Turn	8709201	69	141	72	102.7%	4.0
AMH000002_C4	Turn	8709202	68	141	73	105.3%	4.0
AMH000002_C4	Turn	8709203	67	141	74	108.0%	4.0
AMH000002_C4	Turn	8709204	66	141	75	110.7%	4.0
AMH000002_C4	Turn	8709205	65	141	76	113.5%	4.0
AMH000002_C4	Turn	8709206	64	141	77	116.3%	4.0
AMH000002_C4	Turn	8709207	63	141	78	119.2%	4.0
AMH000002_C4	Turn	8709208	62	141	79	122.1%	4.0
AMH000002_C4	Turn	8709209	61	141	80	125.1%	4.0
AMH000002_C4	Turn	8709210	60	141	81	128.1%	4.0
AMH000002_C4	Turn	8709211	59	141	82	131.2%	4.0
AMH000002_C4	Turn	8709212	58	141	83	134.3%	4.0
AMH000002_C4	Turn	8709213	57	141	84	137.5%	4.0
AMH000002_C4	Turn	8709214	56	141	85	140.7%	4.0
AMH000002_C4	Turn	8709215	55	141	86	144.0%	4.0
AMH000002_C4	Turn	8709216	54	141	87	147.4%	4.0
AMH000002_C4	Turn	8709217	53	141	88	150.9%	4.0
AMH000002_C4	Turn	8709218	52	141	89	154.4%	4.0
AMH000002_C4	Turn	8709219	51	141	90	158.0%	4.0
AMH000002_C4	Turn	8709220	50	141	91	161.6%	4.0
AMH000002_C4	Turn	8709221	49	141	92	165.3%	4.0
AMH000002_C4	Turn	8709222	48	141	93	169.1%	4.0
AMH000002_C4	Turn	8709223	47	141	94	173.0%	4.0
AMH000002_C4	Turn	8709224	46	141	95	176.9%	4.0
AMH000002_C4	Turn	8709225	45	141	96	181.0%	4.0
AMH000002_C4	Turn	8709226	44	141	97	185.1%	4.0
AMH000002_C4	Turn	8709227	43	141	98	189.3%	4.0
AMH000002_C4	Turn	8709228	42	141	99	193.6%	4.0
AMH000002_C4	Turn	8709229	41	141	100	198.0%	4.0
AMH000002_C4	Turn	8709230	40	141	101	202.5%	4.0
AMH000002_C4	Turn	8709231	39	141	102	207.1%	4.0
AMH000002_C4	Turn	8709232	38	141	103	211.8%	4.0
AMH000002_C4	Turn	8709233	37	141	104	216.6%	4.0
AMH000002_C4	Turn	8709234	36	141	105	221.4%	4.0
AMH000002_C4	Turn	8709235	35	141	106	226.3%	4.0
AMH000002_C4	Turn	8709236	34	141	107	231.3%	4.0
AMH000002_C4	Turn	8709237	33	141	108	236.4%	4.0
AMH000002_C4	Turn	8709238	32	141	109	241.6%	4.0
AMH000002_C4	Turn	8709239	31	141	110	246.9%	4.0
AMH000002_C4	Turn	8709240	30	141	111	252.3%	4.0
AMH000002_C4	Turn	8709241	29	141	112	257.8%	4.0
AMH000002_C4	Turn	8709242	28	141	113	263.4%	4.0
AMH000002_C4	Turn	8709243	27	141	114	269.1%	4.0
AMH000002_C4	Turn	8709244	26	141	115	274.9%	4.0
AMH000002_C4	Turn	8709245	25	141	116	280.8%	4.0
AMH000002_C4	Turn	8709246	24	141	117	286.8%	4.0
AMH000002_C4	Turn	8709247	23	141	118	292.9%	4.0
AMH000002_C4	Turn	8709248	22	141	119	299.1%	4.0
AMH000002_C4	Turn	8709249	21	141	120	305.4%	4.0
AMH000002_C4	Turn	8709250	20	141	121	311.8%	4.0
AMH000002_C4	Turn	8709251	19	141	122	318.4%	4.0
AMH000002_C4	Turn	8709252	18	141	123	325.1%	4.0
AMH000002_C4	Turn	8709253	17	141	124	331.9%	4.0
AMH000002_C4	Turn	8709254	16	141	125	338.8%	4.0
AMH000002_C4	Turn	8709255	15	141	126	345.9%	4.0
AMH000002_C4	Turn	8709256	14	141	127	353.1%	4.0
AMH000002_C4	Turn	8709257	13	141	128	360.5%	4.0
AMH000002_C4	Turn	8709258	12	141	129	368.0%	4.0
AMH000002_C4	Turn	8709259	11	141	130	375.7%	4.0
AMH000002_C4	Turn	8709260	10	141	131	383.5%	4.0
AMH000002_C4	Turn	8709261	9	141	132	391.5%	4.0
AMH000002_C4	Turn	8709262	8	141	133	399.6%	4.0
AMH000002_C4	Turn	8709263	7	141	134	407.9%	4.0
AMH000002_C4	Turn	8709264	6	141	135	416.3%	4.0
AMH000002_C4	Turn	8709265	5	141	136	424.9%	4.0
AMH000002_C4	Turn	8709266	4	141	137	433.6%	4.0
AMH000002_C4	Turn	8709267	3	141	138	442.5%	4.0
AMH000002_C4	Turn	8709268	2	141	139	451.5%	4.0
AMH000002_C4	Turn	8709269	1	141	140	460.7%	4.0
AMH000002_C4	Turn	8709270	0	141	141	470.0%	4.0



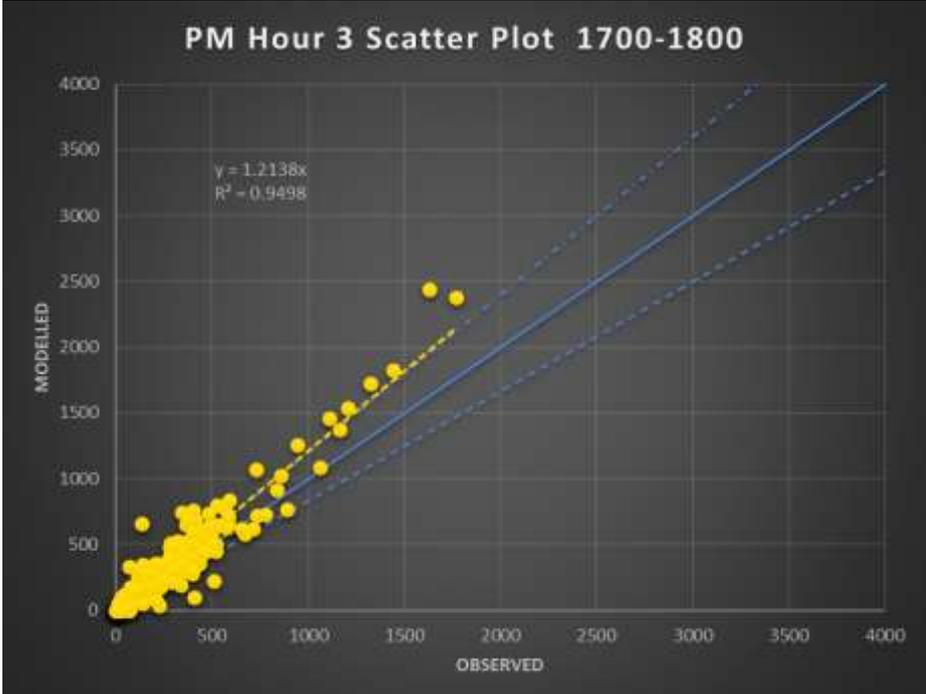
Individual turn counts GEH & XY scatter plot - light vehicles - hybrid layer- AM Hour 4

Location	Turn/Category	Actual #	Obs	Model	Ratio	Color
888 Main St - 888 Main St	Turn	8887212	41	77	186	4.44
888 Main St - 888 Main St	Turn	8887213	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887214	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887215	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887216	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887217	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887218	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887219	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887220	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887221	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887222	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887223	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887224	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887225	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887226	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887227	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887228	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887229	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887230	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887231	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887232	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887233	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887234	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887235	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887236	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887237	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887238	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887239	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887240	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887241	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887242	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887243	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887244	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887245	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887246	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887247	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887248	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887249	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887250	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887251	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887252	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887253	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887254	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887255	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887256	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887257	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887258	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887259	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887260	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887261	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887262	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887263	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887264	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887265	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887266	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887267	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887268	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887269	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887270	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887271	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887272	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887273	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887274	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887275	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887276	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887277	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887278	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887279	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887280	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887281	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887282	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887283	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887284	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887285	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887286	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887287	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887288	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887289	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887290	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887291	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887292	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887293	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887294	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887295	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887296	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887297	144	33	103	0.61
888 Main St - 888 Main St	Turn	8887298	41	141	349	8.51
888 Main St - 888 Main St	Turn	8887299	54	77	186	4.44
888 Main St - 888 Main St	Turn	8887300	144	33	103	0.61



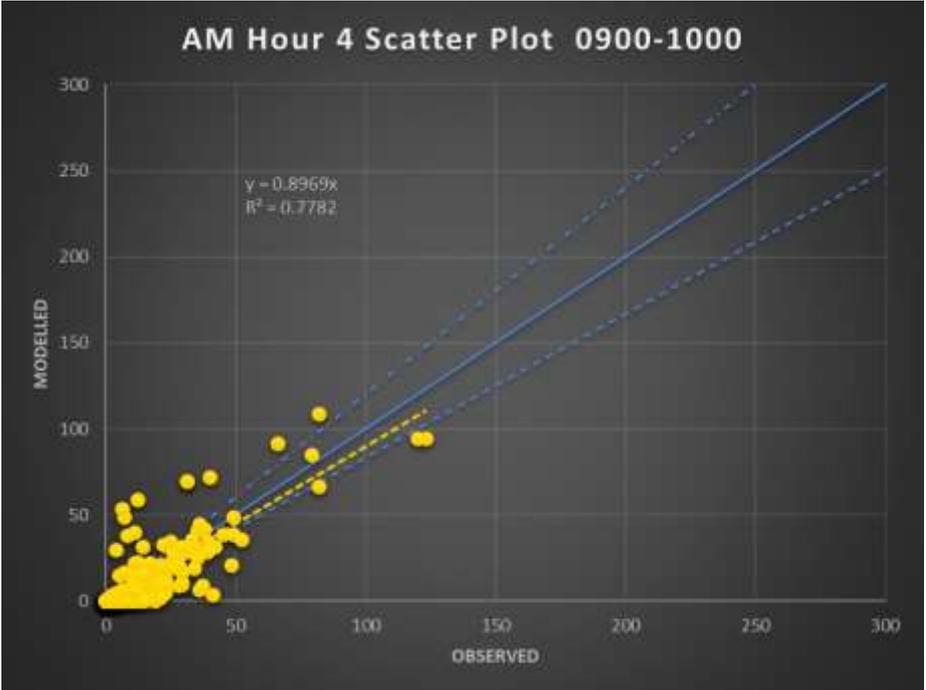
Individual turn counts GEH & XY scatter plot – light vehicles – hybrid layer– IP Hour 4

Location	Turn/Category	Assess	Obs	Mod	PM Hour 3 Mod	Rate
Highway 101 - S	Turn	RT01701	200	200	195	0.97
Highway 101 - S	Turn	RT01702	110	110	108	0.98
Highway 101 - S	Turn	RT01703	100	100	98	0.98
Highway 101 - S	Turn	RT01704	100	100	98	0.98
Highway 101 - S	Turn	RT01705	100	100	98	0.98
Highway 101 - S	Turn	RT01706	100	100	98	0.98
Highway 101 - S	Turn	RT01707	100	100	98	0.98
Highway 101 - S	Turn	RT01708	100	100	98	0.98
Highway 101 - S	Turn	RT01709	100	100	98	0.98
Highway 101 - S	Turn	RT01710	100	100	98	0.98
Highway 101 - S	Turn	RT01711	100	100	98	0.98
Highway 101 - S	Turn	RT01712	100	100	98	0.98
Highway 101 - S	Turn	RT01713	100	100	98	0.98
Highway 101 - S	Turn	RT01714	100	100	98	0.98
Highway 101 - S	Turn	RT01715	100	100	98	0.98
Highway 101 - S	Turn	RT01716	100	100	98	0.98
Highway 101 - S	Turn	RT01717	100	100	98	0.98
Highway 101 - S	Turn	RT01718	100	100	98	0.98
Highway 101 - S	Turn	RT01719	100	100	98	0.98
Highway 101 - S	Turn	RT01720	100	100	98	0.98
Highway 101 - S	Turn	RT01721	100	100	98	0.98
Highway 101 - S	Turn	RT01722	100	100	98	0.98
Highway 101 - S	Turn	RT01723	100	100	98	0.98
Highway 101 - S	Turn	RT01724	100	100	98	0.98
Highway 101 - S	Turn	RT01725	100	100	98	0.98
Highway 101 - S	Turn	RT01726	100	100	98	0.98
Highway 101 - S	Turn	RT01727	100	100	98	0.98
Highway 101 - S	Turn	RT01728	100	100	98	0.98
Highway 101 - S	Turn	RT01729	100	100	98	0.98
Highway 101 - S	Turn	RT01730	100	100	98	0.98
Highway 101 - S	Turn	RT01731	100	100	98	0.98
Highway 101 - S	Turn	RT01732	100	100	98	0.98
Highway 101 - S	Turn	RT01733	100	100	98	0.98
Highway 101 - S	Turn	RT01734	100	100	98	0.98
Highway 101 - S	Turn	RT01735	100	100	98	0.98
Highway 101 - S	Turn	RT01736	100	100	98	0.98
Highway 101 - S	Turn	RT01737	100	100	98	0.98
Highway 101 - S	Turn	RT01738	100	100	98	0.98
Highway 101 - S	Turn	RT01739	100	100	98	0.98
Highway 101 - S	Turn	RT01740	100	100	98	0.98
Highway 101 - S	Turn	RT01741	100	100	98	0.98
Highway 101 - S	Turn	RT01742	100	100	98	0.98
Highway 101 - S	Turn	RT01743	100	100	98	0.98
Highway 101 - S	Turn	RT01744	100	100	98	0.98
Highway 101 - S	Turn	RT01745	100	100	98	0.98
Highway 101 - S	Turn	RT01746	100	100	98	0.98
Highway 101 - S	Turn	RT01747	100	100	98	0.98
Highway 101 - S	Turn	RT01748	100	100	98	0.98
Highway 101 - S	Turn	RT01749	100	100	98	0.98
Highway 101 - S	Turn	RT01750	100	100	98	0.98
Highway 101 - S	Turn	RT01751	100	100	98	0.98
Highway 101 - S	Turn	RT01752	100	100	98	0.98
Highway 101 - S	Turn	RT01753	100	100	98	0.98
Highway 101 - S	Turn	RT01754	100	100	98	0.98
Highway 101 - S	Turn	RT01755	100	100	98	0.98
Highway 101 - S	Turn	RT01756	100	100	98	0.98
Highway 101 - S	Turn	RT01757	100	100	98	0.98
Highway 101 - S	Turn	RT01758	100	100	98	0.98
Highway 101 - S	Turn	RT01759	100	100	98	0.98
Highway 101 - S	Turn	RT01760	100	100	98	0.98
Highway 101 - S	Turn	RT01761	100	100	98	0.98
Highway 101 - S	Turn	RT01762	100	100	98	0.98
Highway 101 - S	Turn	RT01763	100	100	98	0.98
Highway 101 - S	Turn	RT01764	100	100	98	0.98
Highway 101 - S	Turn	RT01765	100	100	98	0.98
Highway 101 - S	Turn	RT01766	100	100	98	0.98
Highway 101 - S	Turn	RT01767	100	100	98	0.98
Highway 101 - S	Turn	RT01768	100	100	98	0.98
Highway 101 - S	Turn	RT01769	100	100	98	0.98
Highway 101 - S	Turn	RT01770	100	100	98	0.98
Highway 101 - S	Turn	RT01771	100	100	98	0.98
Highway 101 - S	Turn	RT01772	100	100	98	0.98
Highway 101 - S	Turn	RT01773	100	100	98	0.98
Highway 101 - S	Turn	RT01774	100	100	98	0.98
Highway 101 - S	Turn	RT01775	100	100	98	0.98
Highway 101 - S	Turn	RT01776	100	100	98	0.98
Highway 101 - S	Turn	RT01777	100	100	98	0.98
Highway 101 - S	Turn	RT01778	100	100	98	0.98
Highway 101 - S	Turn	RT01779	100	100	98	0.98
Highway 101 - S	Turn	RT01780	100	100	98	0.98
Highway 101 - S	Turn	RT01781	100	100	98	0.98
Highway 101 - S	Turn	RT01782	100	100	98	0.98
Highway 101 - S	Turn	RT01783	100	100	98	0.98
Highway 101 - S	Turn	RT01784	100	100	98	0.98
Highway 101 - S	Turn	RT01785	100	100	98	0.98
Highway 101 - S	Turn	RT01786	100	100	98	0.98
Highway 101 - S	Turn	RT01787	100	100	98	0.98
Highway 101 - S	Turn	RT01788	100	100	98	0.98
Highway 101 - S	Turn	RT01789	100	100	98	0.98
Highway 101 - S	Turn	RT01790	100	100	98	0.98
Highway 101 - S	Turn	RT01791	100	100	98	0.98
Highway 101 - S	Turn	RT01792	100	100	98	0.98
Highway 101 - S	Turn	RT01793	100	100	98	0.98
Highway 101 - S	Turn	RT01794	100	100	98	0.98
Highway 101 - S	Turn	RT01795	100	100	98	0.98
Highway 101 - S	Turn	RT01796	100	100	98	0.98
Highway 101 - S	Turn	RT01797	100	100	98	0.98
Highway 101 - S	Turn	RT01798	100	100	98	0.98
Highway 101 - S	Turn	RT01799	100	100	98	0.98
Highway 101 - S	Turn	RT01800	100	100	98	0.98



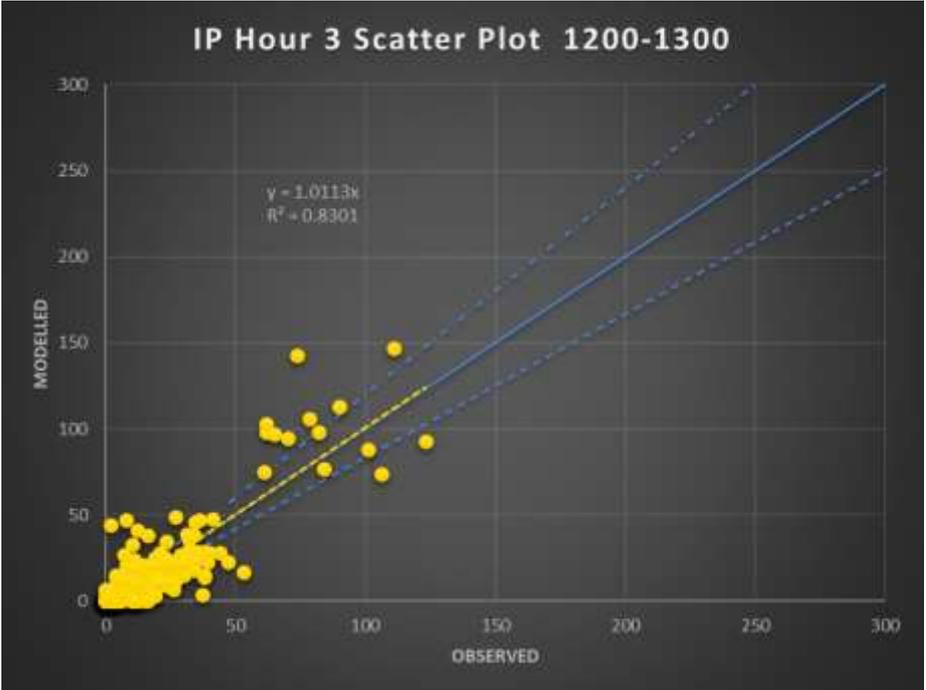
Individual turn counts GEH & XY scatter plot - light vehicles - hybrid layer- PM Hour 3

Location	Turn/Category	Access #	Obs	Mod	Diff	Rate	Rate
888-MANCHA-042-C-A	Turn	87597120					
888-MANCHA-042-C-B	Turn	87597121					
888-MANCHA-042-C-C	Turn	87597122					
888-MANCHA-042-A-B	Turn	87597123					
888-MANCHA-042-A-C	Turn	87597124					
888-MANCHA-042-E-D	Turn	87597125					
888-MANCHA-042-E-E	Turn	87597126					
888-MANCHA-042-D	Turn	87597127					
888-MANCHA-042-E	Turn	87597128					
888-MANCHA-042-E	Turn	87597129					
888-MANCHA-042-E	Turn	87597130					
888-MANCHA-042-E	Turn	87597131					
888-MANCHA-042-E	Turn	87597132					
888-MANCHA-042-E	Turn	87597133					
888-MANCHA-042-E	Turn	87597134					
888-MANCHA-042-E	Turn	87597135					
888-MANCHA-042-E	Turn	87597136					
888-MANCHA-042-E	Turn	87597137					
888-MANCHA-042-E	Turn	87597138					
888-MANCHA-042-E	Turn	87597139					
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888-MANCHA-042-E	Turn	87597142					
888-MANCHA-042-E	Turn	87597143					
888-MANCHA-042-E	Turn	87597144					
888-MANCHA-042-E	Turn	87597145					
888-MANCHA-042-E	Turn	87597146					
888-MANCHA-042-E	Turn	87597147					
888-MANCHA-042-E	Turn	87597148					
888-MANCHA-042-E	Turn	87597149					
888-MANCHA-042-E	Turn	87597150					
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888-MANCHA-042-E	Turn	87597152					
888-MANCHA-042-E	Turn	87597153					
888-MANCHA-042-E	Turn	87597154					
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888-MANCHA-042-E	Turn	87597156					
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888-MANCHA-042-E	Turn	87597162					
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888-MANCHA-042-E	Turn	87597167					
888-MANCHA-042-E	Turn	87597168					
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888-MANCHA-042-E	Turn	87597170					
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888-MANCHA-042-E	Turn	87597213					
888-MANCHA-042-E	Turn	87597214					
888-MANCHA-042-E	Turn	87597215					
888-MANCHA-042-E	Turn	87597216					
888-MANCHA-042-E	Turn	87597217					
888-MANCHA-042-E	Turn	87597218					
888-MANCHA-042-E	Turn	87597219					
888-MANCHA-042-E	Turn	87597220					
888-MANCHA-042-E	Turn	87597221					
888-MANCHA-042-E	Turn	87597222					
888-MANCHA-042-E	Turn	87597223					
888-MANCHA-042-E	Turn	87597224					
888-MANCHA-042-E	Turn	87597225					
888-MANCHA-042-E	Turn	87597226					
888-MANCHA-042-E	Turn	87597227					
888-MANCHA-042-E	Turn	87597228					
888-MANCHA-042-E	Turn	87597229					
888-MANCHA-042-E	Turn	87597230					
888-MANCHA-042-E	Turn	87597231					
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888-MANCHA-042-E	Turn	87597234					
888-MANCHA-042-E	Turn	87597235					
888-MANCHA-042-E	Turn	87597236					
888-MANCHA-042-E	Turn	87597237					
888-MANCHA-042-E	Turn	87597238					
888-MANCHA-042-E	Turn	87597239					
888-MANCHA-042-E	Turn	87597240					
888-MANCHA-042-E	Turn	87597241					
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888-MANCHA-042-E	Turn	87597243					
888-MANCHA-042-E	Turn	87597244					
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888-MANCHA-042-E	Turn	87597297					
888-MANCHA-042-E	Turn	87597298					
888-MANCHA-042-E	Turn	87597299					
888-MANCHA-042-E	Turn	87597300					



Individual turn counts GEH & XY scatter plot – heavy vehicles – hybrid layer– AM Hour 4

Location	Turn/Category	Access #	Obs	Mod	IP Hour 1200-1300	Line
Highway 404 E	Turn	8701711	146667	146667	146667	100
Highway 404 E	Turn	8701712	701333	701333	701333	100
Highway 404 E	Turn	8701713	233333	233333	233333	100
Highway 404 E	Turn	8701714	100000	100000	100000	100
Highway 404 E	Turn	8701715	111111	111111	111111	100
Highway 404 E	Turn	8701716	222222	222222	222222	100
Highway 404 E	Turn	8701717	333333	333333	333333	100
Highway 404 E	Turn	8701718	444444	444444	444444	100
Highway 404 E	Turn	8701719	555555	555555	555555	100
Highway 404 E	Turn	8701720	666666	666666	666666	100
Highway 404 E	Turn	8701721	777777	777777	777777	100
Highway 404 E	Turn	8701722	888888	888888	888888	100
Highway 404 E	Turn	8701723	999999	999999	999999	100
Highway 404 E	Turn	8701724	1000000	1000000	1000000	100
Highway 404 E	Turn	8701725	1100000	1100000	1100000	100
Highway 404 E	Turn	8701726	1200000	1200000	1200000	100
Highway 404 E	Turn	8701727	1300000	1300000	1300000	100
Highway 404 E	Turn	8701728	1400000	1400000	1400000	100
Highway 404 E	Turn	8701729	1500000	1500000	1500000	100
Highway 404 E	Turn	8701730	1600000	1600000	1600000	100
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Highway 404 E	Turn	8701733	1900000	1900000	1900000	100
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Highway 404 E	Turn	8701736	2200000	2200000	2200000	100
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Highway 404 E	Turn	8701741	2700000	2700000	2700000	100
Highway 404 E	Turn	8701742	2800000	2800000	2800000	100
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Highway 404 E	Turn	8701744	3000000	3000000	3000000	100
Highway 404 E	Turn	8701745	3100000	3100000	3100000	100
Highway 404 E	Turn	8701746	3200000	3200000	3200000	100
Highway 404 E	Turn	8701747	3300000	3300000	3300000	100
Highway 404 E	Turn	8701748	3400000	3400000	3400000	100
Highway 404 E	Turn	8701749	3500000	3500000	3500000	100
Highway 404 E	Turn	8701750	3600000	3600000	3600000	100
Highway 404 E	Turn	8701751	3700000	3700000	3700000	100
Highway 404 E	Turn	8701752	3800000	3800000	3800000	100
Highway 404 E	Turn	8701753	3900000	3900000	3900000	100
Highway 404 E	Turn	8701754	4000000	4000000	4000000	100
Highway 404 E	Turn	8701755	4100000	4100000	4100000	100
Highway 404 E	Turn	8701756	4200000	4200000	4200000	100
Highway 404 E	Turn	8701757	4300000	4300000	4300000	100
Highway 404 E	Turn	8701758	4400000	4400000	4400000	100
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Highway 404 E	Turn	8701766	5200000	5200000	5200000	100
Highway 404 E	Turn	8701767	5300000	5300000	5300000	100
Highway 404 E	Turn	8701768	5400000	5400000	5400000	100
Highway 404 E	Turn	8701769	5500000	5500000	5500000	100
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Highway 404 E	Turn	8701799	8500000	8500000	8500000	100
Highway 404 E	Turn	8701800	8600000	8600000	8600000	100
Highway 404 E	Turn	8701801	8700000	8700000	8700000	100
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Highway 404 E	Turn	8701808	9400000	9400000	9400000	100
Highway 404 E	Turn	8701809	9500000	9500000	9500000	100
Highway 404 E	Turn	8701810	9600000	9600000	9600000	100
Highway 404 E	Turn	8701811	9700000	9700000	9700000	100
Highway 404 E	Turn	8701812	9800000	9800000	9800000	100
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Highway 404 E	Turn	8701814	10000000	10000000	10000000	100



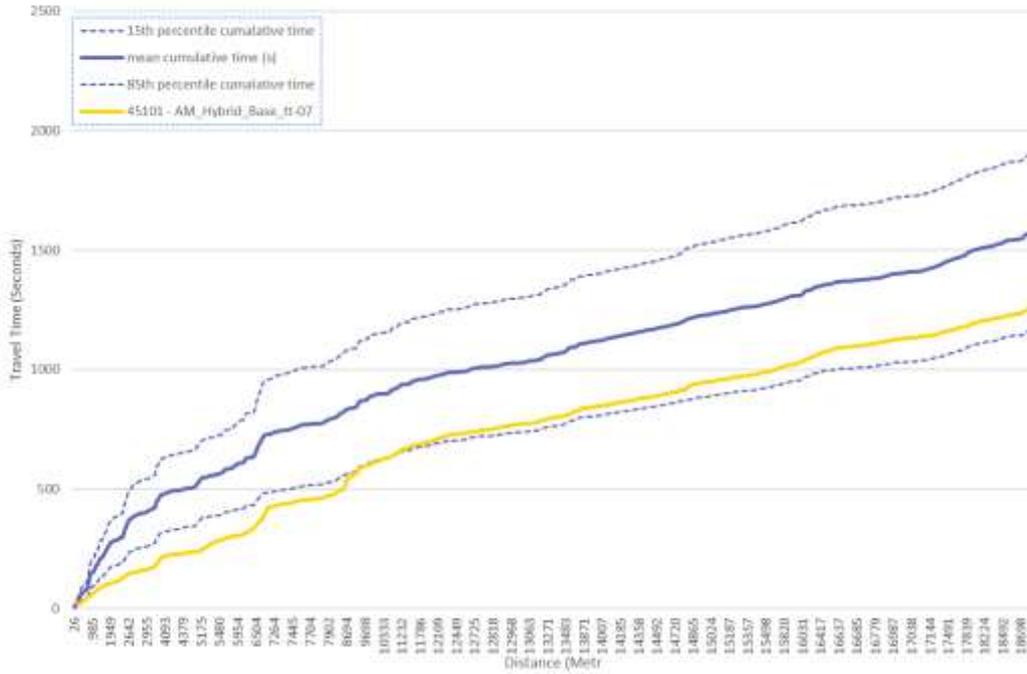
Individual turn counts GEH & XY scatter plot – hybrid vehicles – hybrid layer– IP Hour 3

Appendix B

Travel Time Profile Comparisons

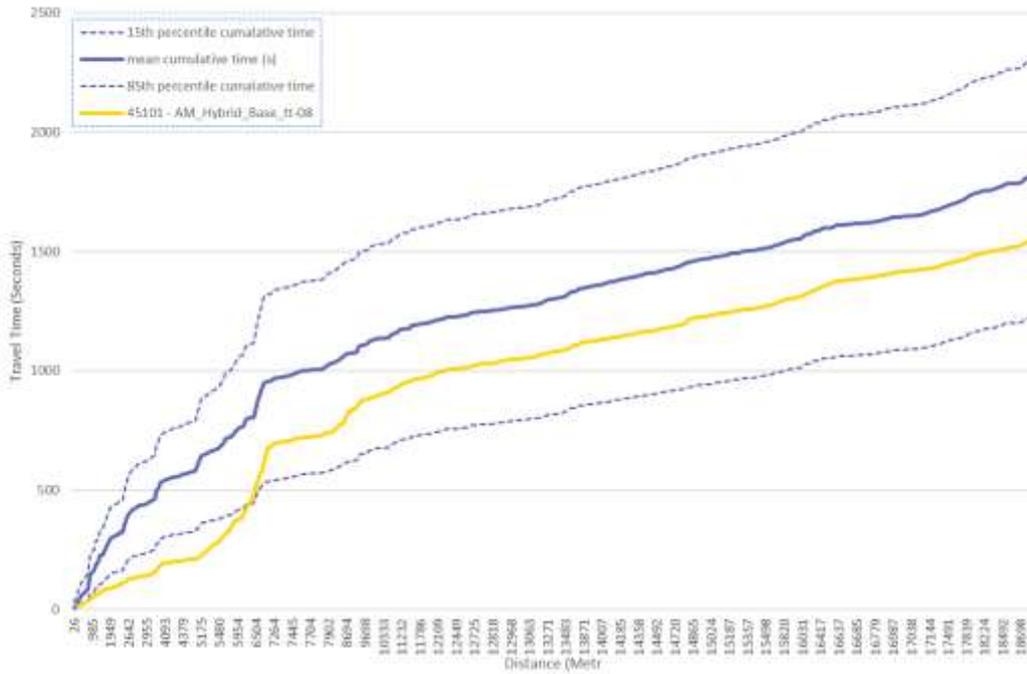
The following figures show the profile of travel time against the distance for each route of the middle 2-hour peak.

Tomtom vs Modelled Travel Time



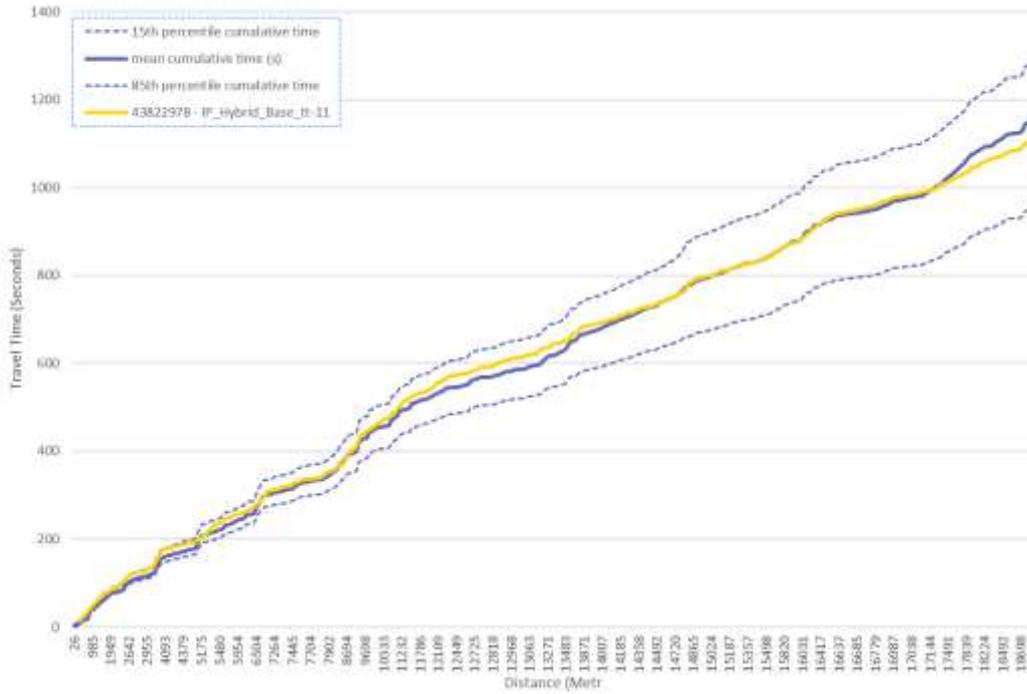
Travel time profile: Grenada – Seaview (7-8)

Tomtom vs Modelled Travel Time



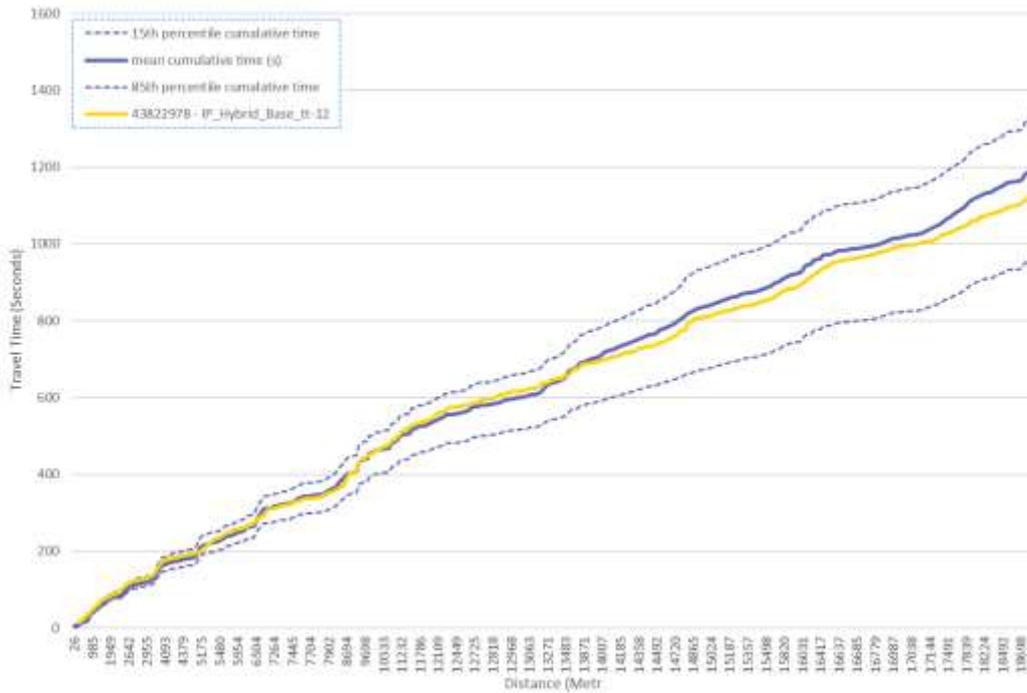
Travel time profile: Grenada – Seaview (8-9)

Tomtom vs Modelled Travel Time



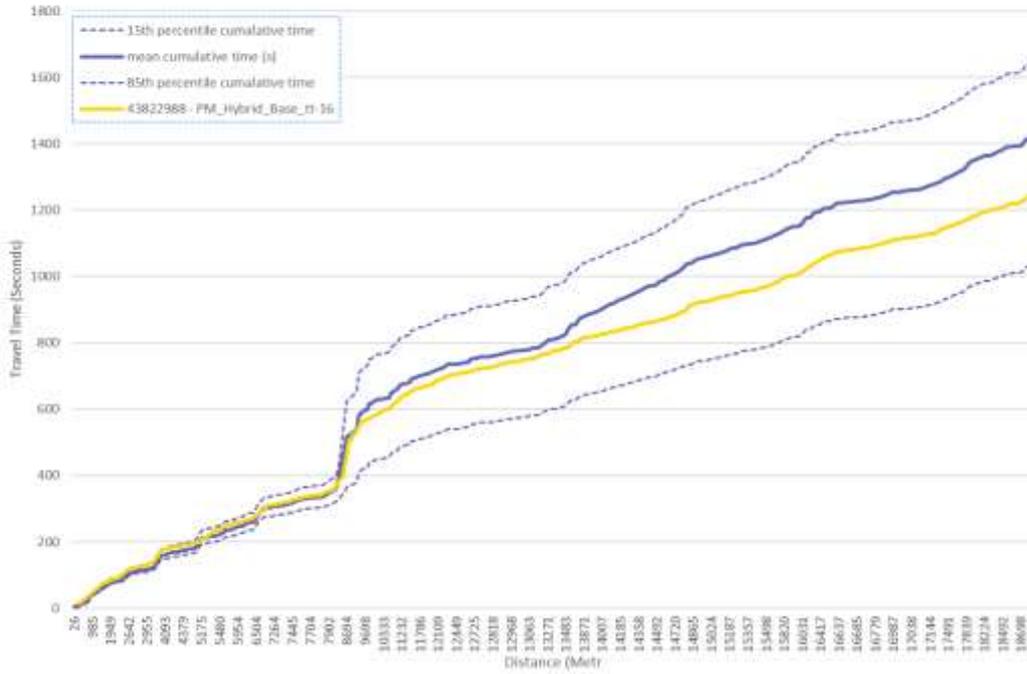
Travel time profile: Grenada – Seaview (11-12)

Tomtom vs Modelled Travel Time



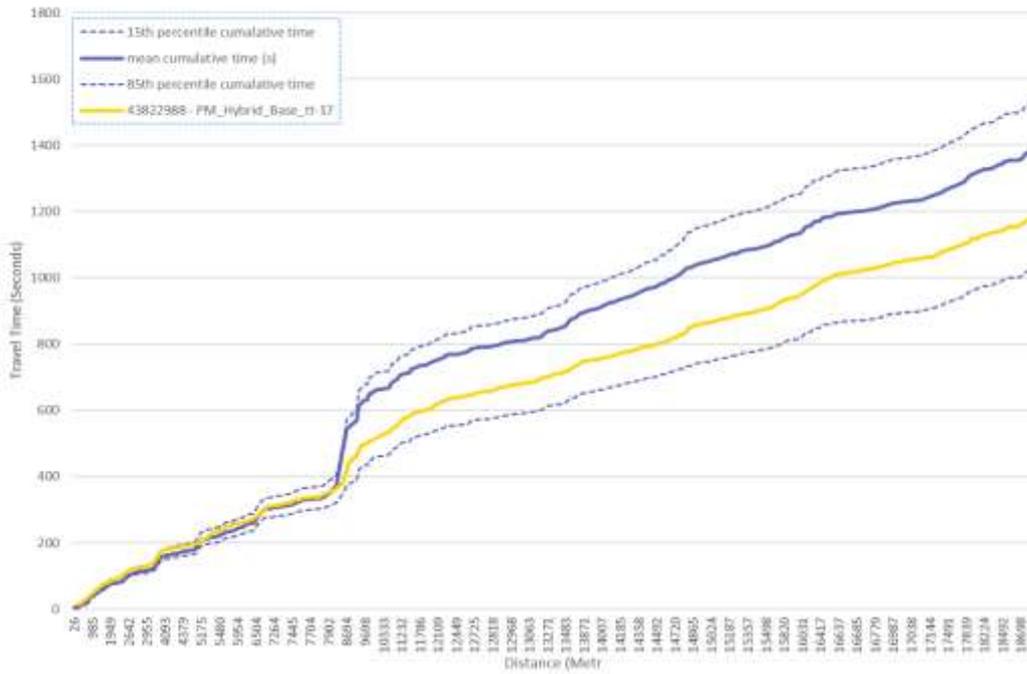
Travel time profile: Grenada – Seaview (12-13)

Tomtom vs Modelled Travel Time



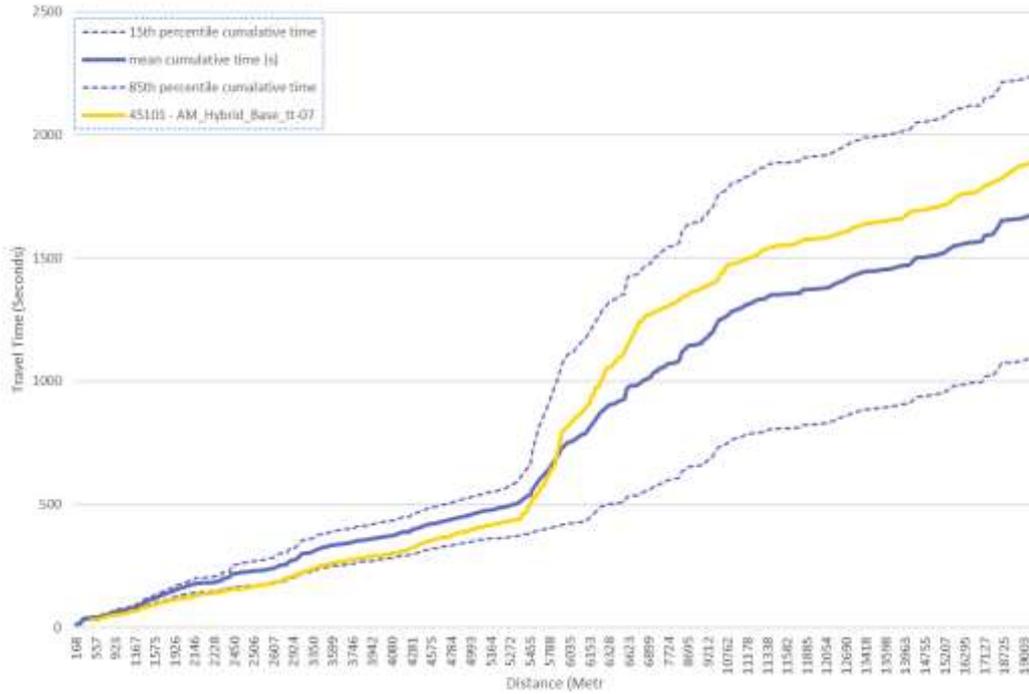
Travel time profile: Grenada - Seaview (16-17)

Tomtom vs Modelled Travel Time



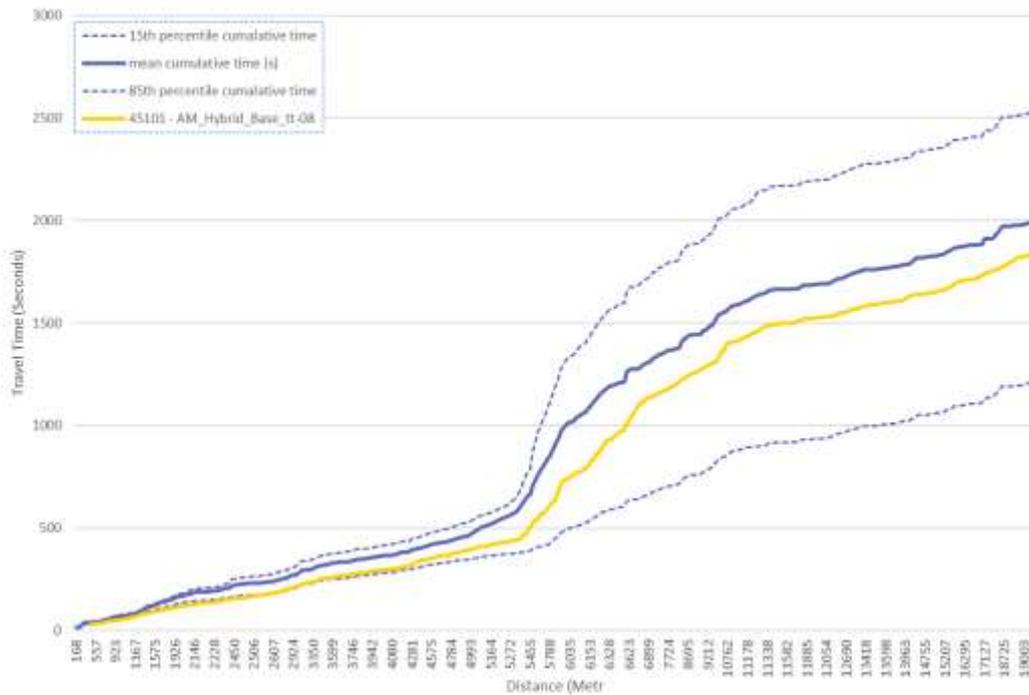
Travel time profile: Grenada - Seaview (17-18)

Tomtom vs Modelled Travel Time



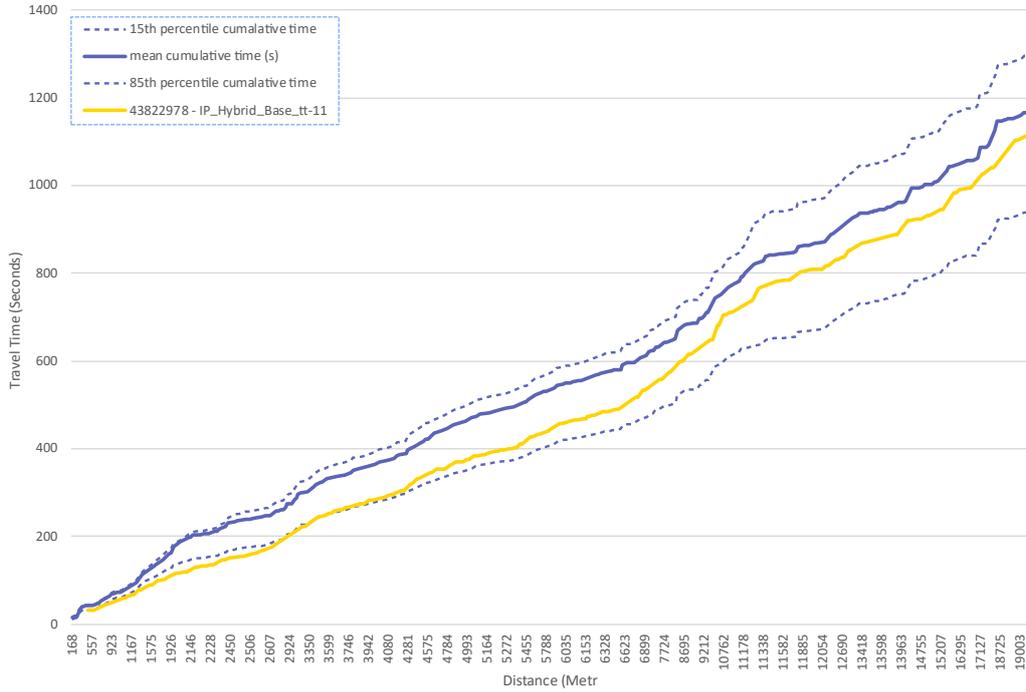
Travel time profile: Seaview – Grenada (7-8)

Tomtom vs Modelled Travel Time



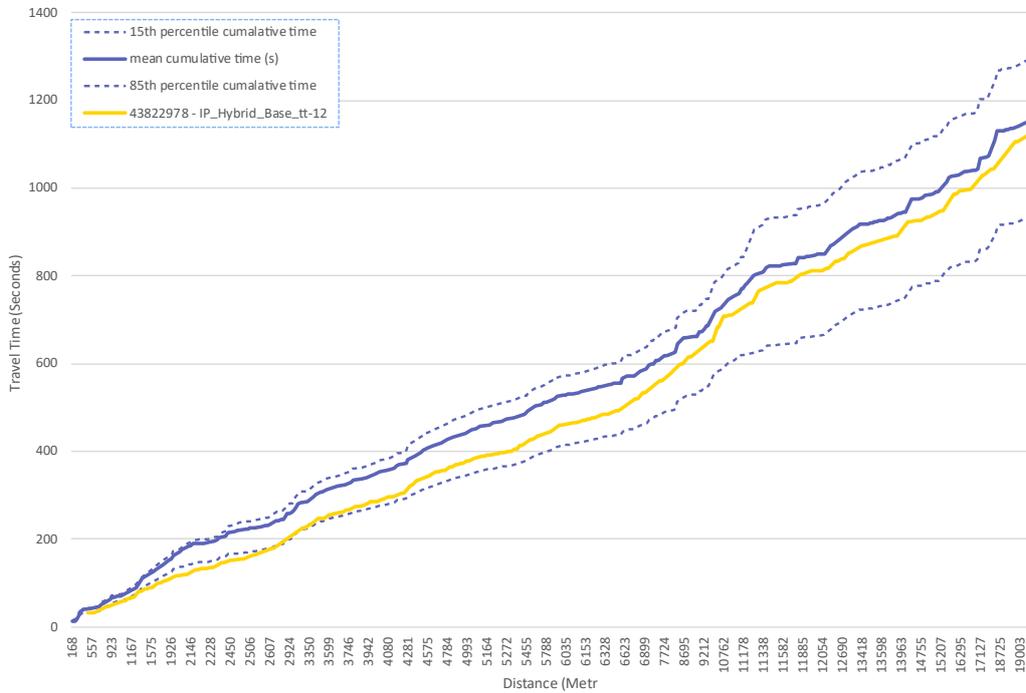
Travel time profile: Seaview – Grenada (8-9)

Tomtom vs Modelled Travel Time



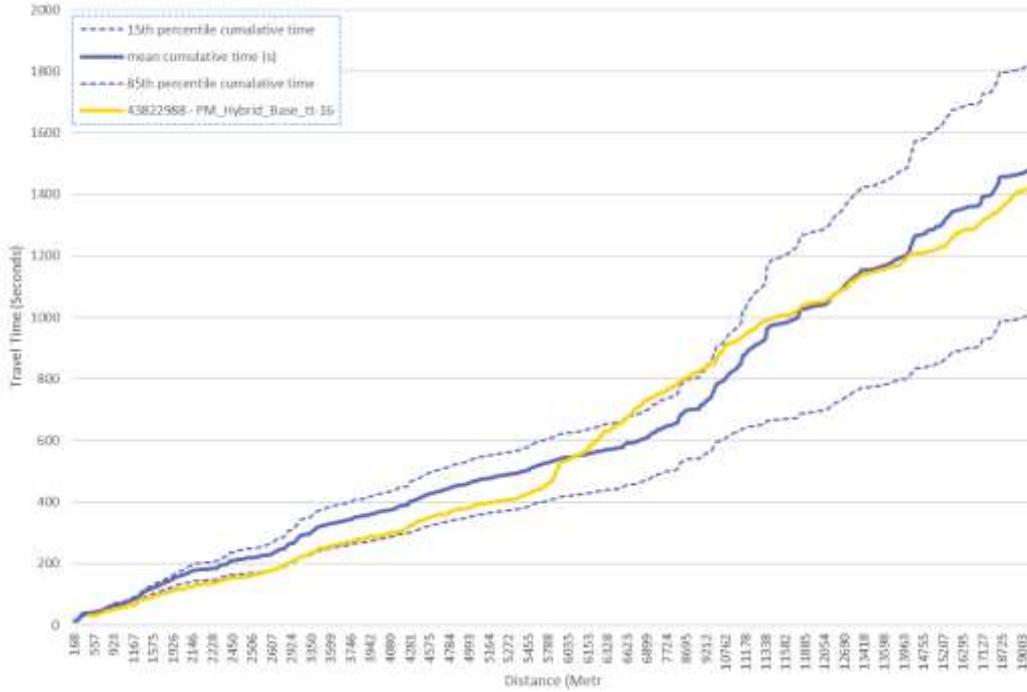
Travel time profile: Seaview – Grenada (11-12)

Tomtom vs Modelled Travel Time



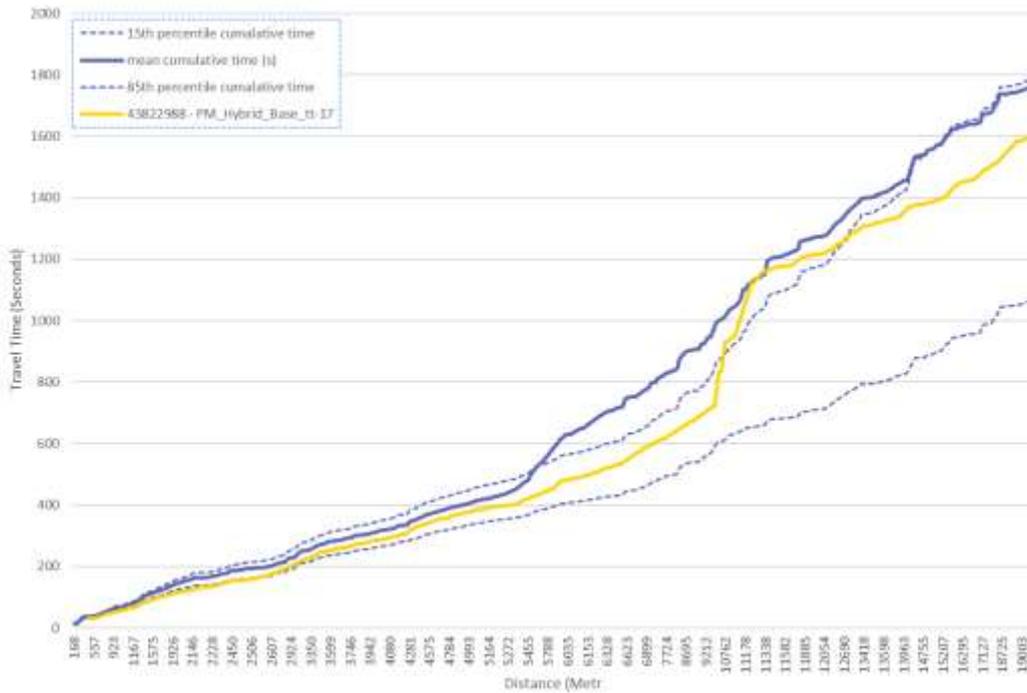
Travel time profile: Seaview – Grenada (12-13)

Tomtom vs Modelled Travel Time



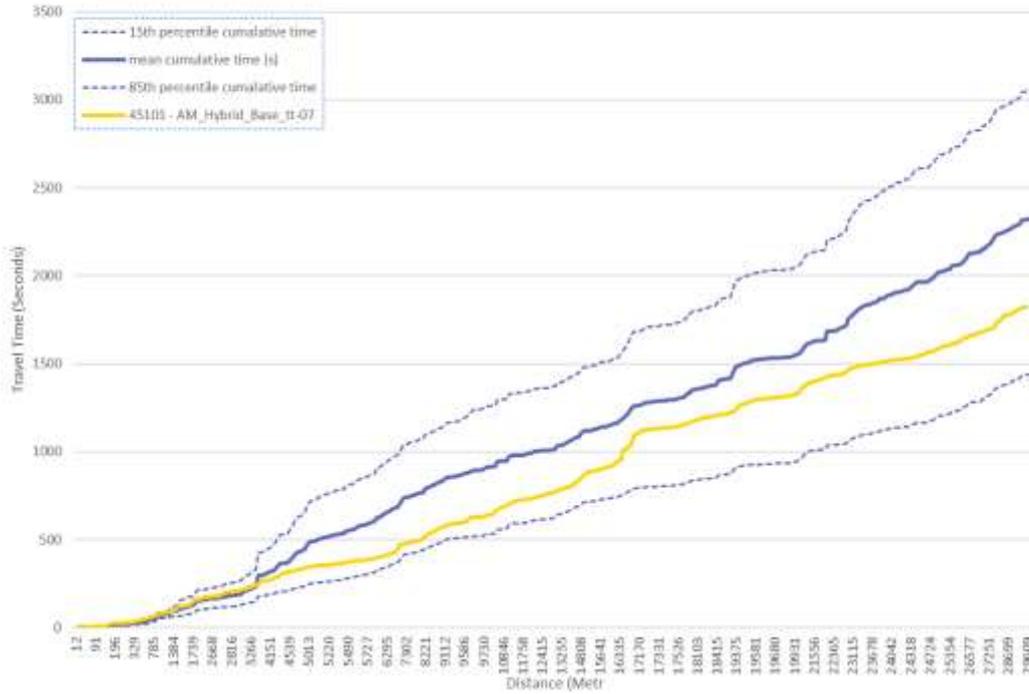
Travel time profile: Seaview – Grenada (16-17)

Tomtom vs Modelled Travel Time



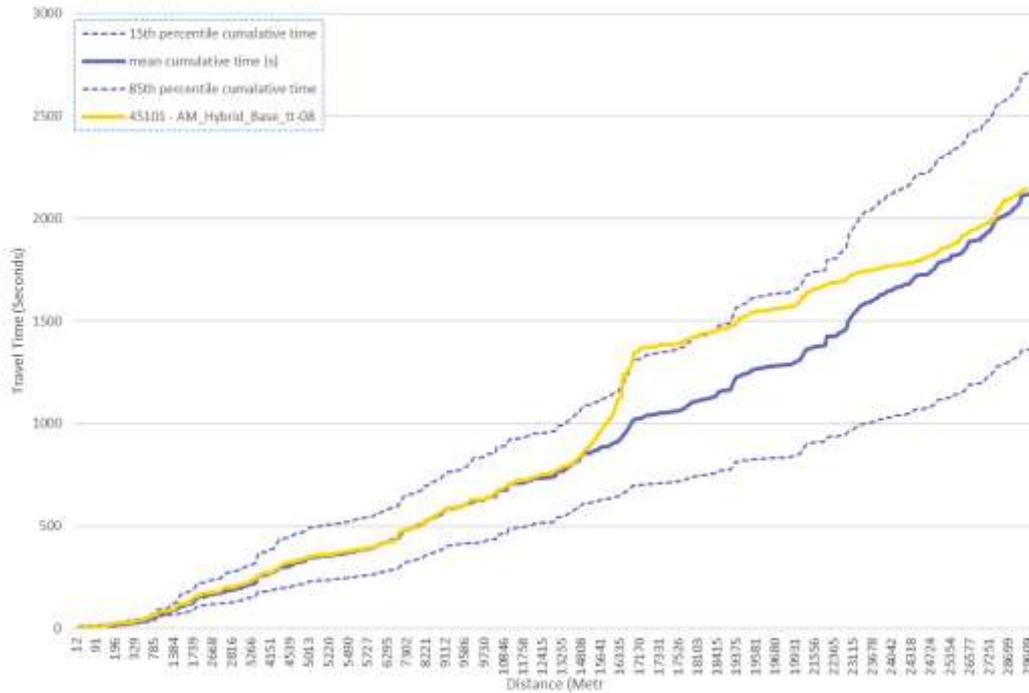
Travel time profile: Seaview – Grenada (17-18)

Tomtom vs Modelled Travel Time



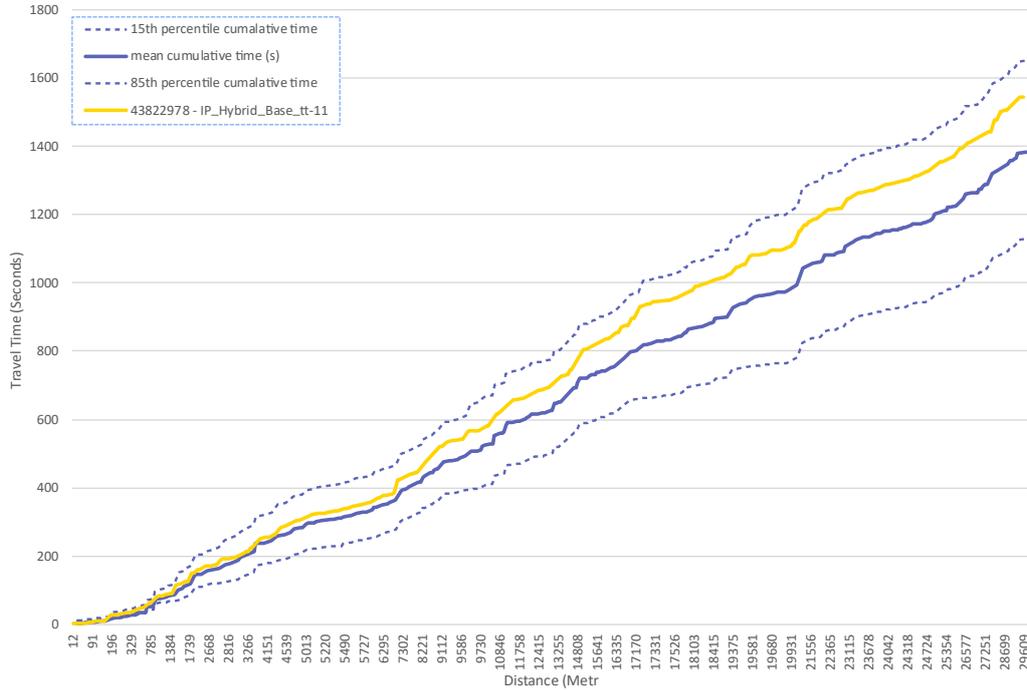
Travel time profile: SH2: Maoribank - Ngauranga (7-8)

Tomtom vs Modelled Travel Time



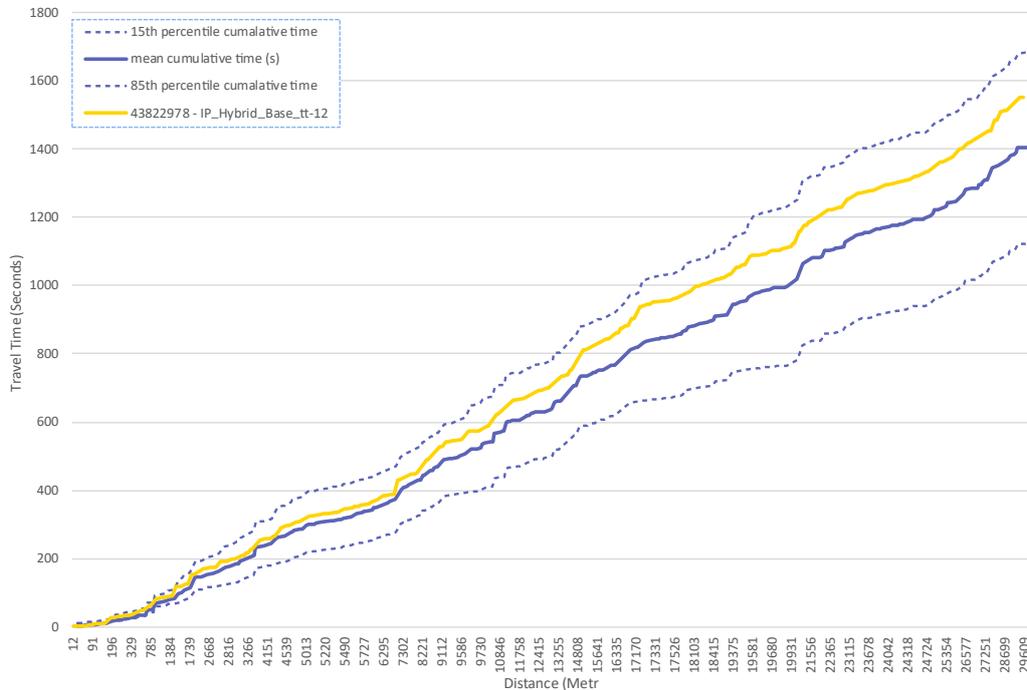
Travel time profile: SH2: Maoribank - Ngauranga (8-9)

Tomtom vs Modelled Travel Time



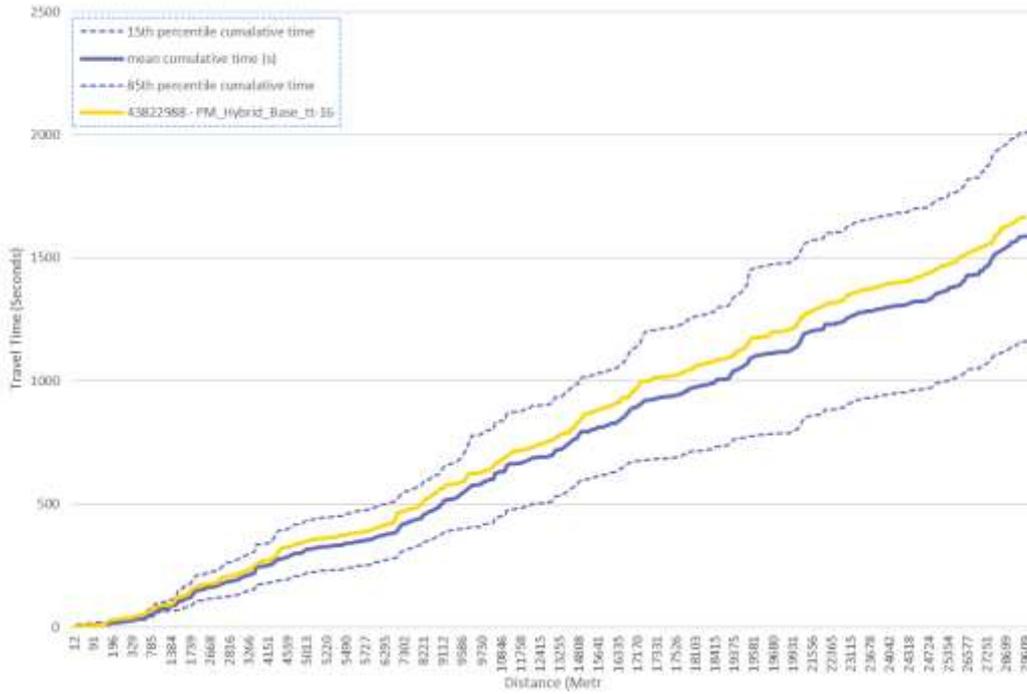
Travel time profile: SH2: Maoribank - Ngauranga (11-12)

Tomtom vs Modelled Travel Time



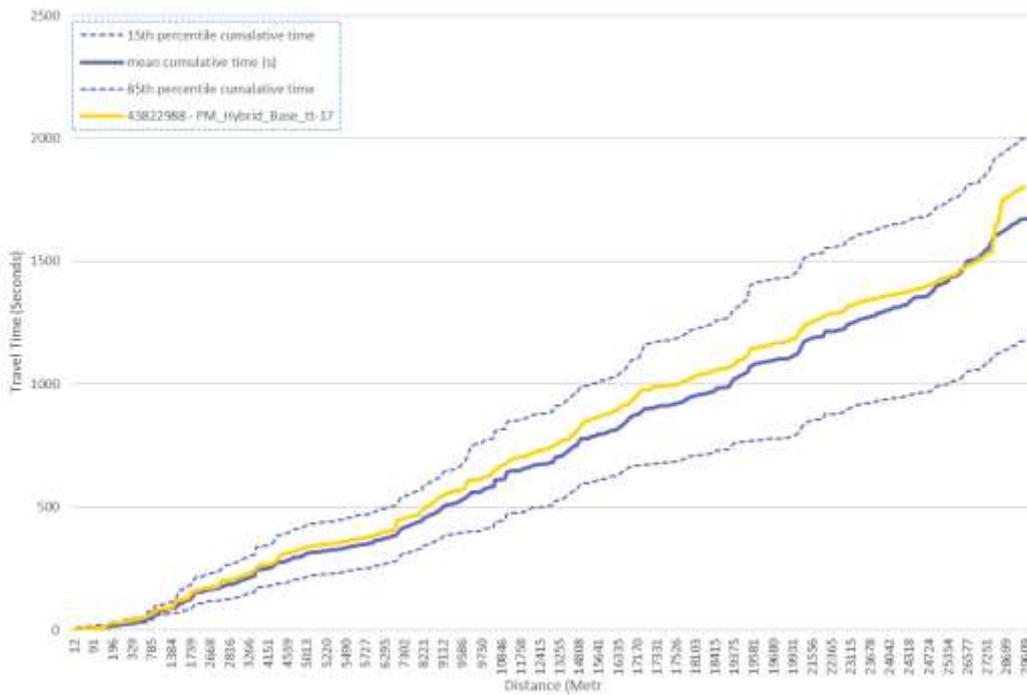
Travel time profile: SH2: Maoribank - Ngauranga (12-13)

Tomtom vs Modelled Travel Time



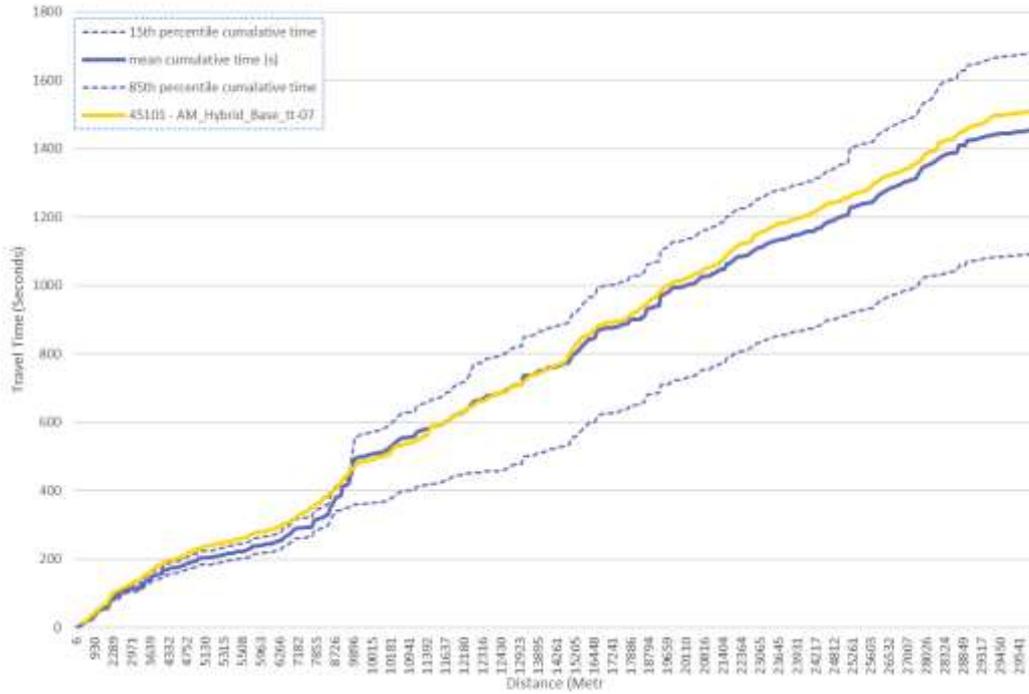
Travel time profile: SH2: Maoribank - Ngauranga (16-17)

Tomtom vs Modelled Travel Time



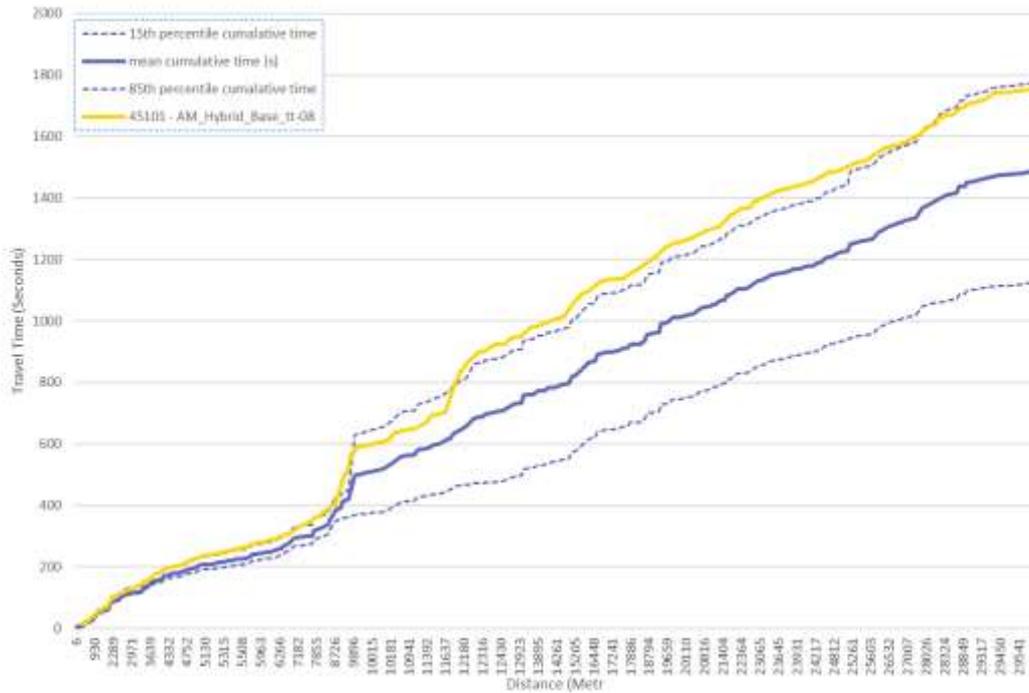
Travel time profile: SH2: Maoribank - Ngauranga (17-18)

Tomtom vs Modelled Travel Time



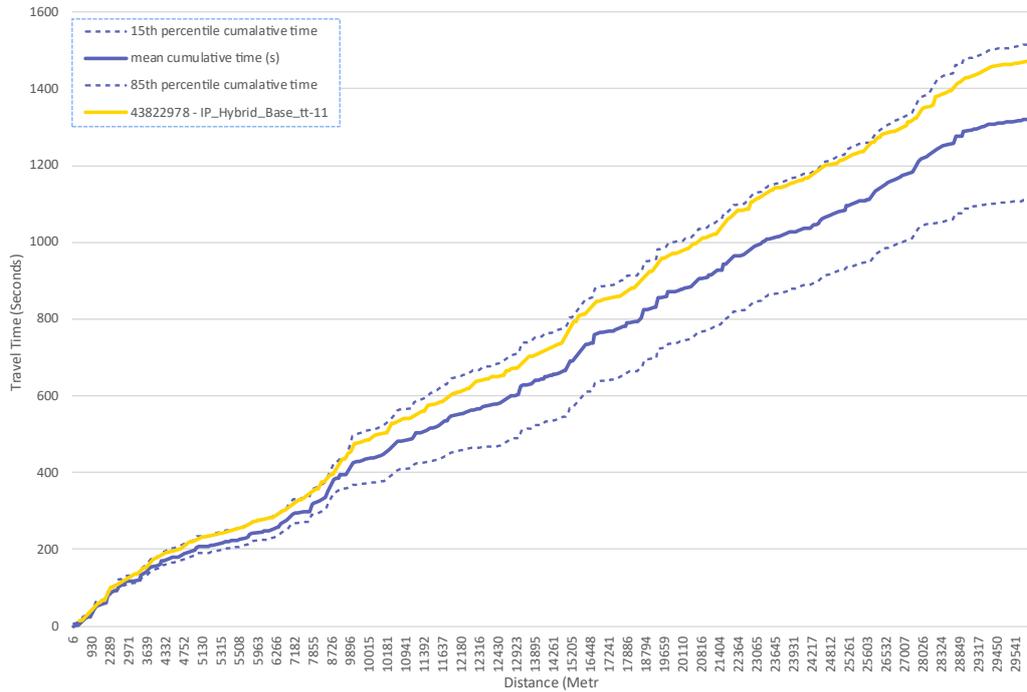
Travel time profile: SH2: Ngauranga - Maoribank (7-8)

Tomtom vs Modelled Travel Time



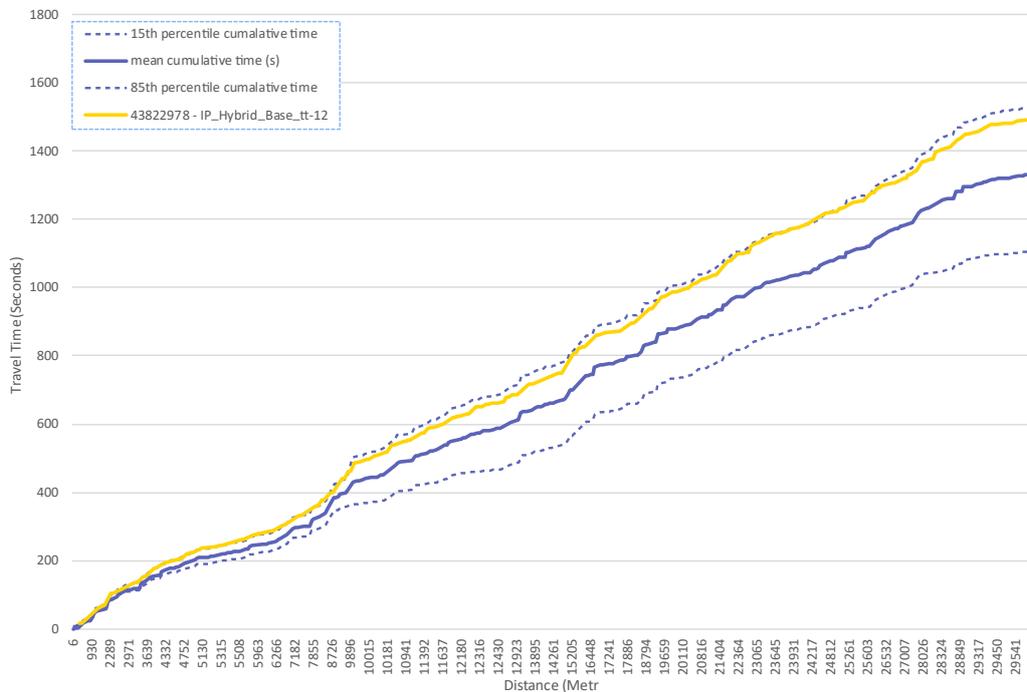
Travel time profile: Ngauranga - Maoribank (8-9)

Tomtom vs Modelled Travel Time



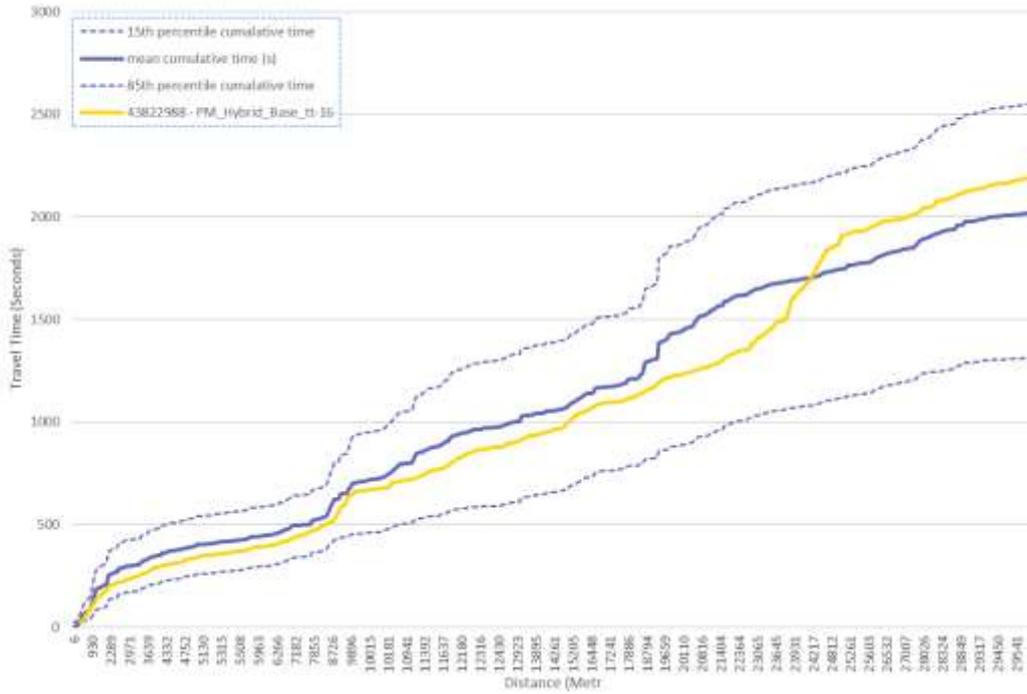
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Tomtom vs Modelled Travel Time



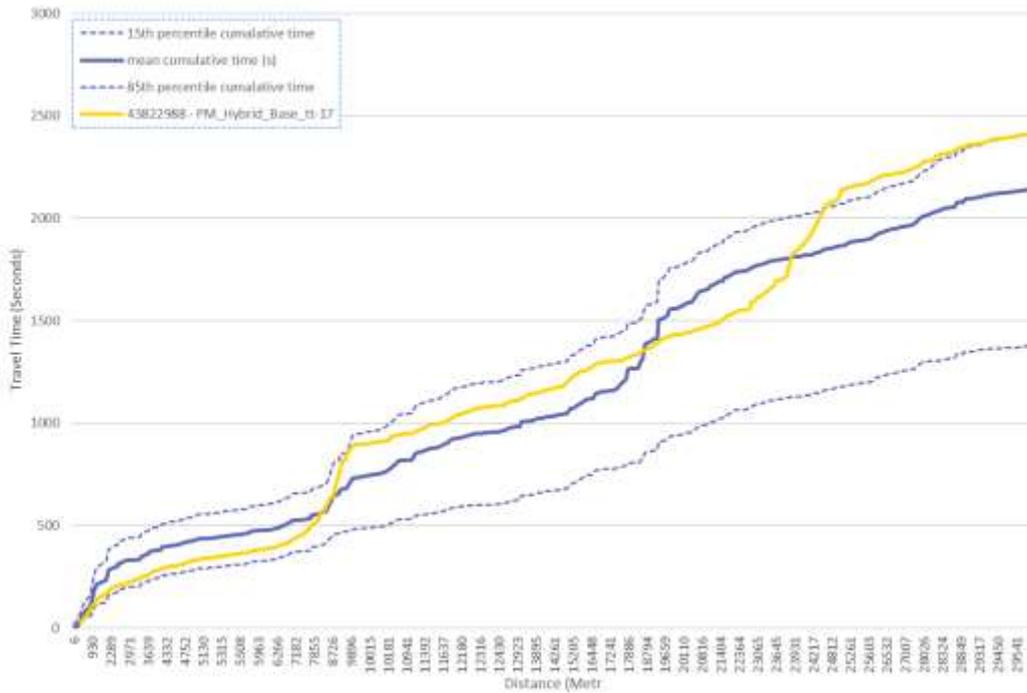
Travel time profile: Ngauranga – Maoribank (12-13)

Tomtom vs Modelled Travel Time



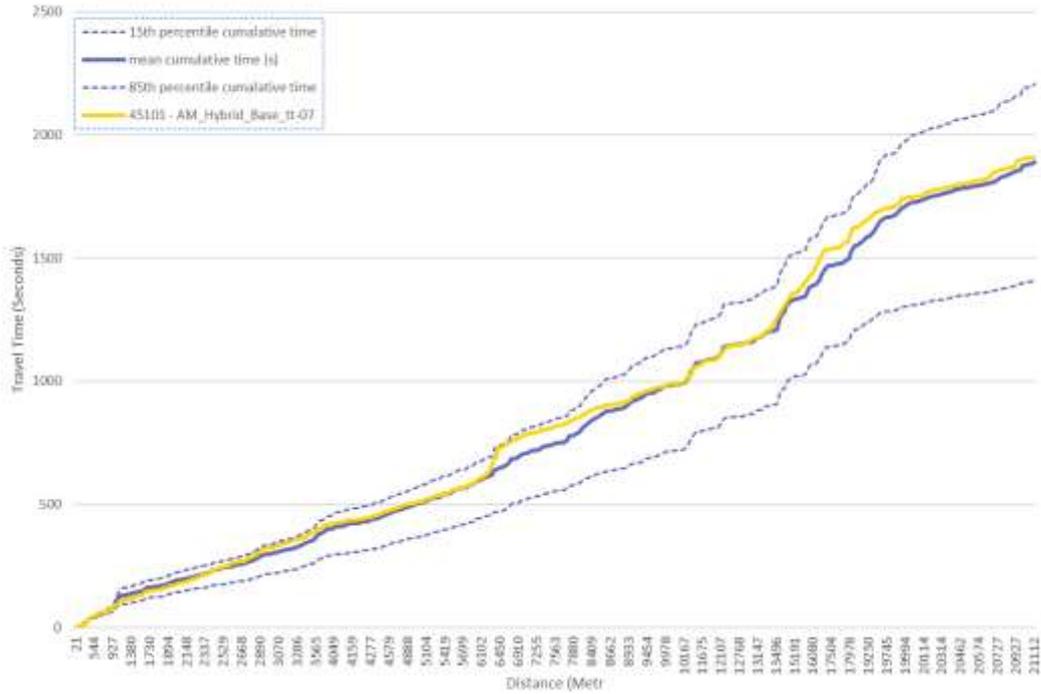
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Tomtom vs Modelled Travel Time



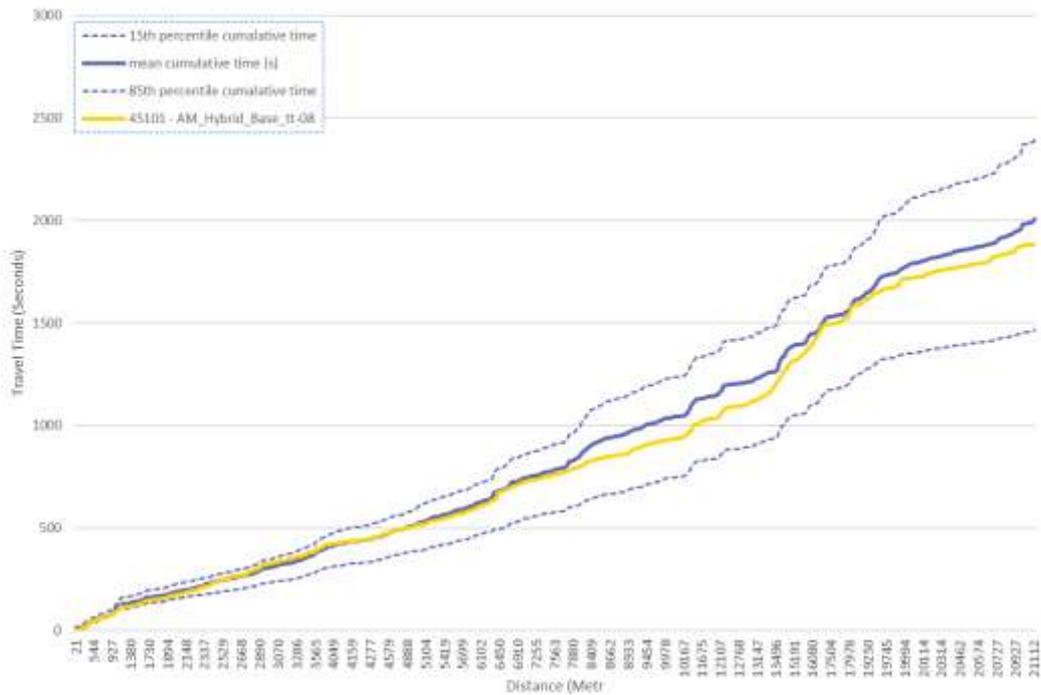
Travel time profile: Ngauranga – Maoribank (17-18)

Tomtom vs Modelled Travel Time



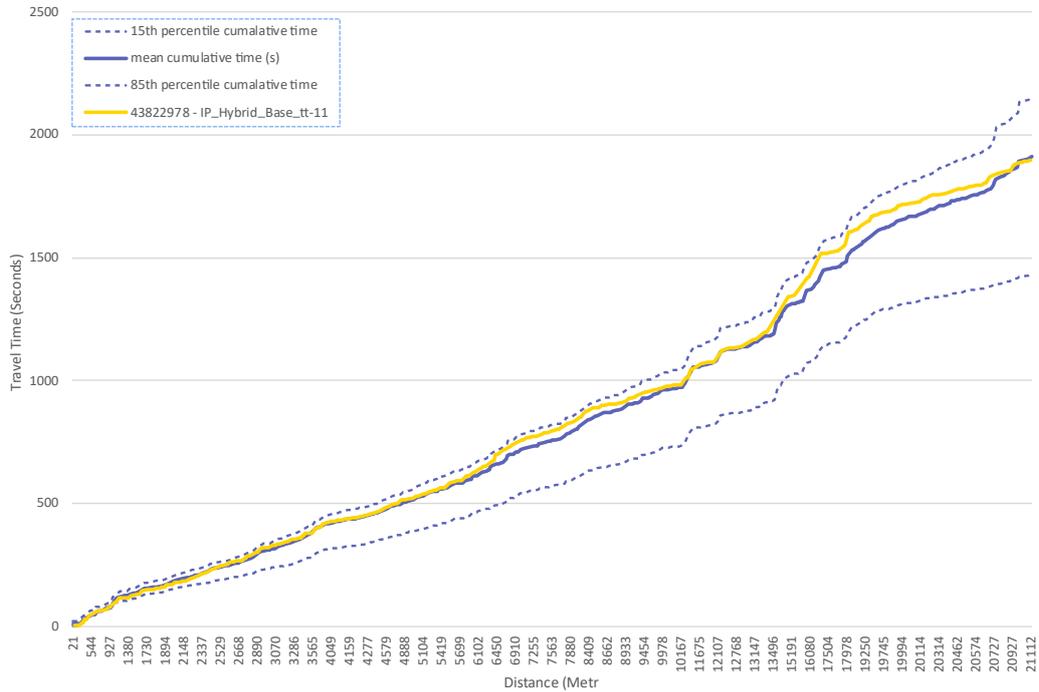
Travel time profile: Fergusson Dr – Harcourt Werry Dr (7-8)

Tomtom vs Modelled Travel Time



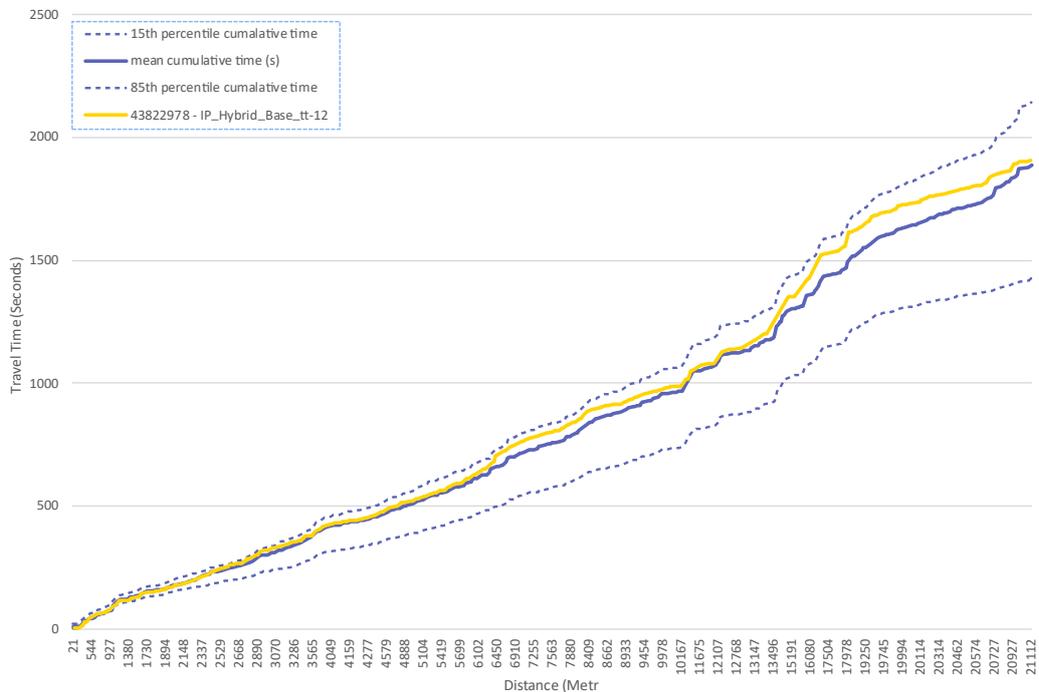
Travel time profile: Fergusson Dr – Harcourt Werry Dr (8-9)

Tomtom vs Modelled Travel Time



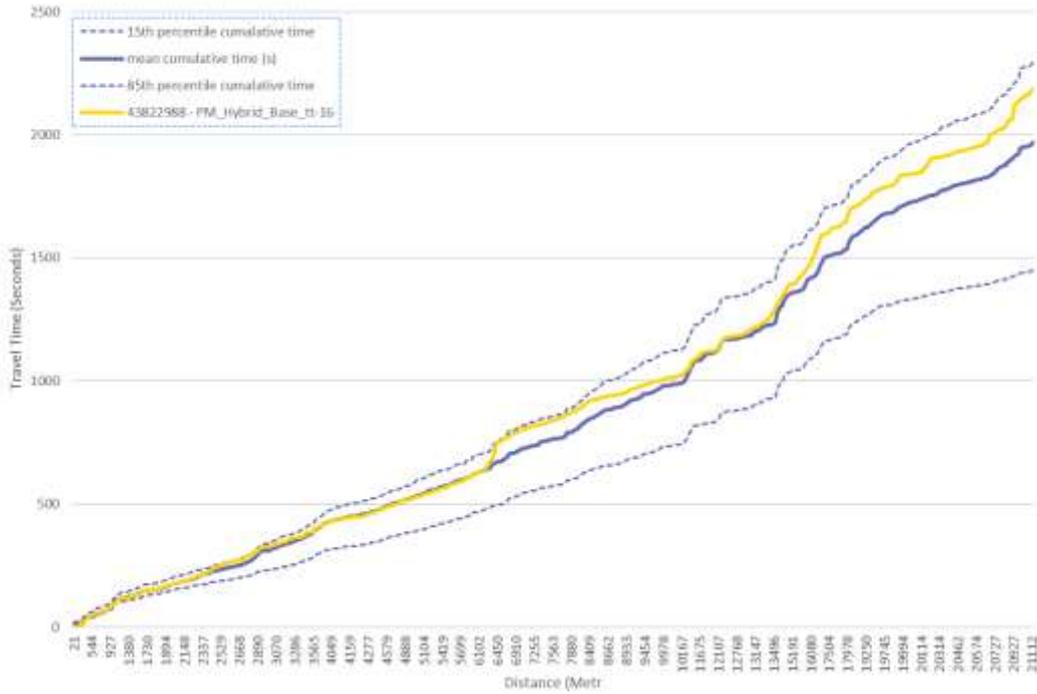
Travel time profile: Fergusson Dr – Harcourt Werry Dr (11-12)

Tomtom vs Modelled Travel Time



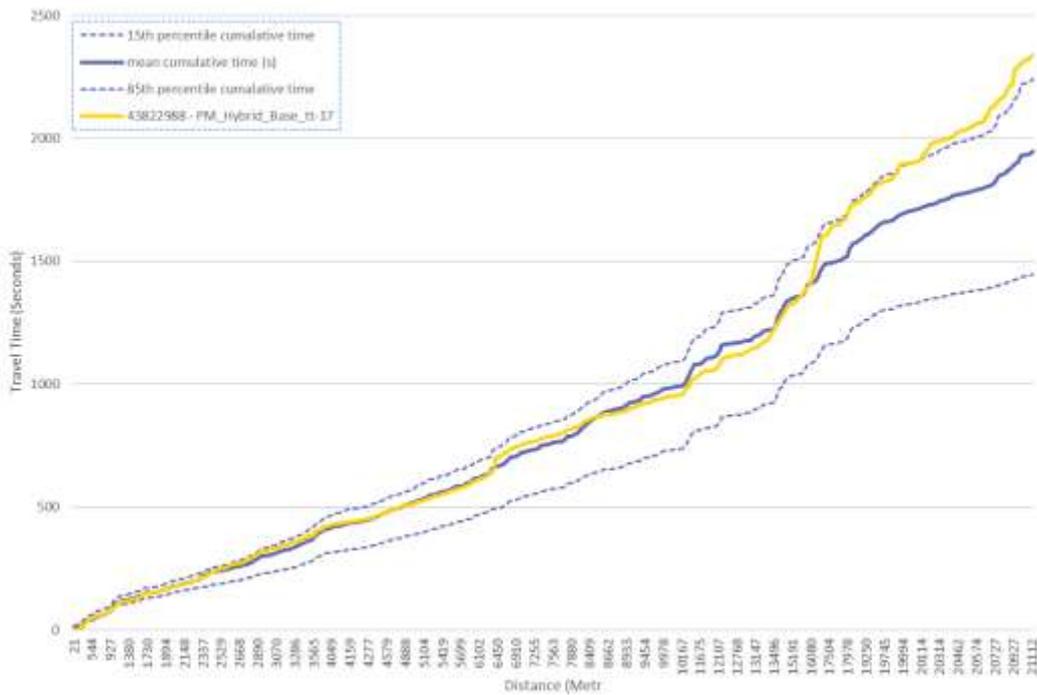
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Tomtom vs Modelled Travel Time



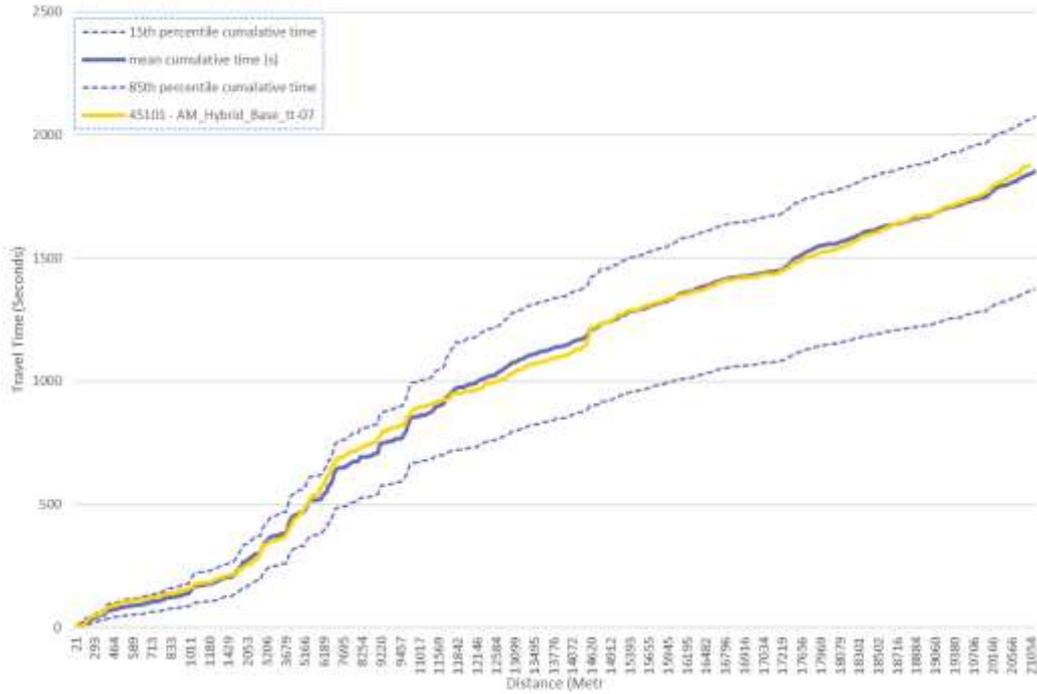
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Tomtom vs Modelled Travel Time



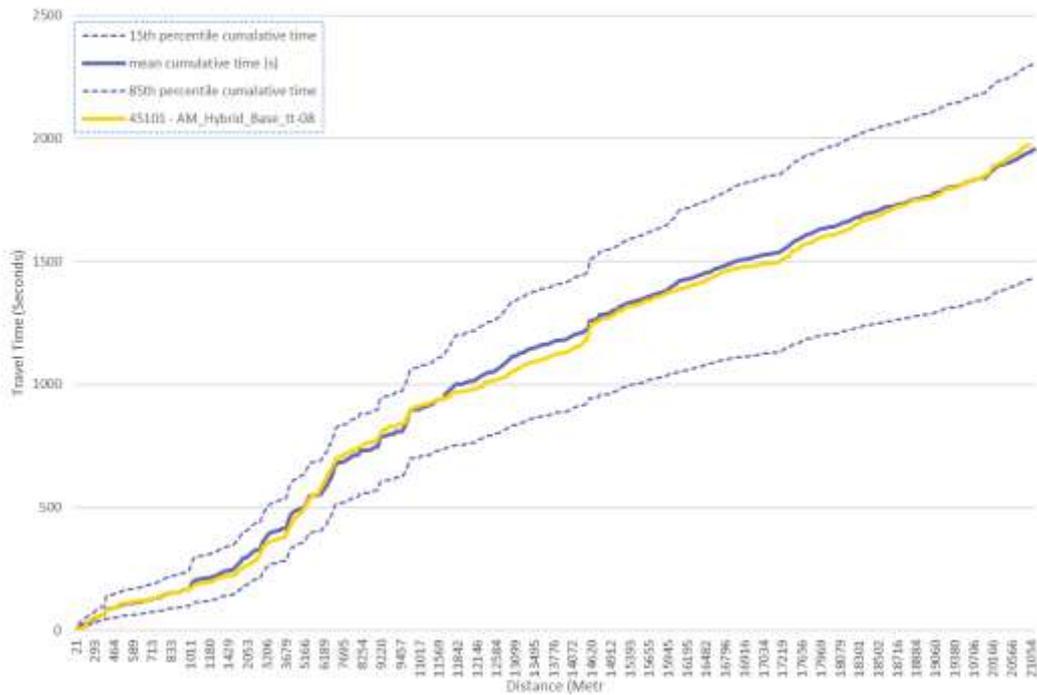
Travel time profile: Fergusson Dr – Harcourt Werry Dr (17-18)

Tomtom vs Modelled Travel Time



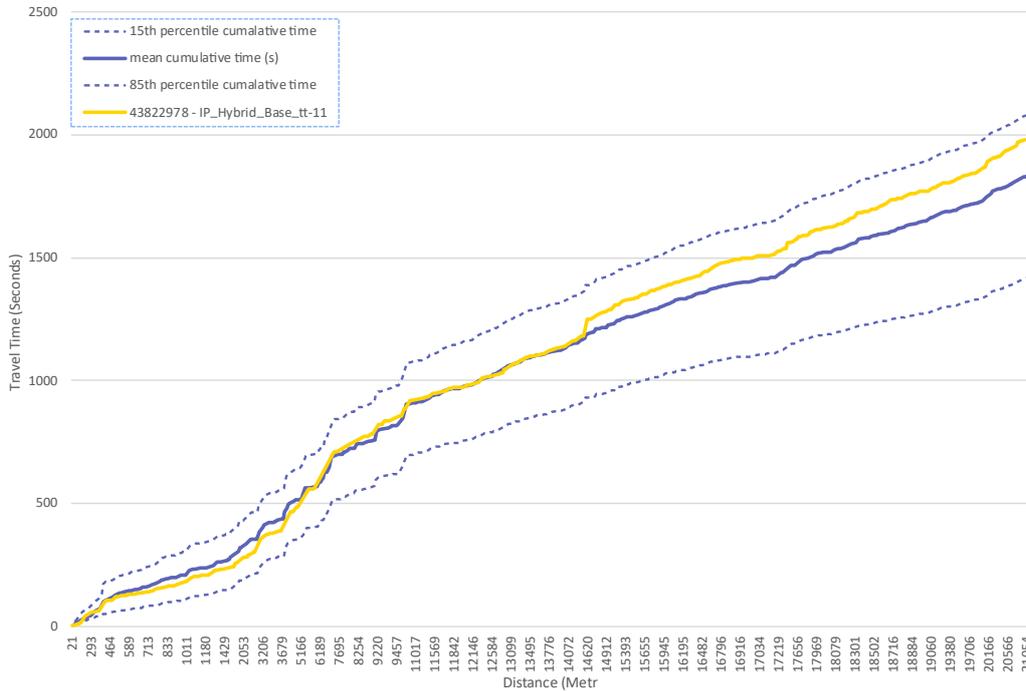
Travel time profile: Harcourt Werry Dr – Fergusson Dr (7-8)

Tomtom vs Modelled Travel Time



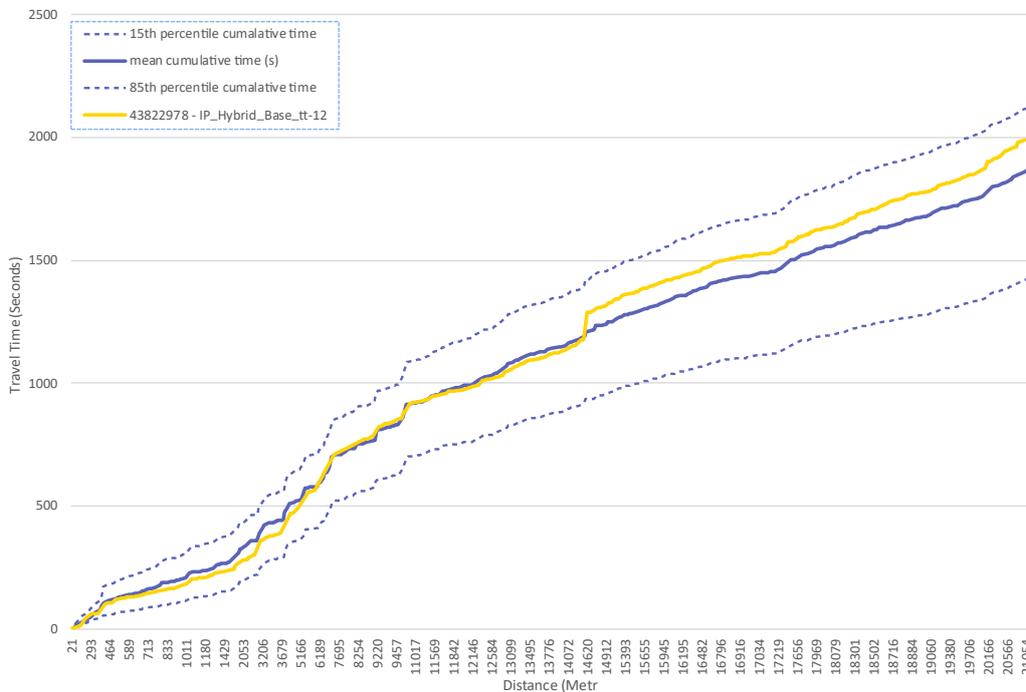
Travel time profile: Harcourt Werry Dr – Fergusson Dr (8-9)

Tomtom vs Modelled Travel Time



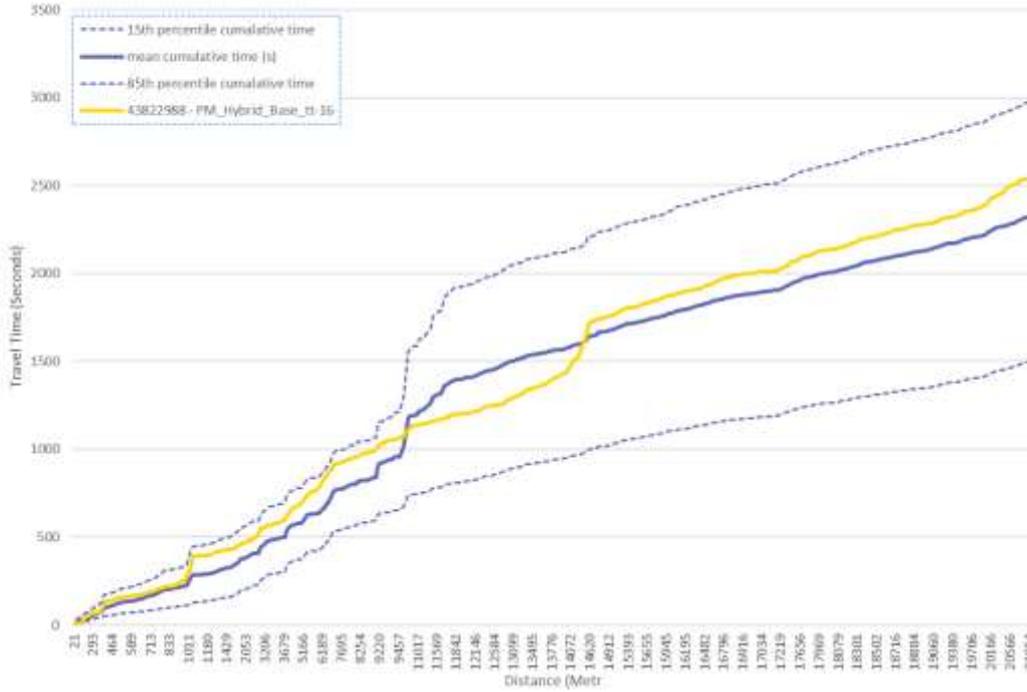
Travel time profile: Harcourt Werry Dr – Fergusson Dr (11-12)

Tomtom vs Modelled Travel Time



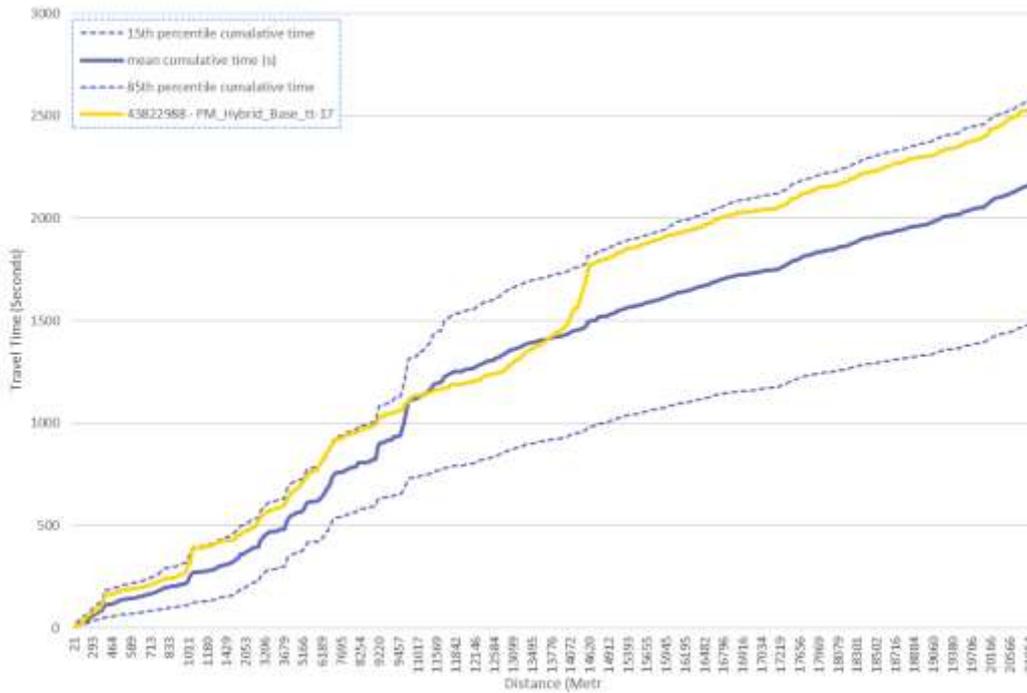
Travel time profile: Harcourt Werry Dr – Fergusson Dr (12-13)

Tomtom vs Modelled Travel Time



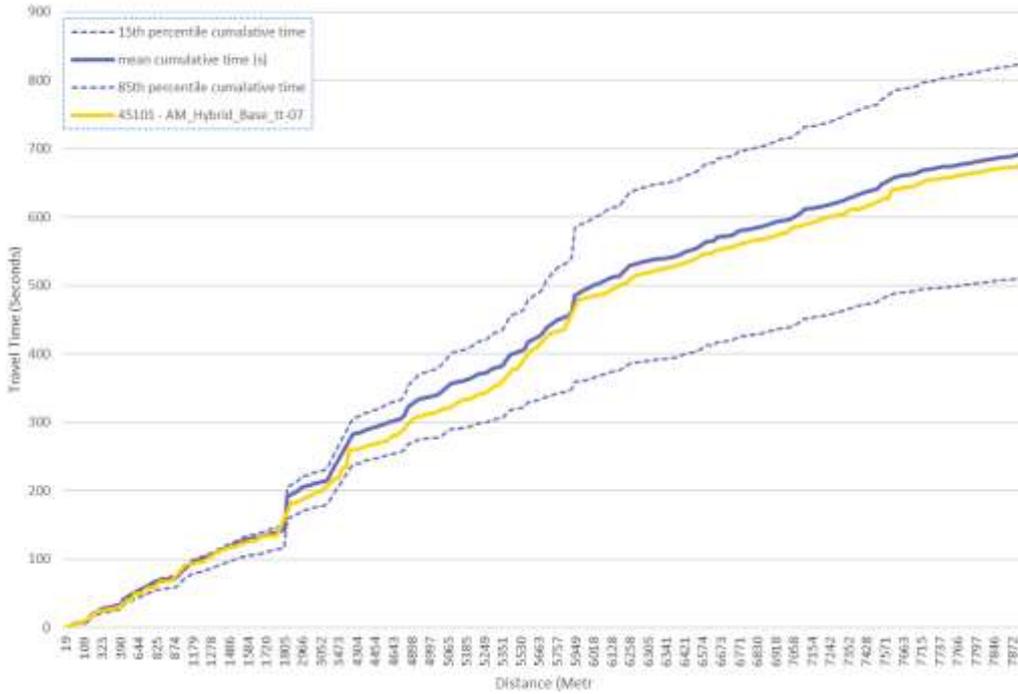
Travel time profile: Harcourt Werry Dr – Fergusson Dr (16-17)

Tomtom vs Modelled Travel Time



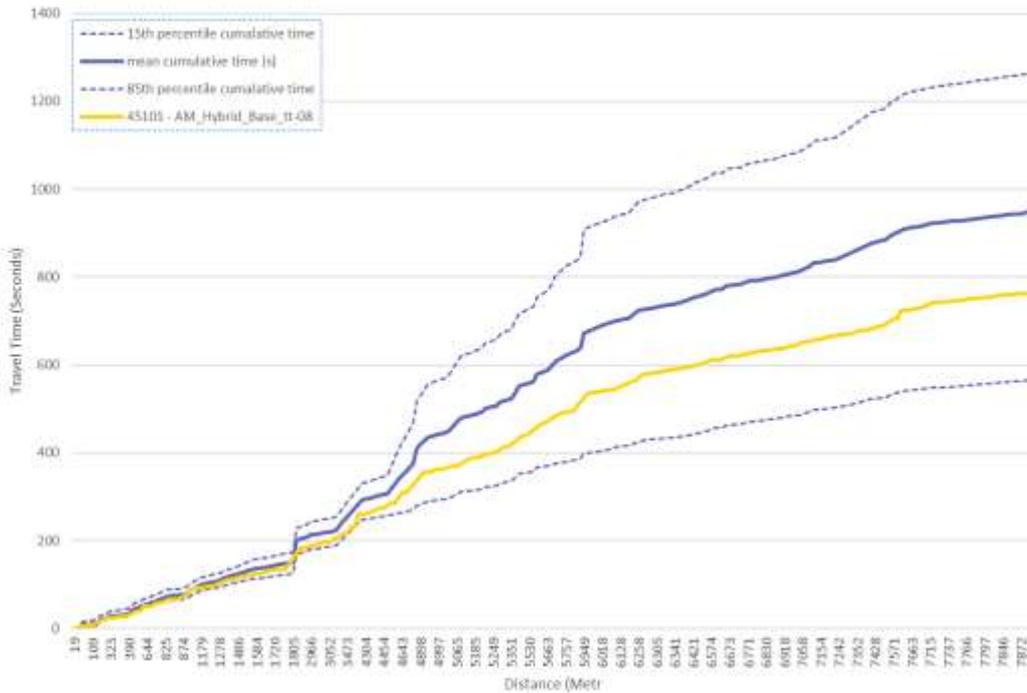
Travel time profile: Harcourt Werry Dr – Fergusson Dr (17-18)

Tomtom vs Modelled Travel Time



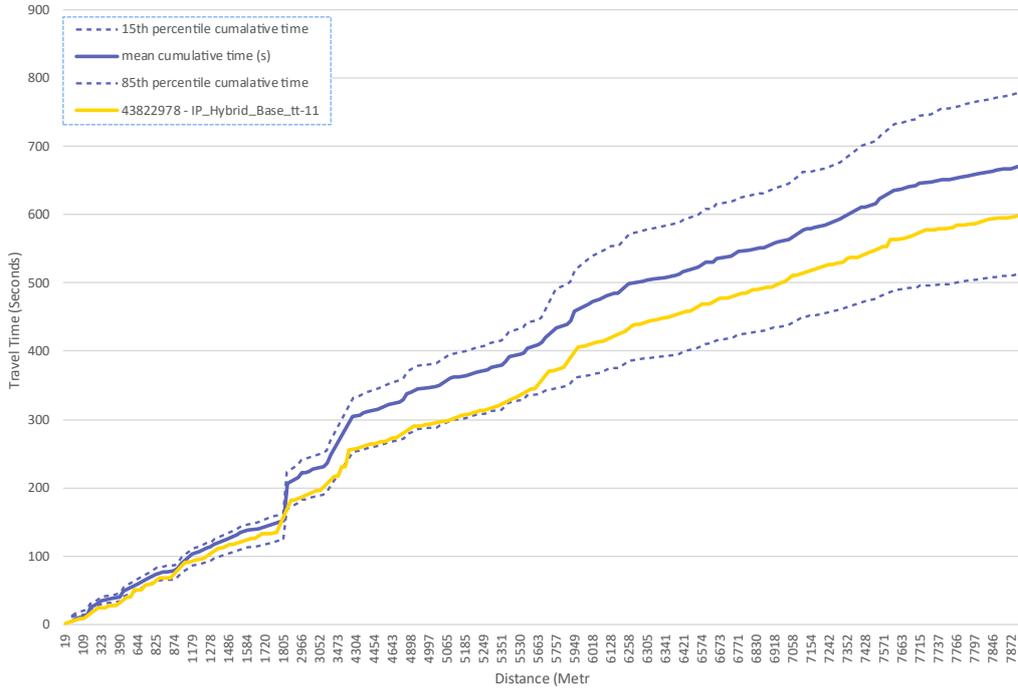
Travel time profile: Wainuiomata – CBD (7-8)

Tomtom vs Modelled Travel Time



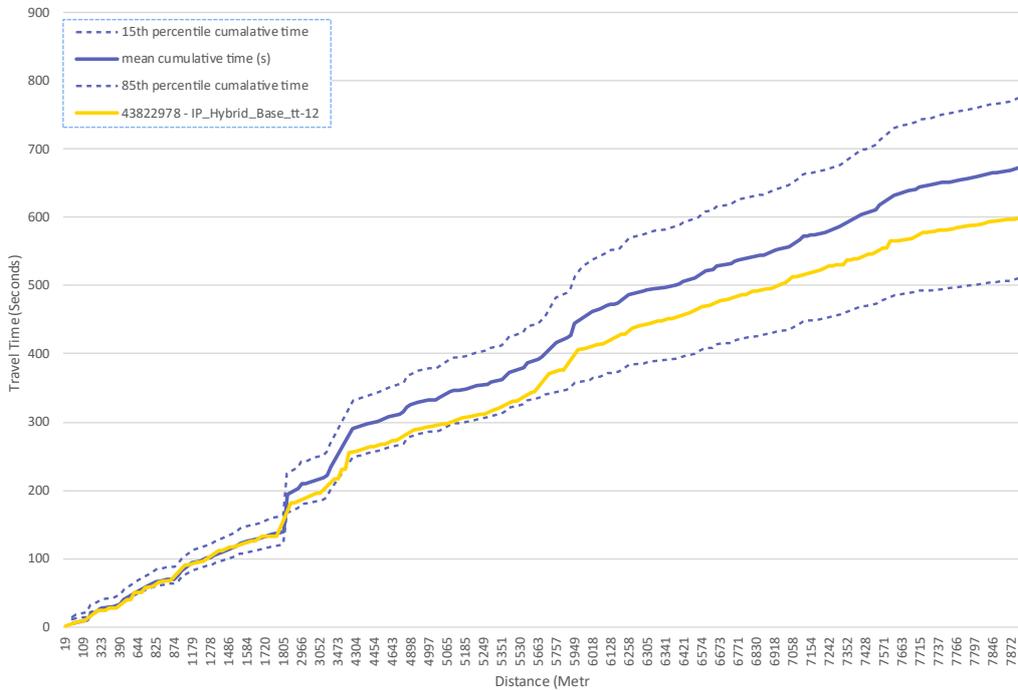
Travel time profile: Wainuiomata – CBD (8-9)

Tomtom vs Modelled Travel Time



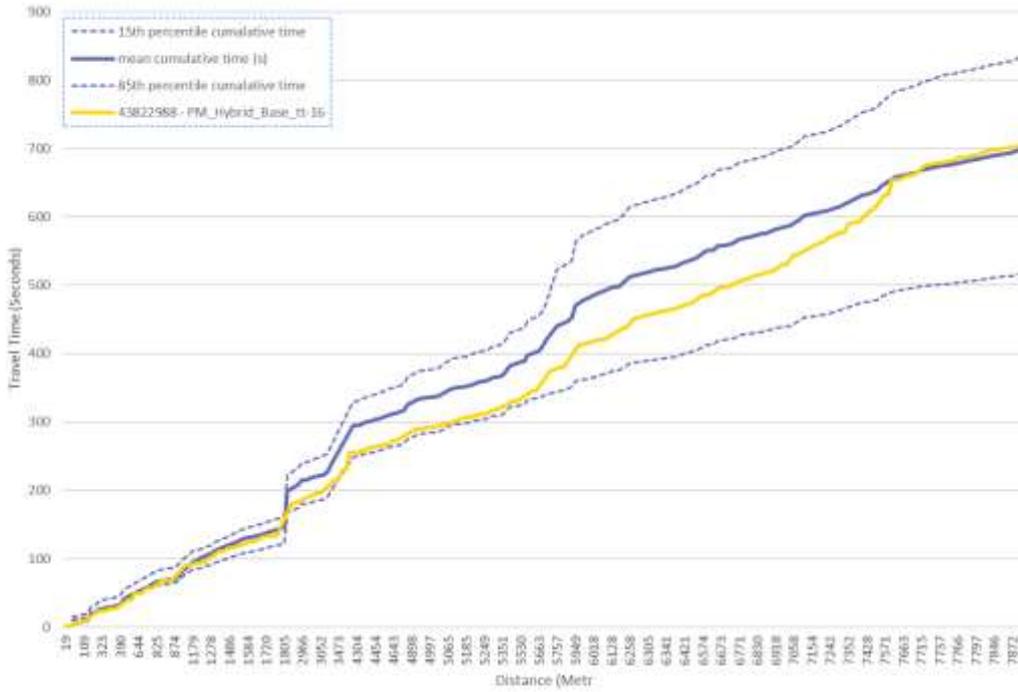
Travel time profile: Wainuiomata – CBD (11-12)

Tomtom vs Modelled Travel Time



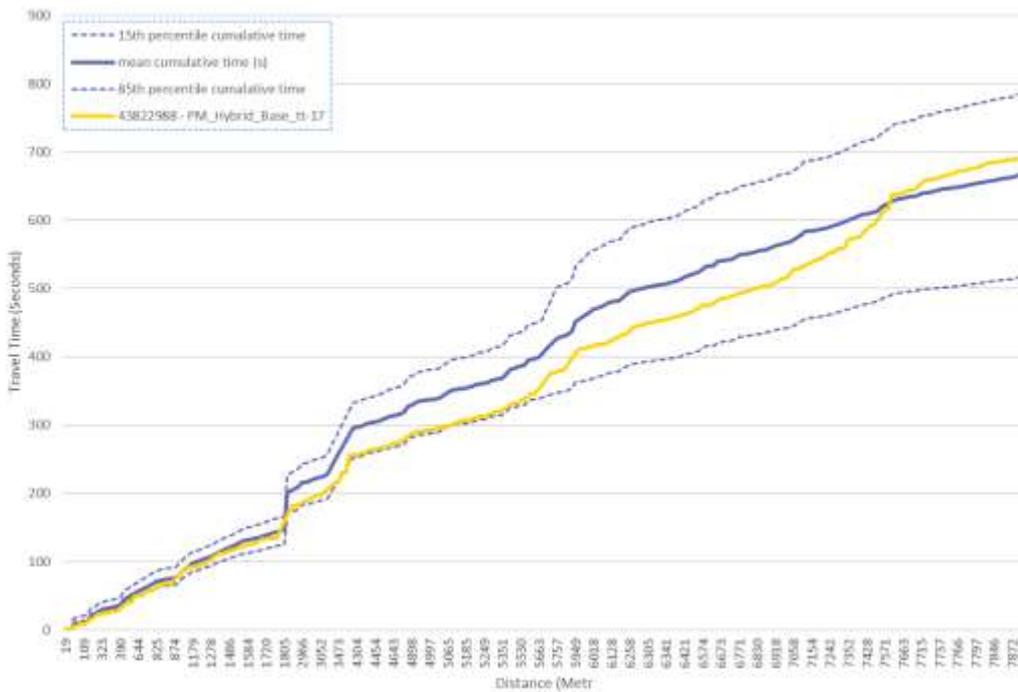
Travel time profile: Wainuiomata – CBD (12-13)

Tomtom vs Modelled Travel Time



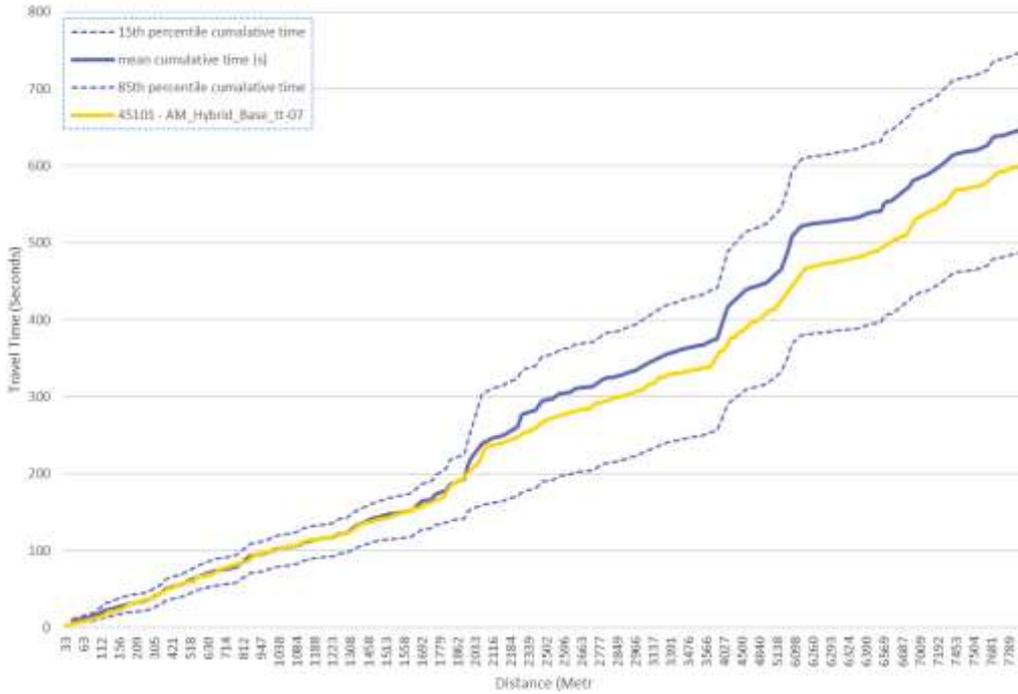
Travel time profile: Wainuiomata – CBD (16-17)

Tomtom vs Modelled Travel Time



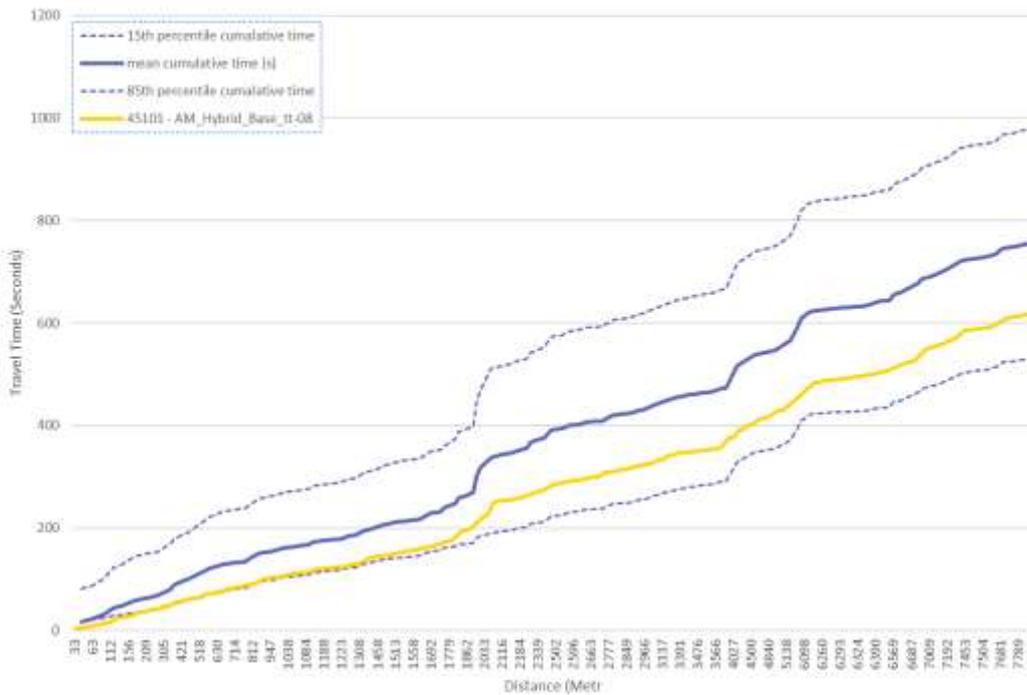
Travel time profile: Wainuiomata – CBD (17-18)

Tomtom vs Modelled Travel Time



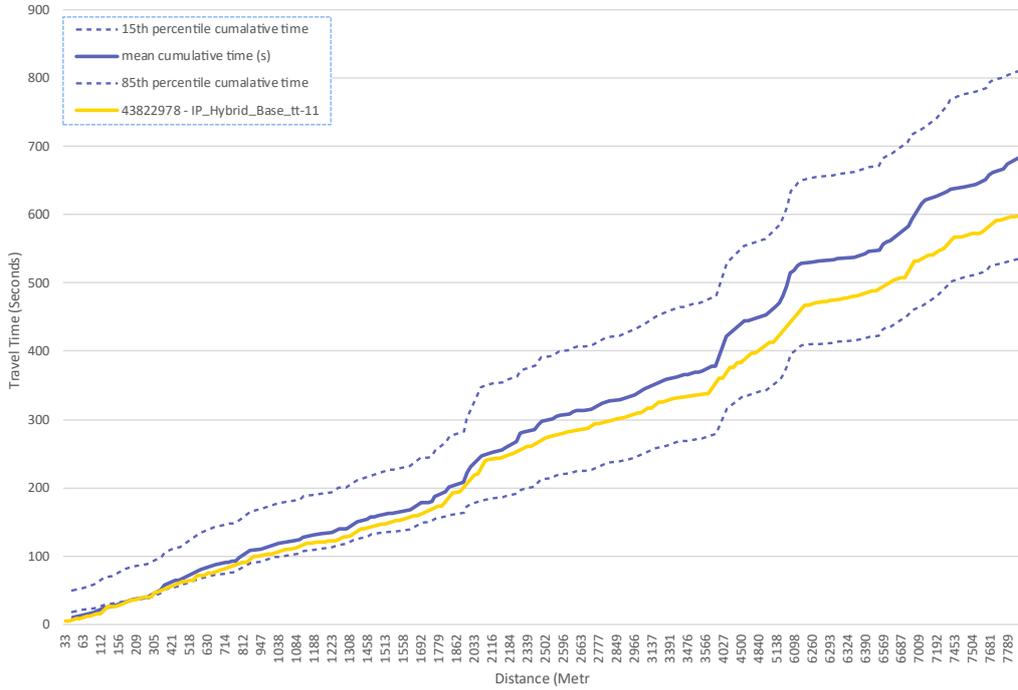
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Tomtom vs Modelled Travel Time



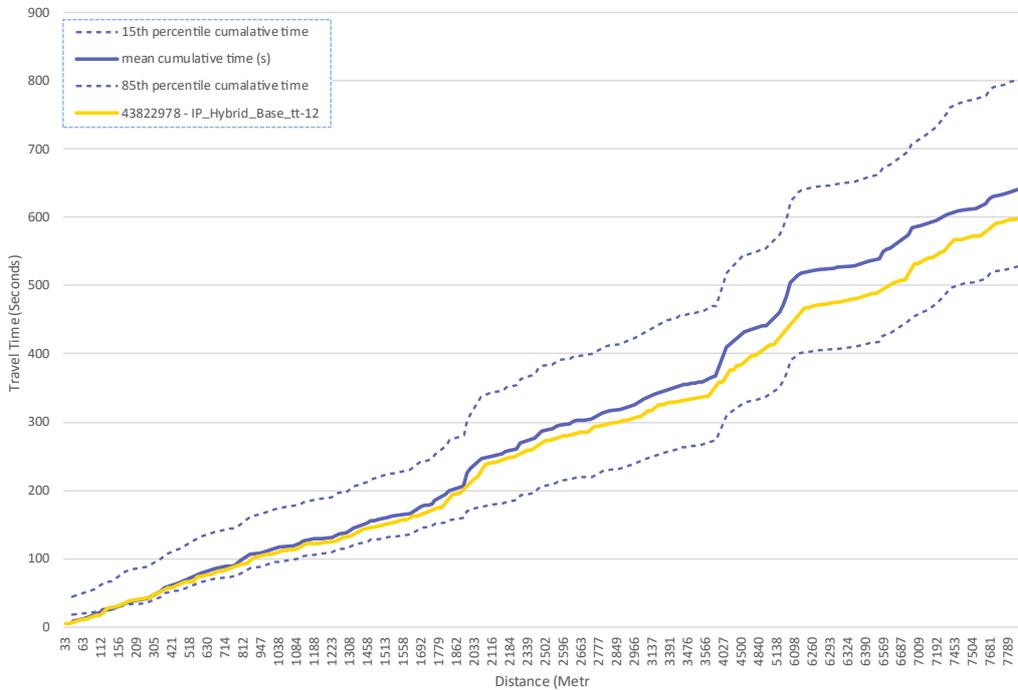
Travel time profile: CBD – Wainuiomata (8-9)

Tomtom vs Modelled Travel Time



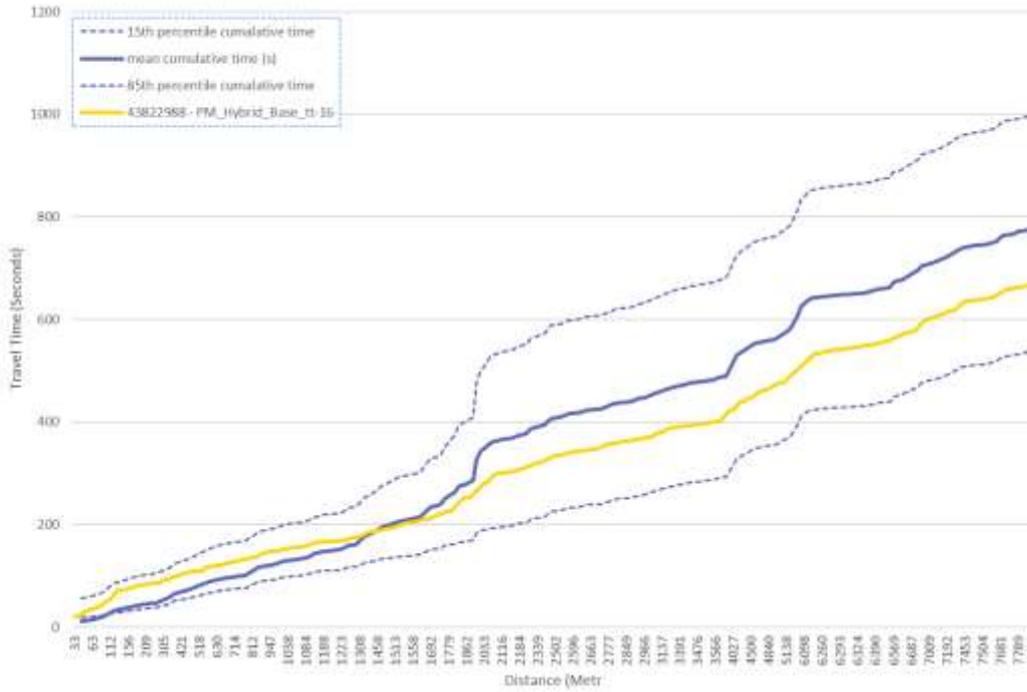
Travel time profile: CBD – Wainuiomata (11-12)

Tomtom vs Modelled Travel Time



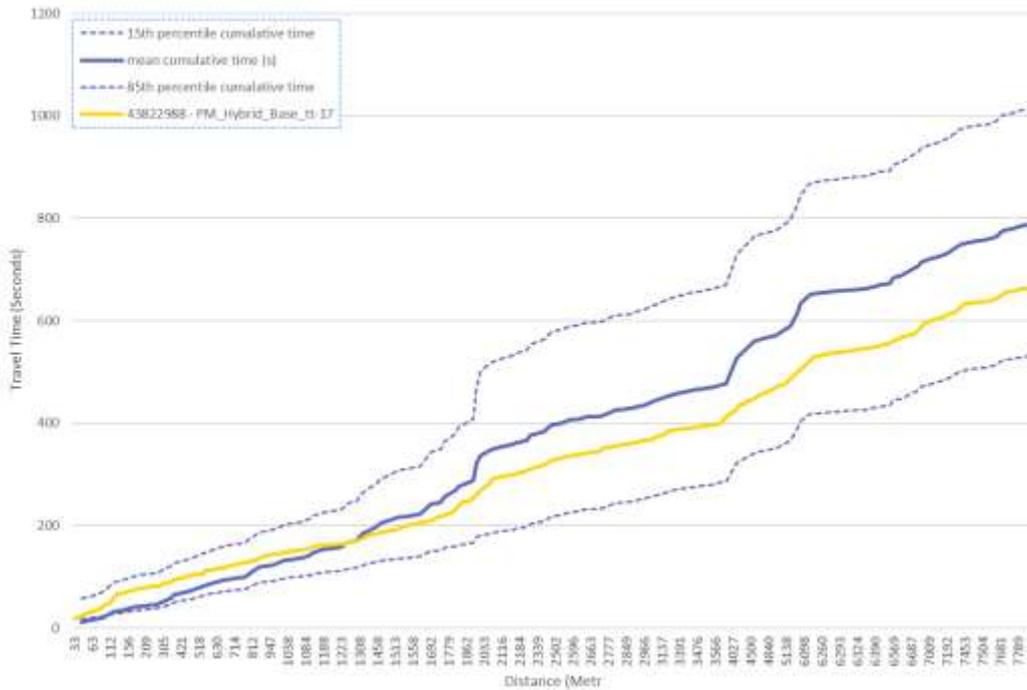
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Tomtom vs Modelled Travel Time



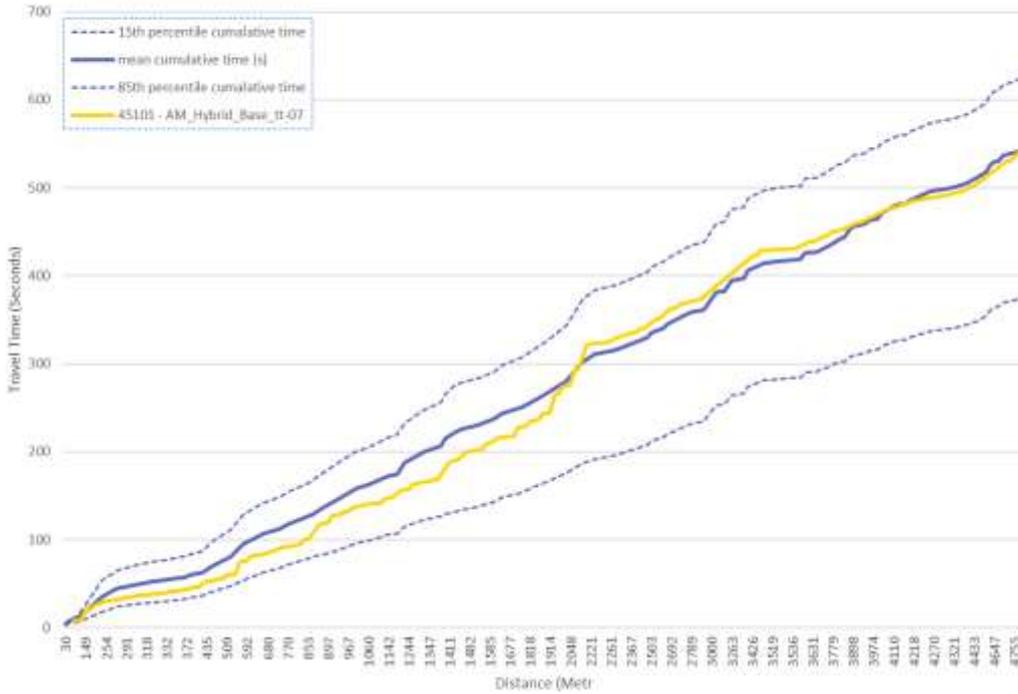
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Tomtom vs Modelled Travel Time



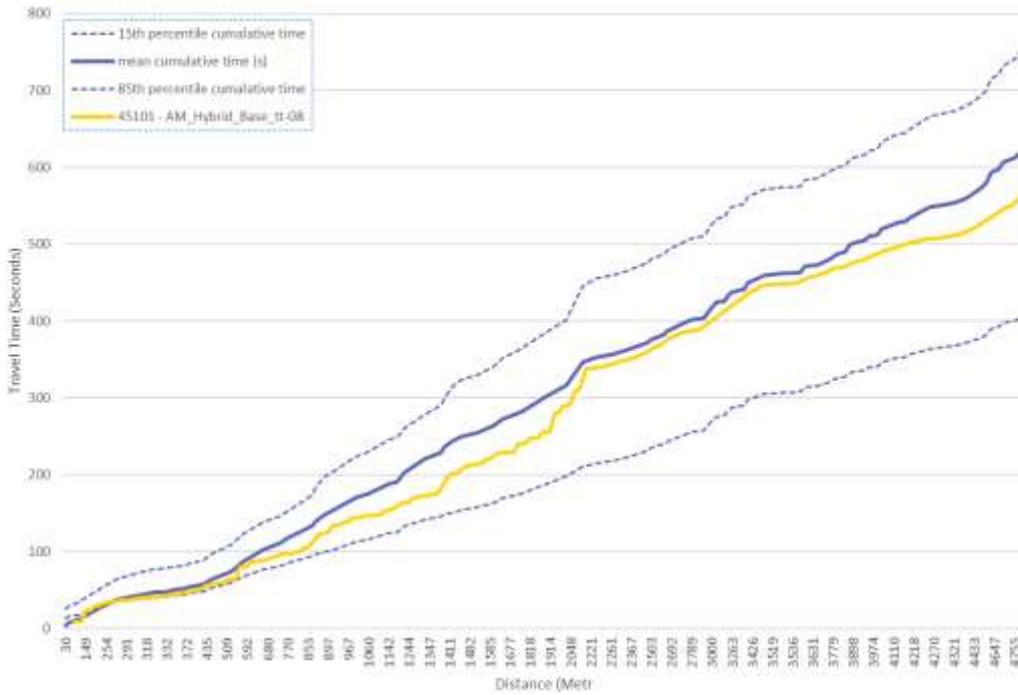
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Tomtom vs Modelled Travel Time



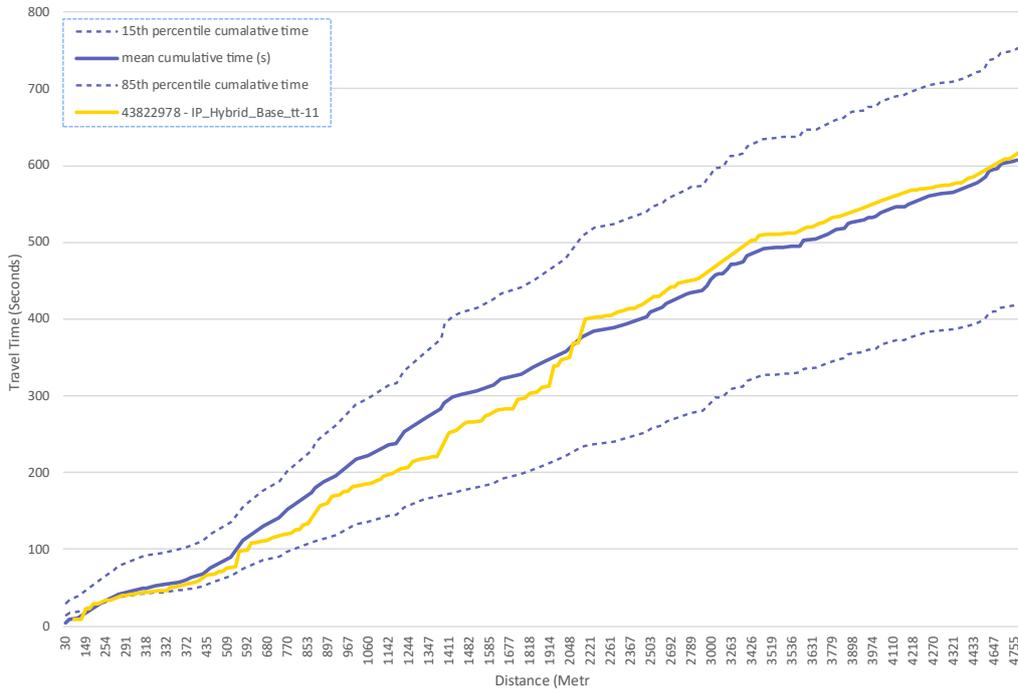
Travel time profile: Jackson St - Randwick Rd (7-8)

Tomtom vs Modelled Travel Time



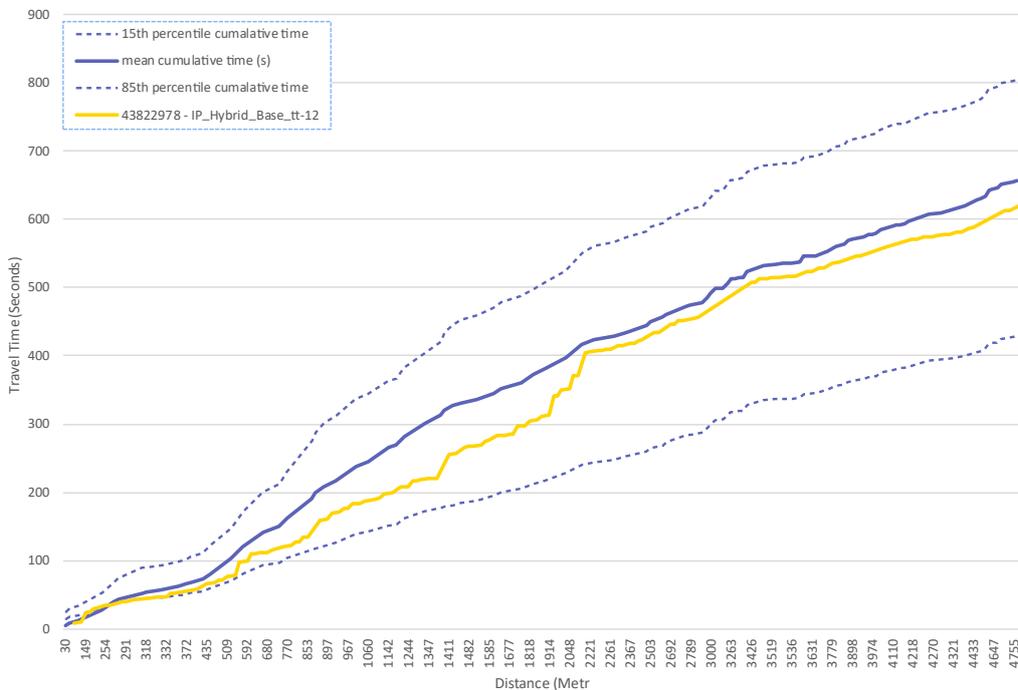
Travel time profile: Jackson St - Randwick Rd (8-9)

Tomtom vs Modelled Travel Time



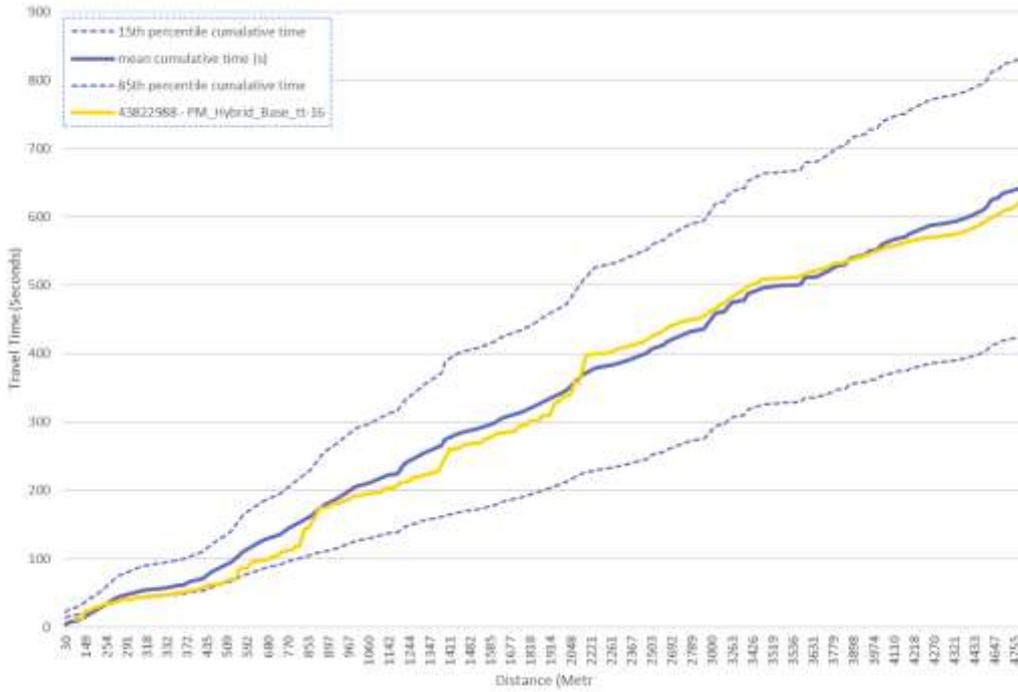
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Tomtom vs Modelled Travel Time



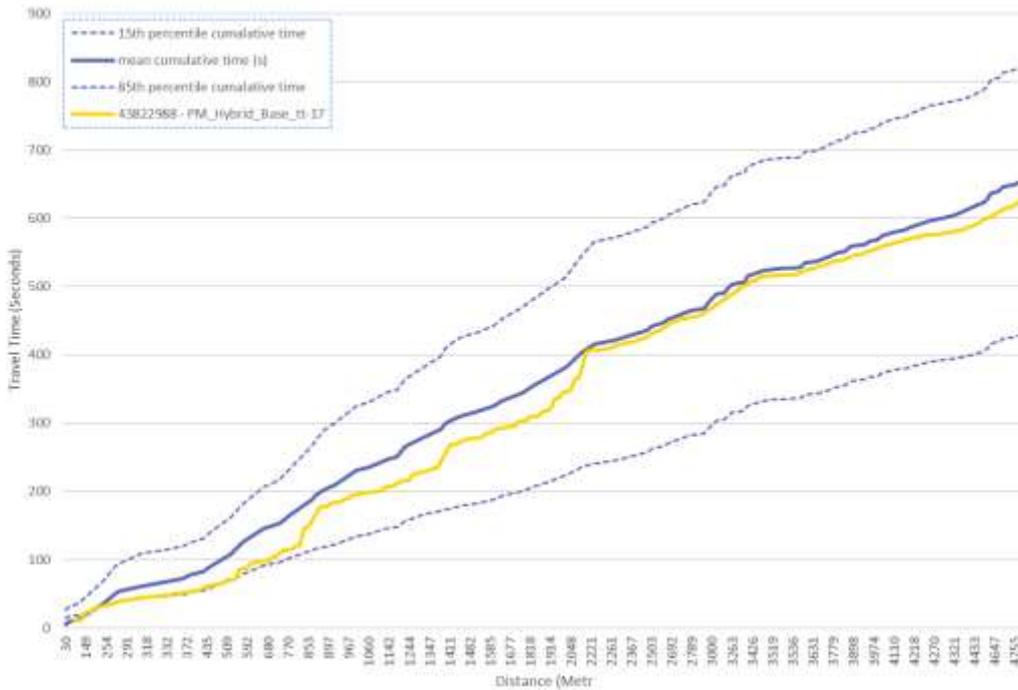
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Tomtom vs Modelled Travel Time



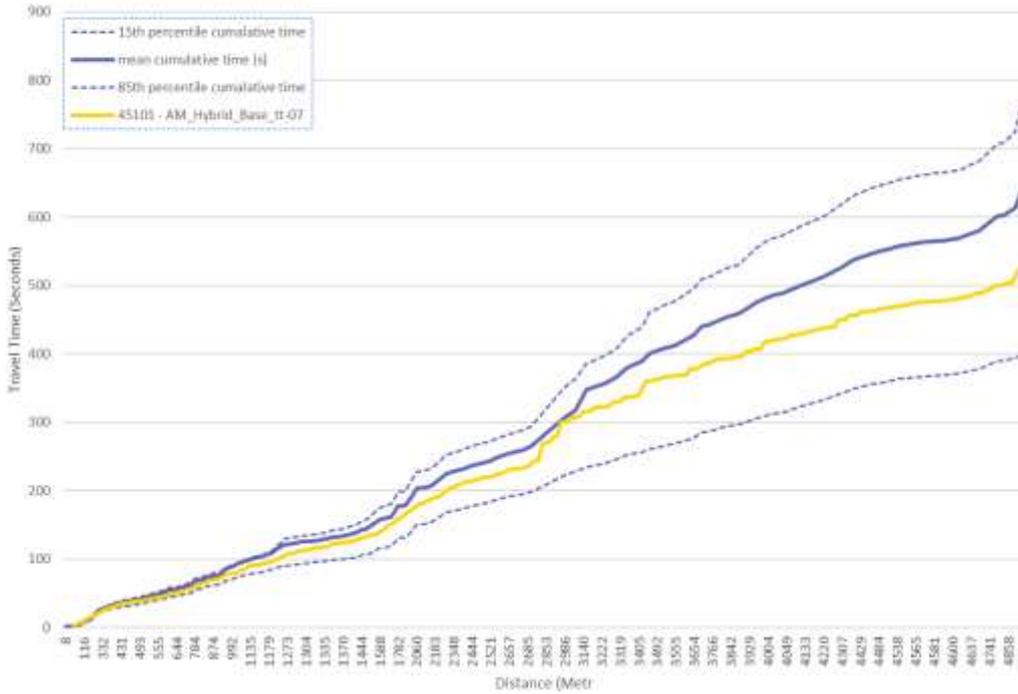
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Tomtom vs Modelled Travel Time



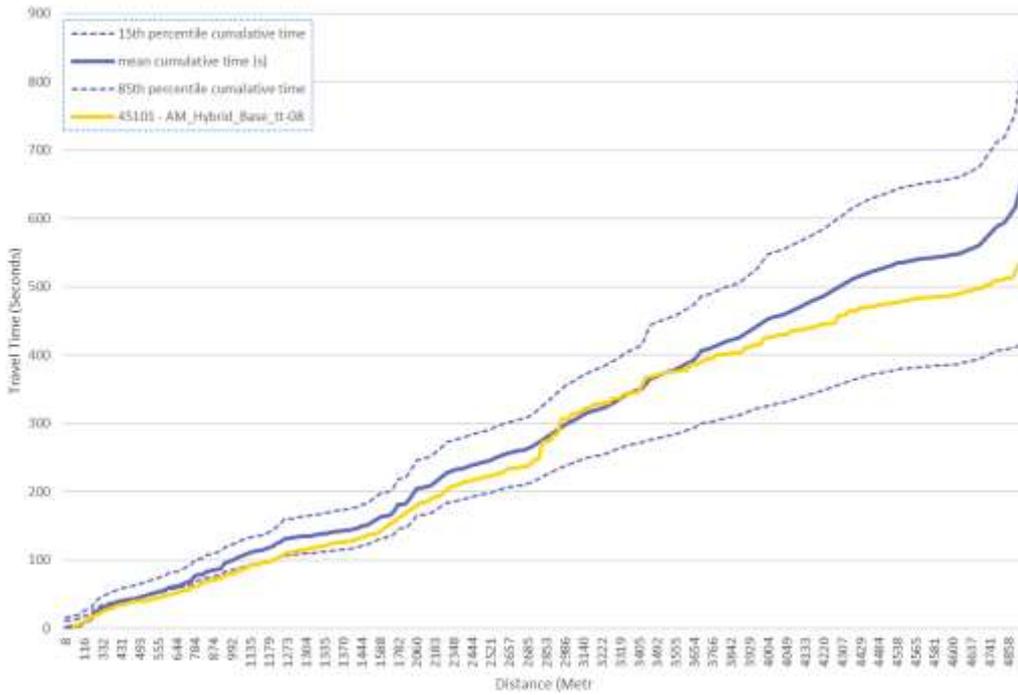
Travel time profile: Jackson St - Randwick Rd (17-18)

Tomtom vs Modelled Travel Time



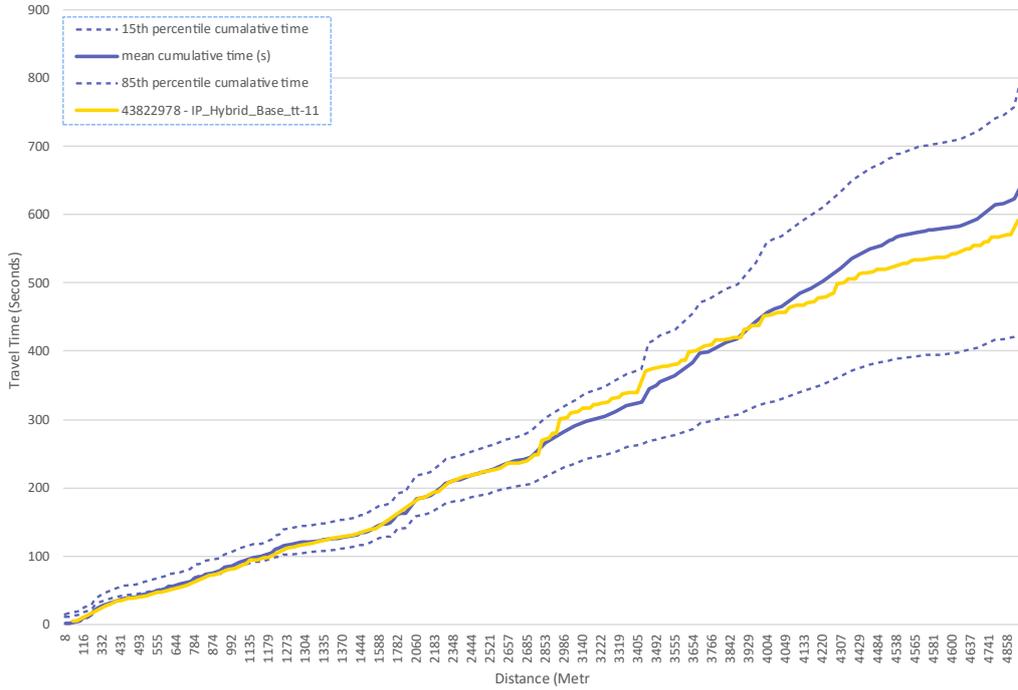
Travel time profile: Randwick Rd – Jackson St (7-8)

Tomtom vs Modelled Travel Time



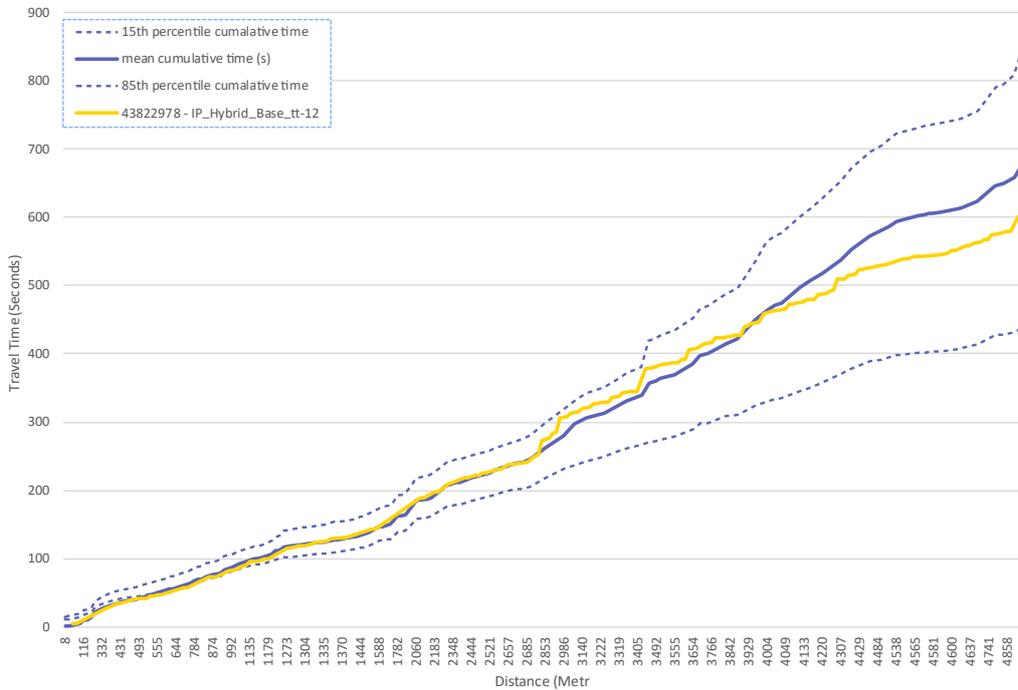
Travel time profile: Randwick Rd – Jackson St (8-9)

Tomtom vs Modelled Travel Time



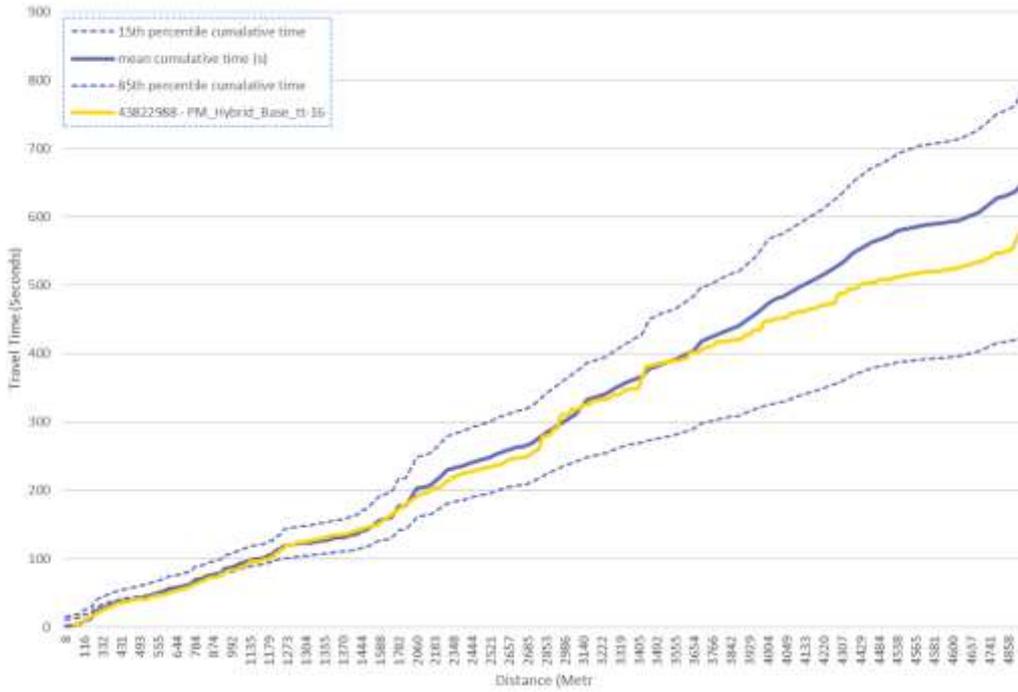
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Tomtom vs Modelled Travel Time



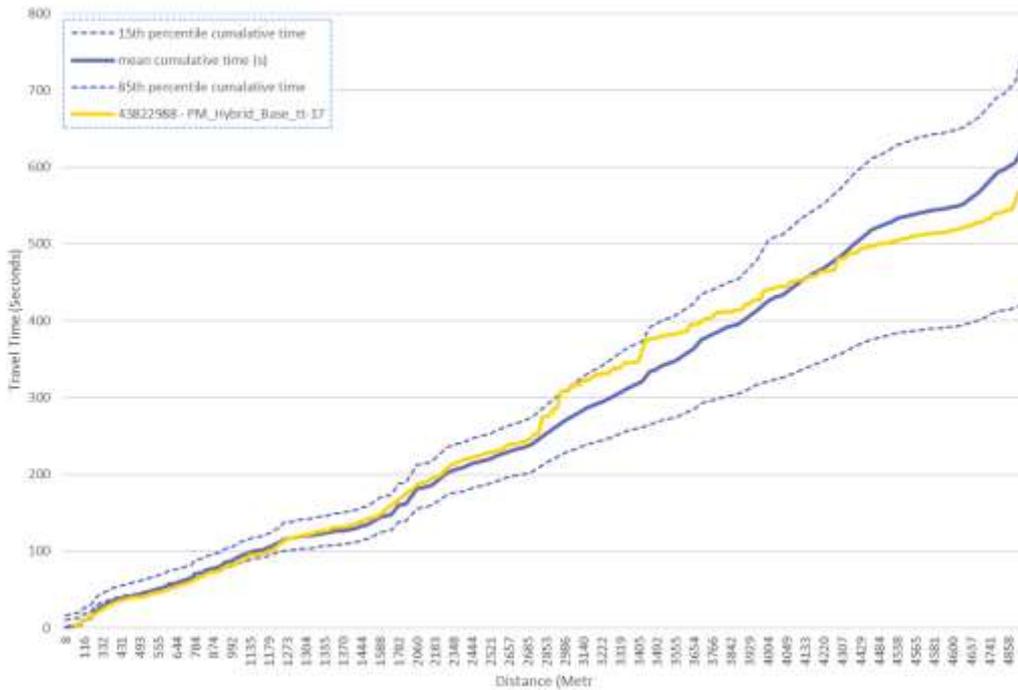
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Tomtom vs Modelled Travel Time



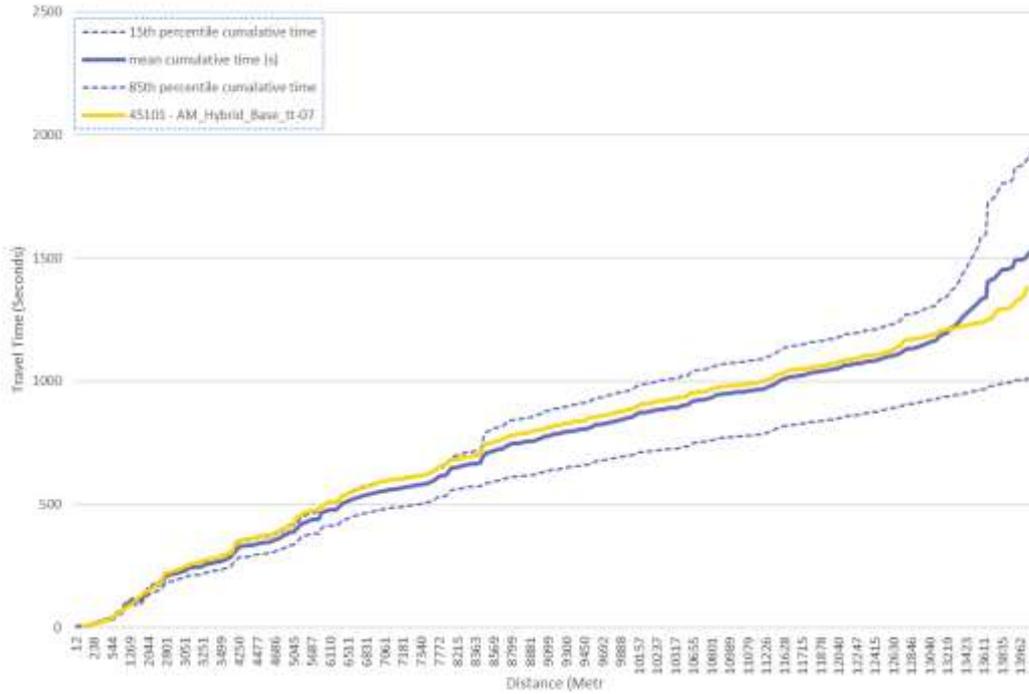
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Tomtom vs Modelled Travel Time



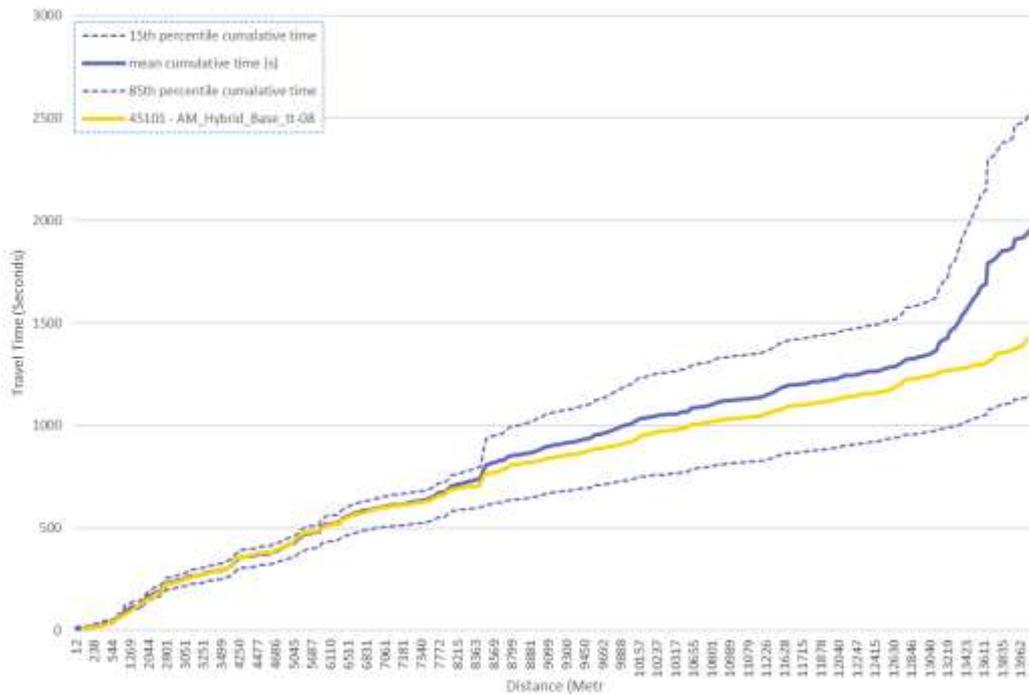
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Tomtom vs Modelled Travel Time



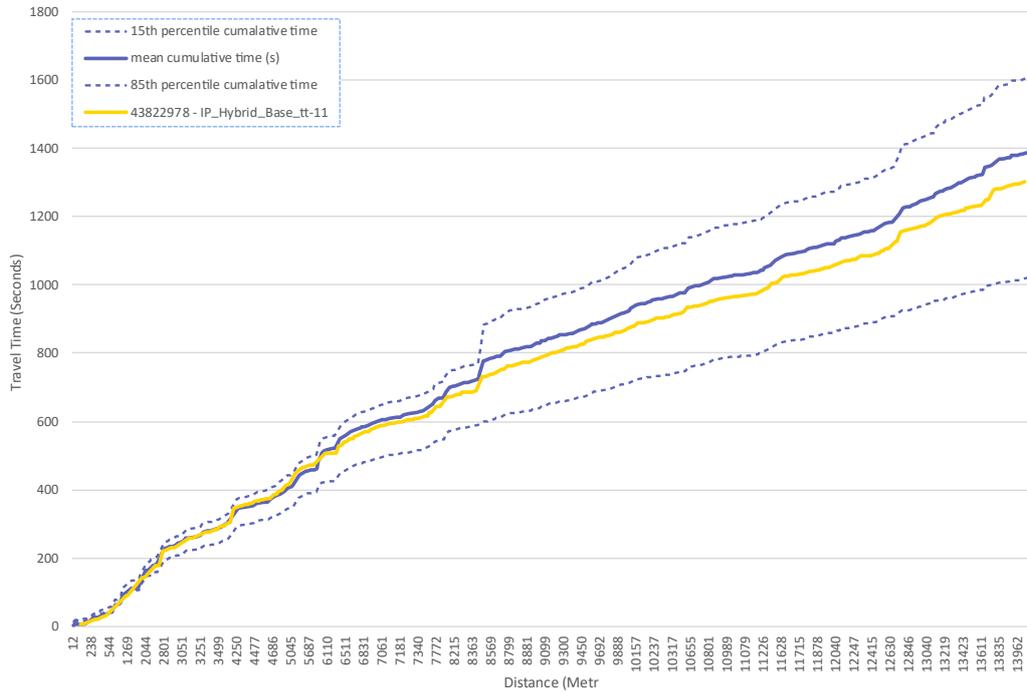
Travel time profile: Cambridge Tce - Petone (7-8)

Tomtom vs Modelled Travel Time



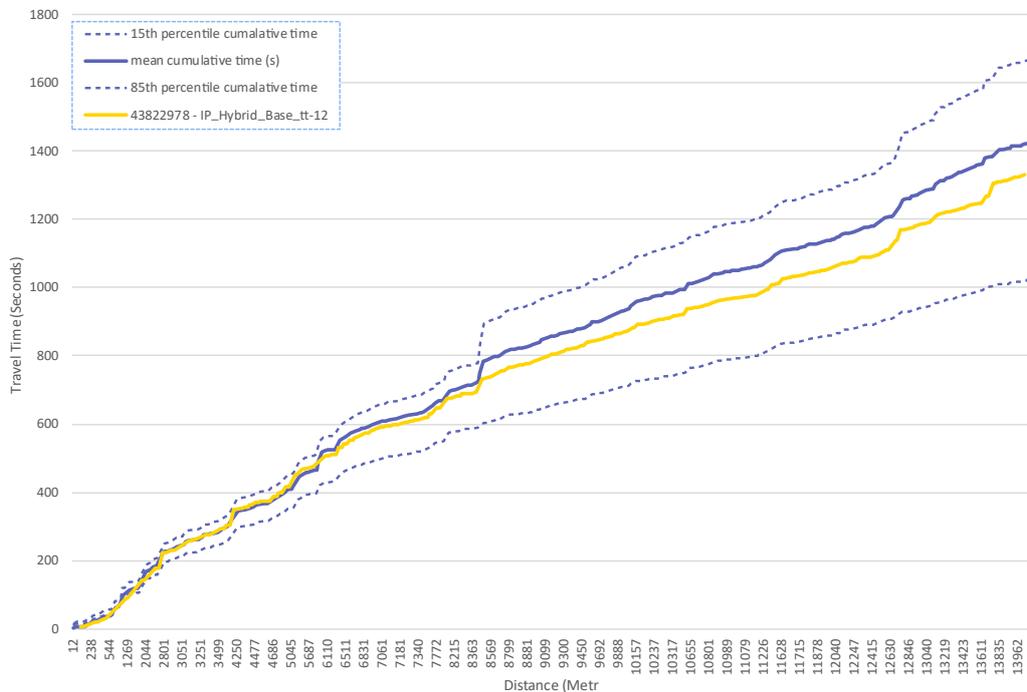
Travel time profile: Cambridge Tce - Petone (8-9)

Tomtom vs Modelled Travel Time



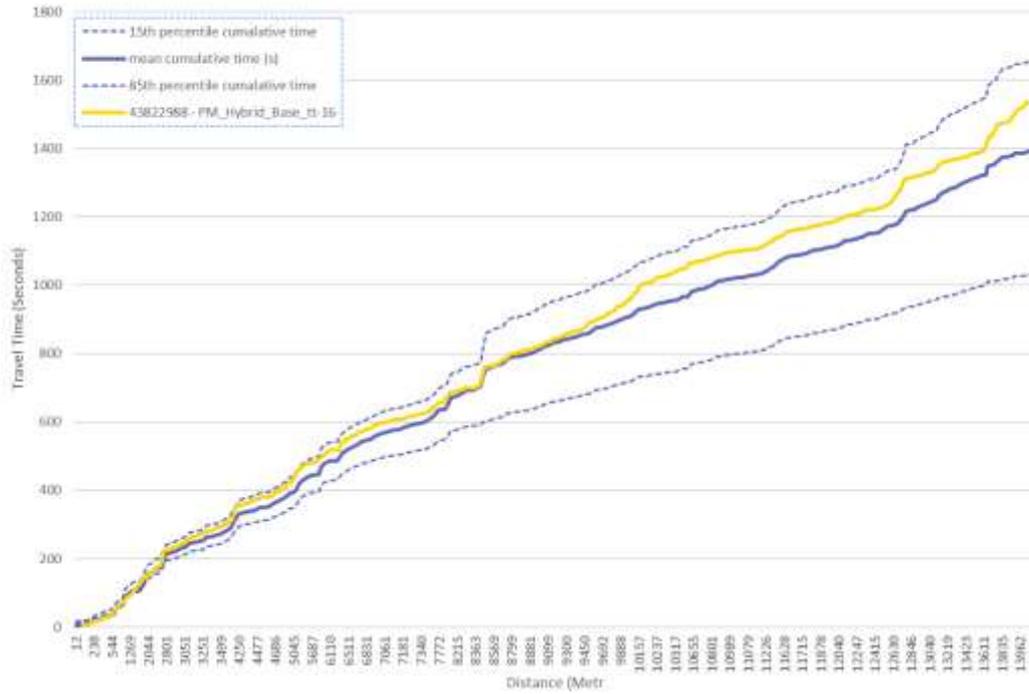
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Tomtom vs Modelled Travel Time



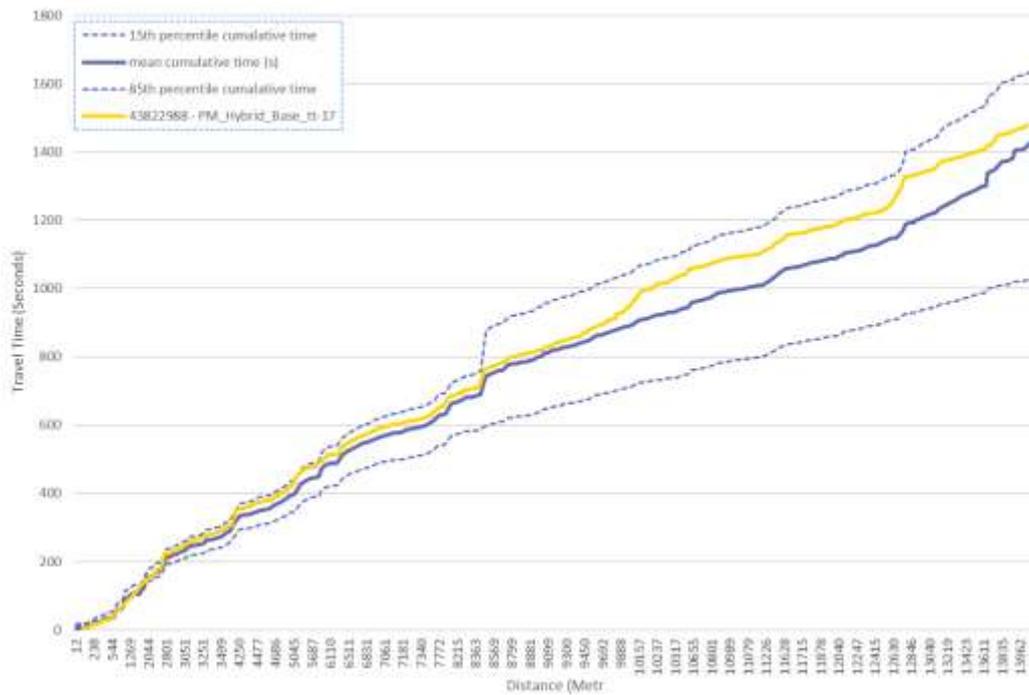
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Tomtom vs Modelled Travel Time



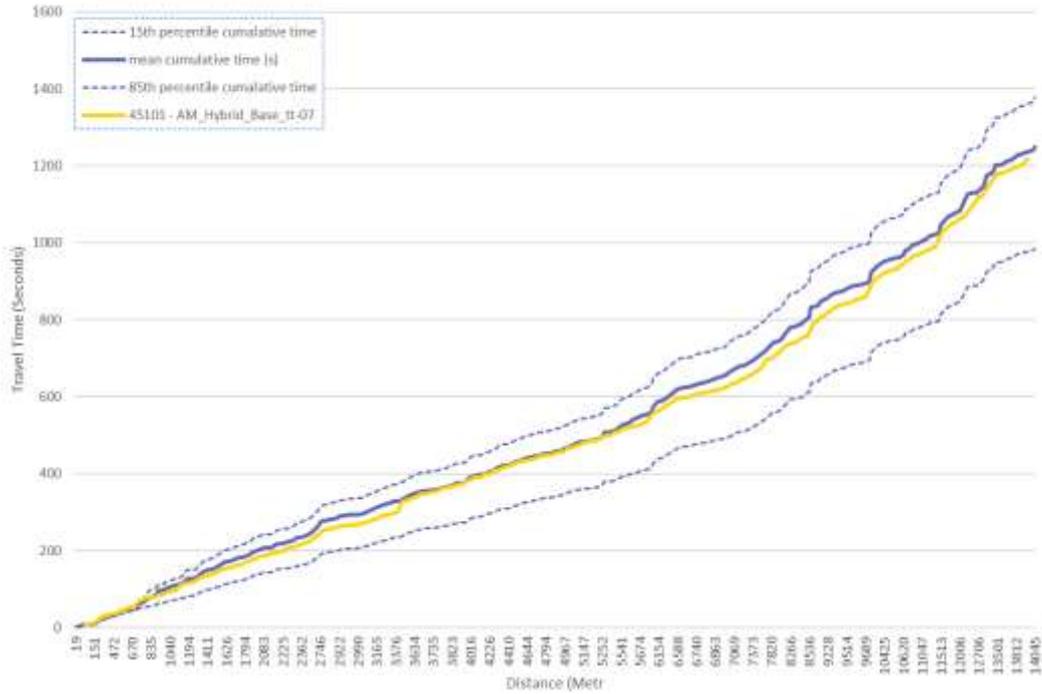
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Tomtom vs Modelled Travel Time



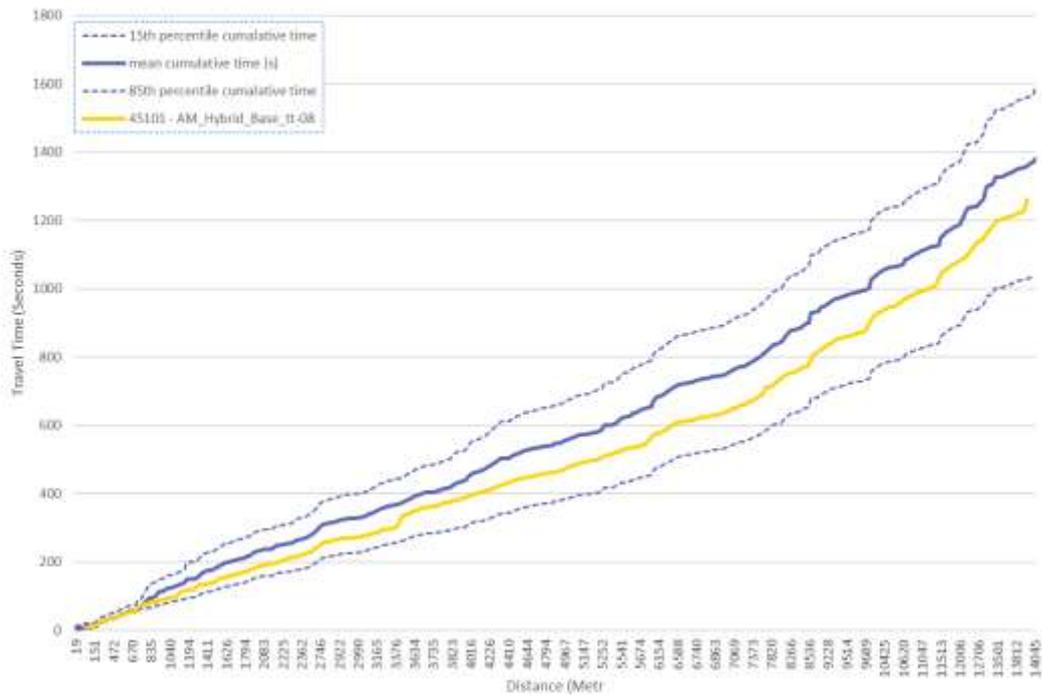
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Tomtom vs Modelled Travel Time



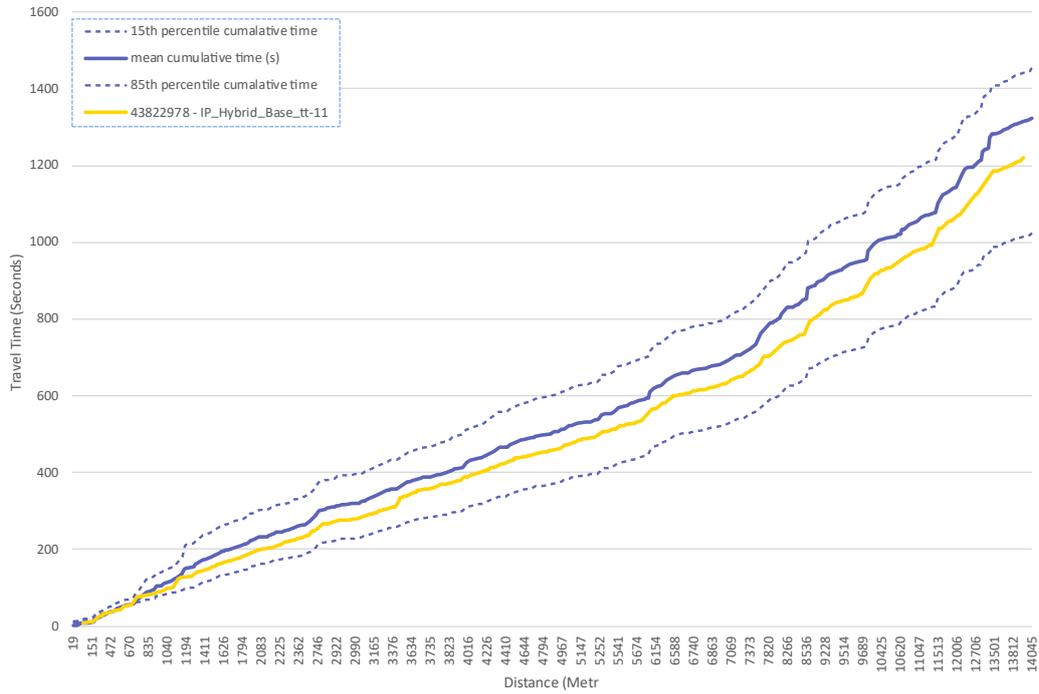
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Tomtom vs Modelled Travel Time



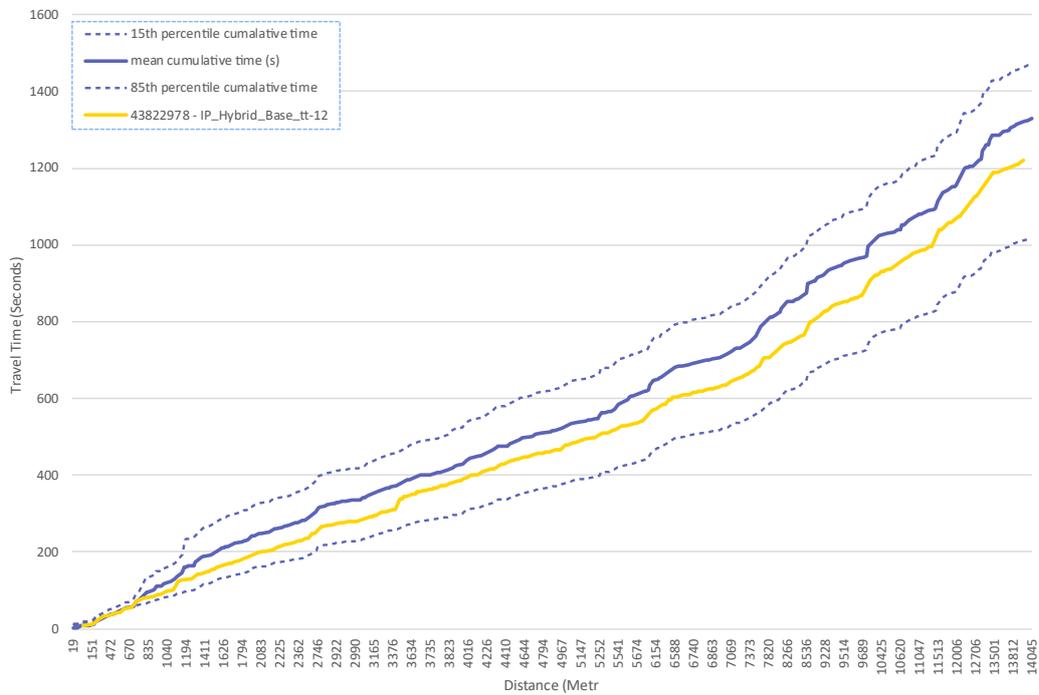
Travel time profile: Petone – Cambridge Tce (8-9)

Tomtom vs Modelled Travel Time



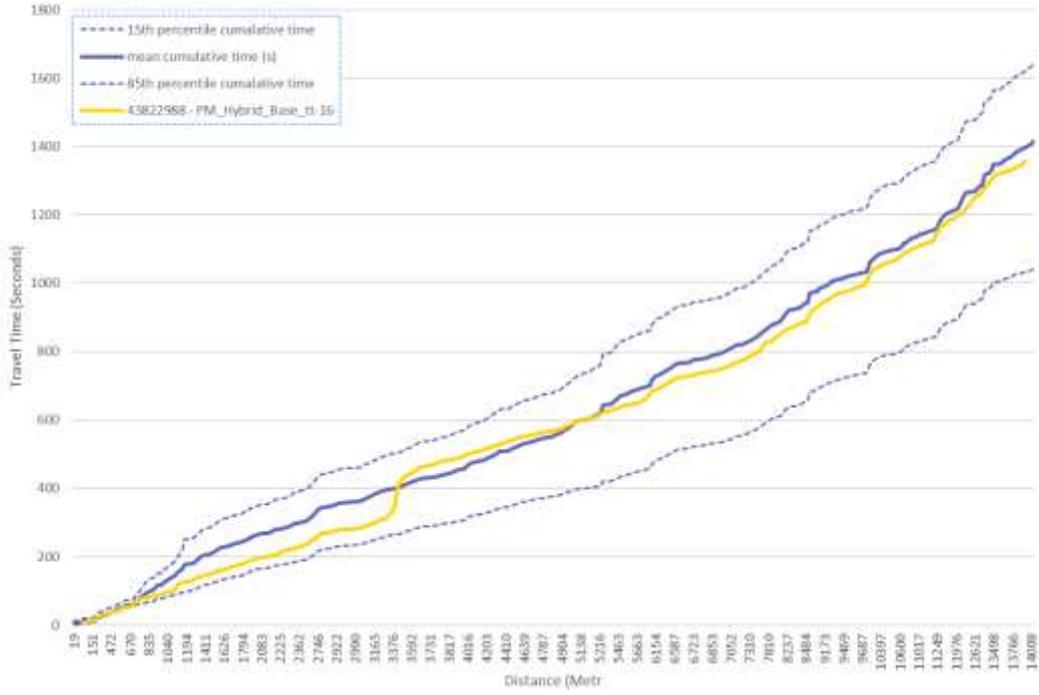
Travel time profile: Petone – Cambridge Tce (11-12)

Tomtom vs Modelled Travel Time



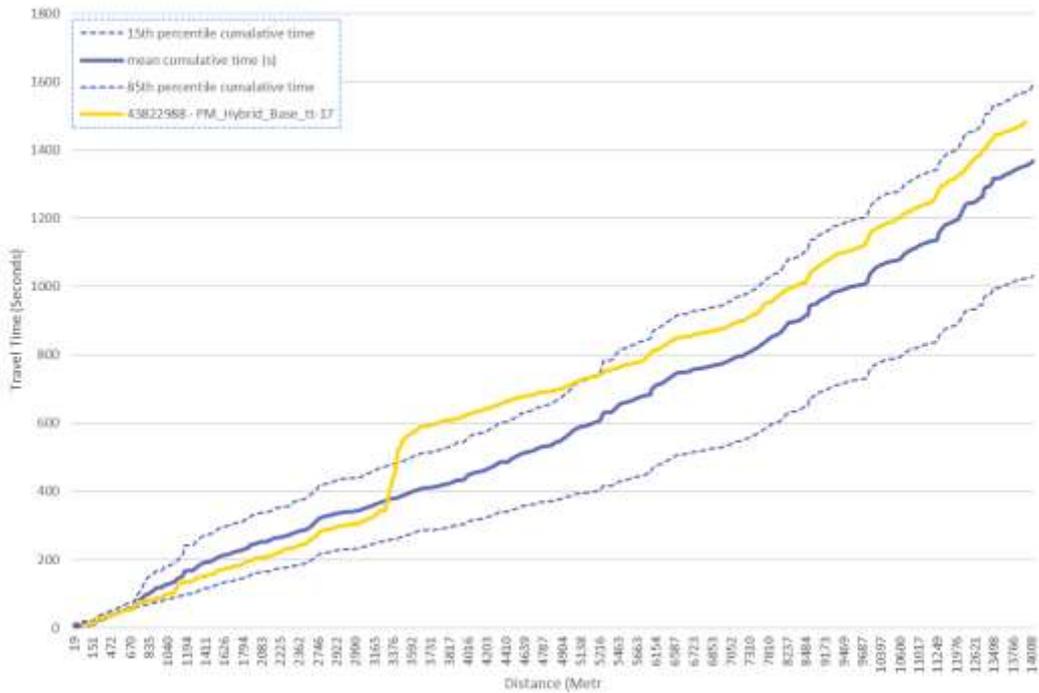
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Tomtom vs Modelled Travel Time



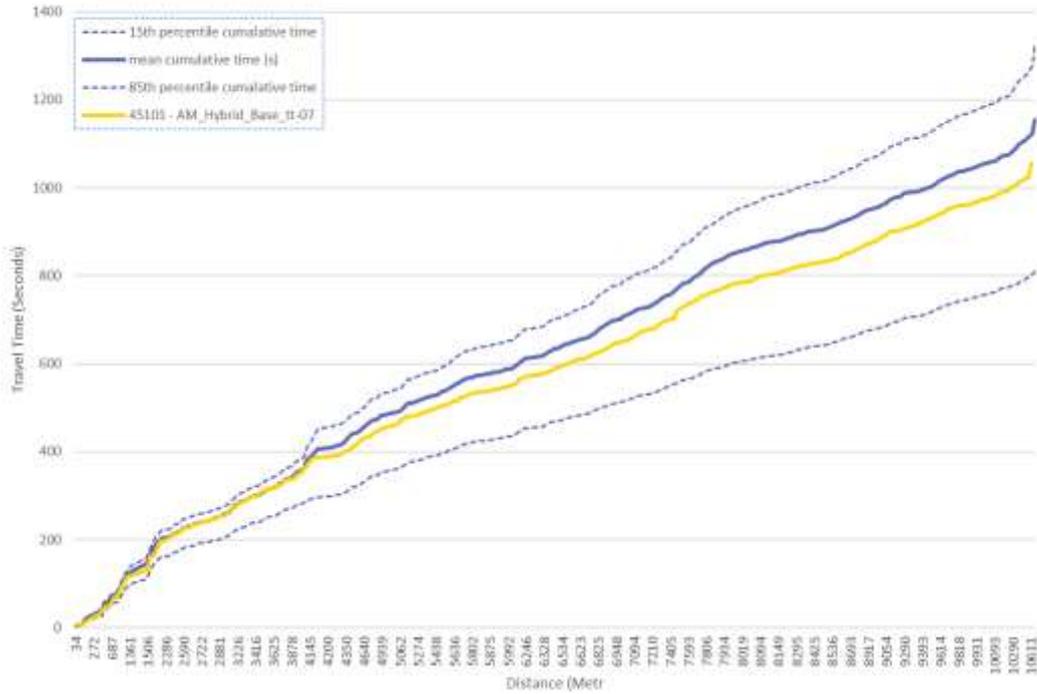
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Tomtom vs Modelled Travel Time



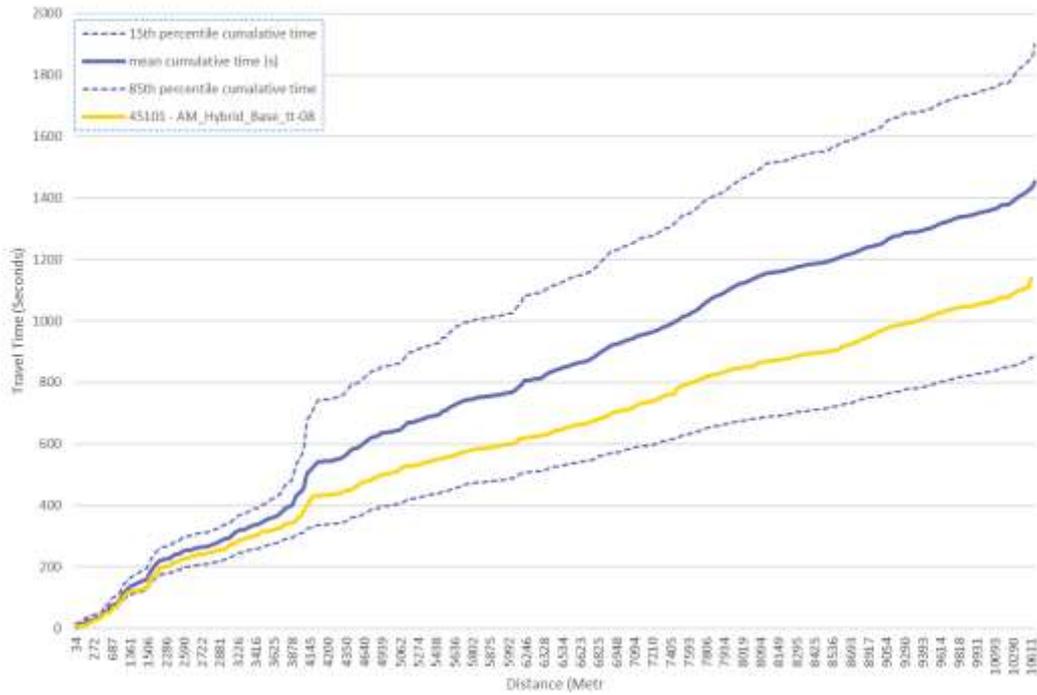
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Tomtom vs Modelled Travel Time



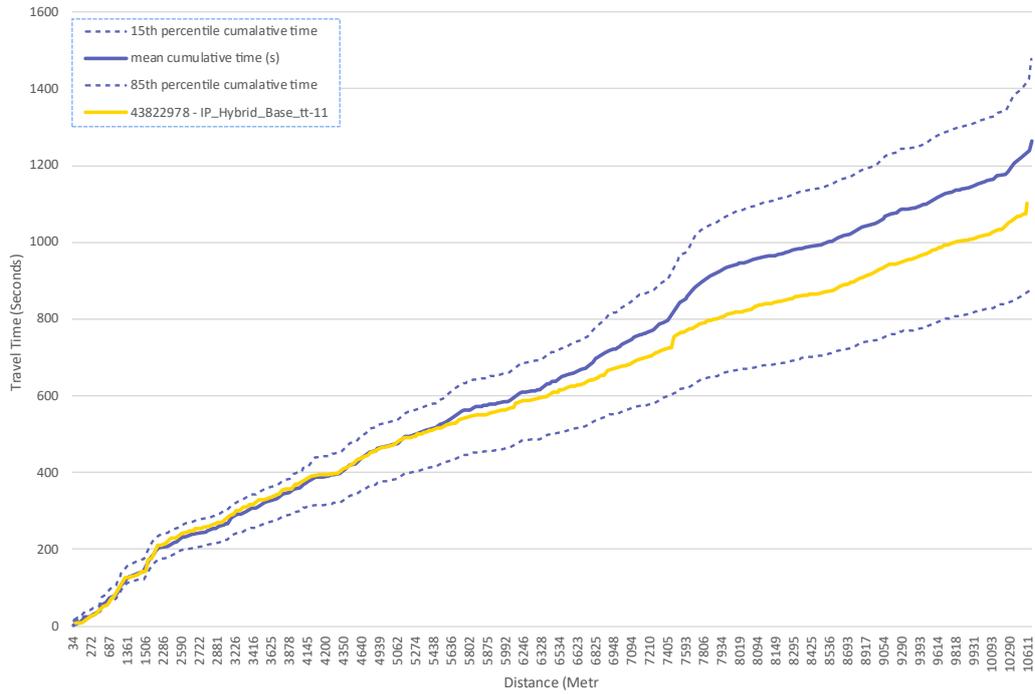
Travel time profile: High St - Cuba St(7-8)

Tomtom vs Modelled Travel Time



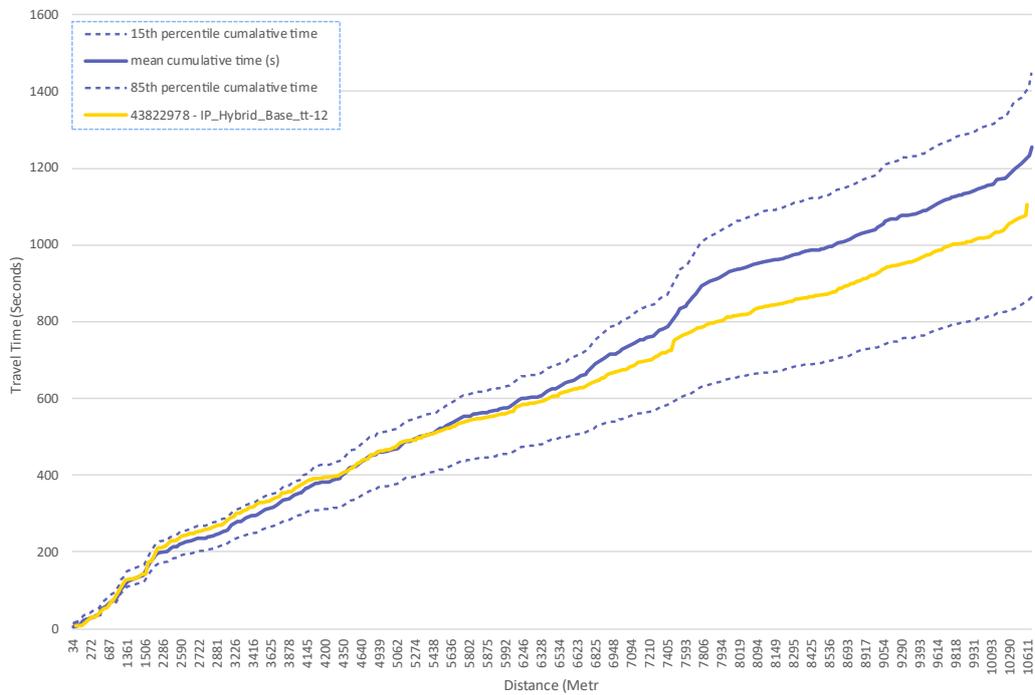
Travel time profile: High St - Cuba St (8-9)

Tomtom vs Modelled Travel Time



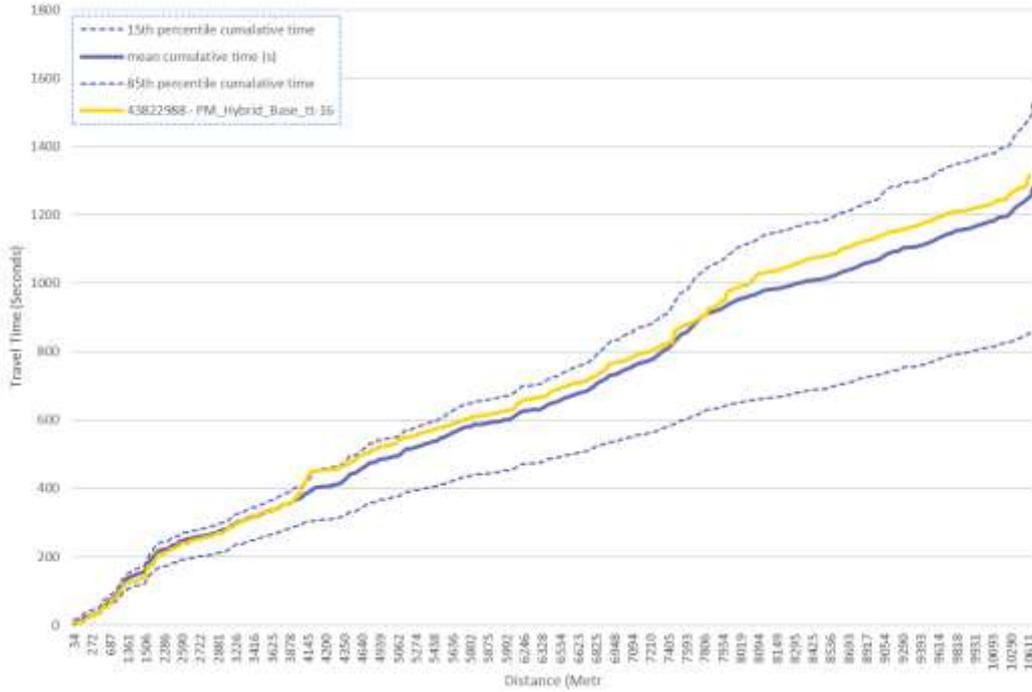
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Tomtom vs Modelled Travel Time



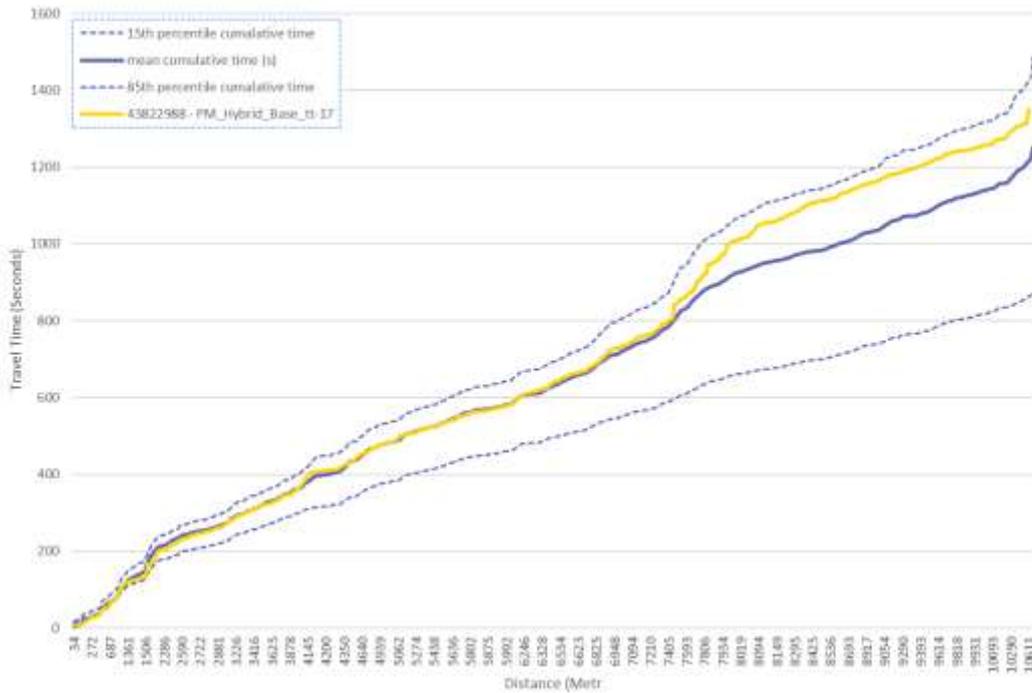
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Tomtom vs Modelled Travel Time



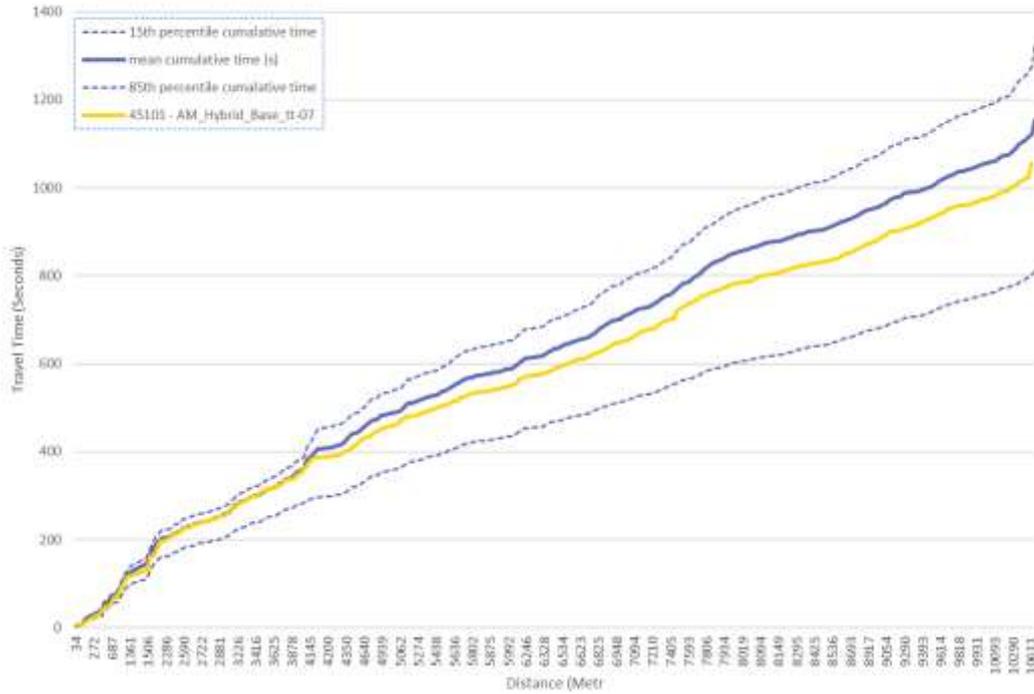
Travel time profile: High St - Cuba St (16-17)

Tomtom vs Modelled Travel Time



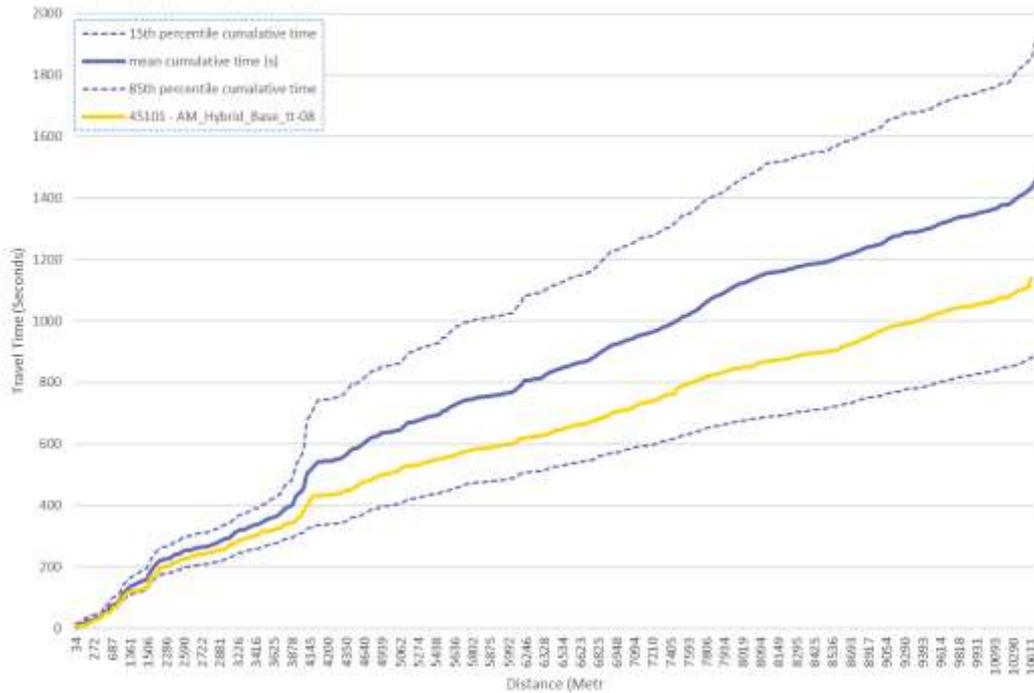
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Tomtom vs Modelled Travel Time



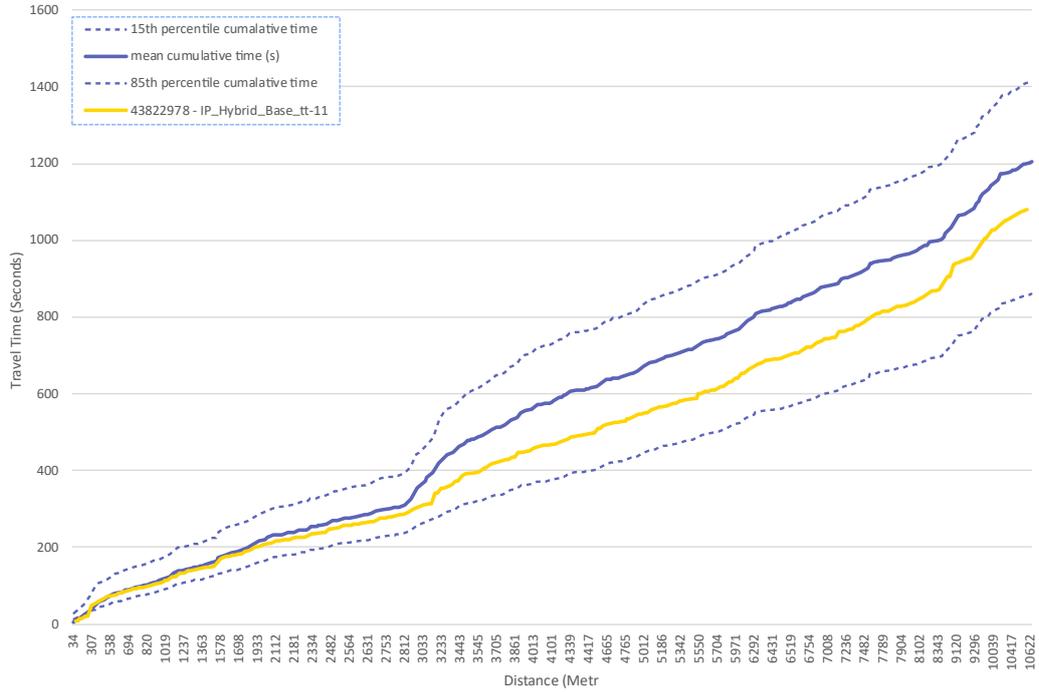
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Tomtom vs Modelled Travel Time



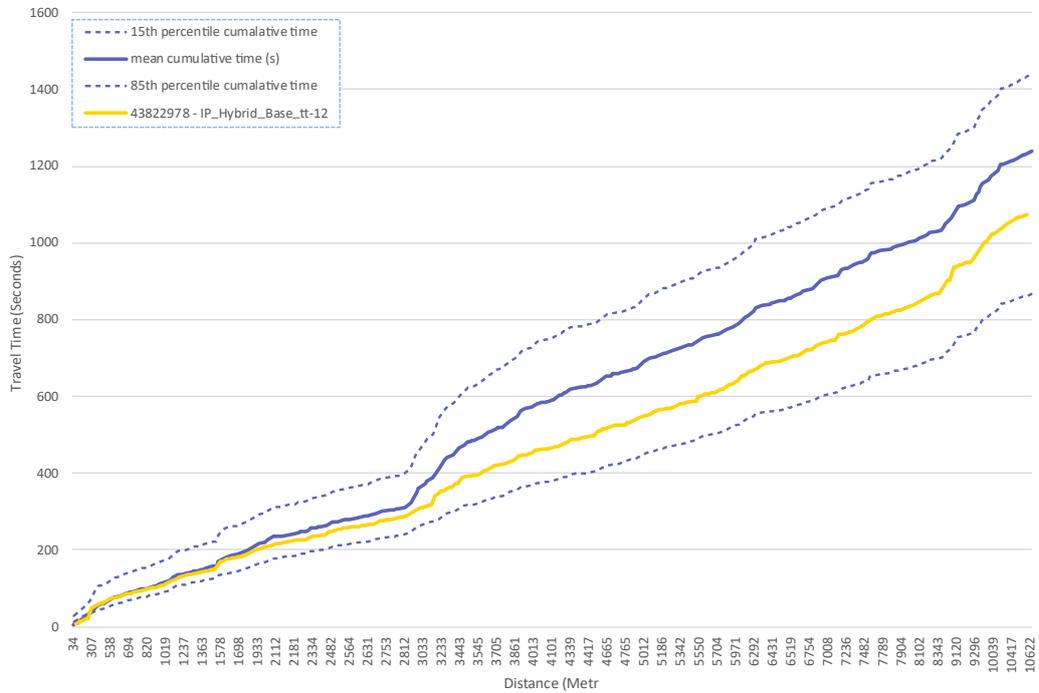
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Tomtom vs Modelled Travel Time



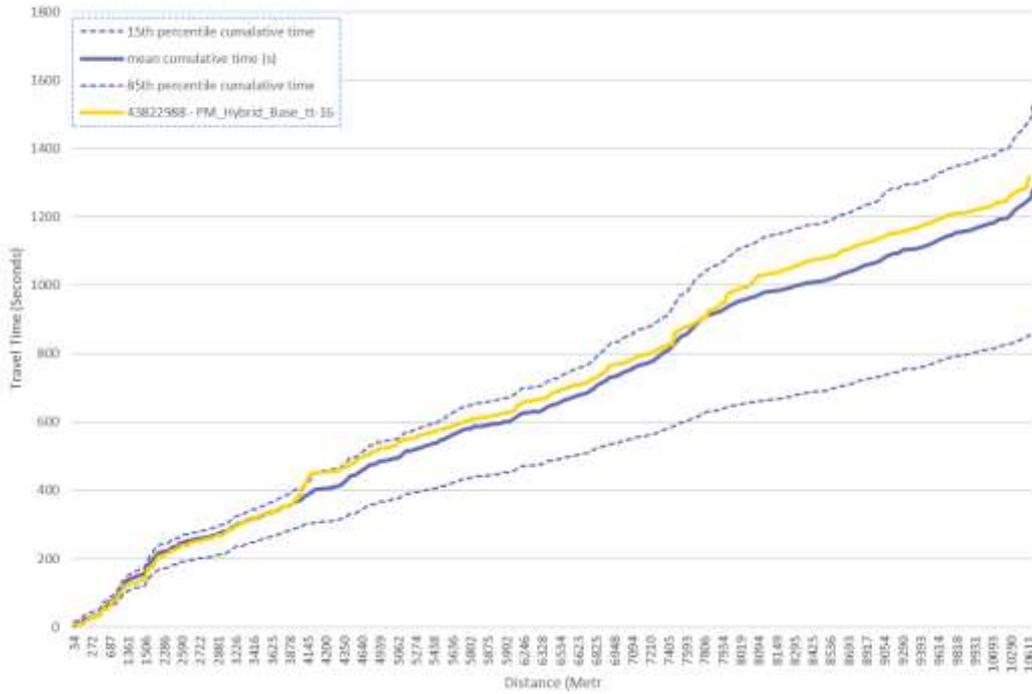
Travel time profile: Cuba St - High St (11-12)

Tomtom vs Modelled Travel Time



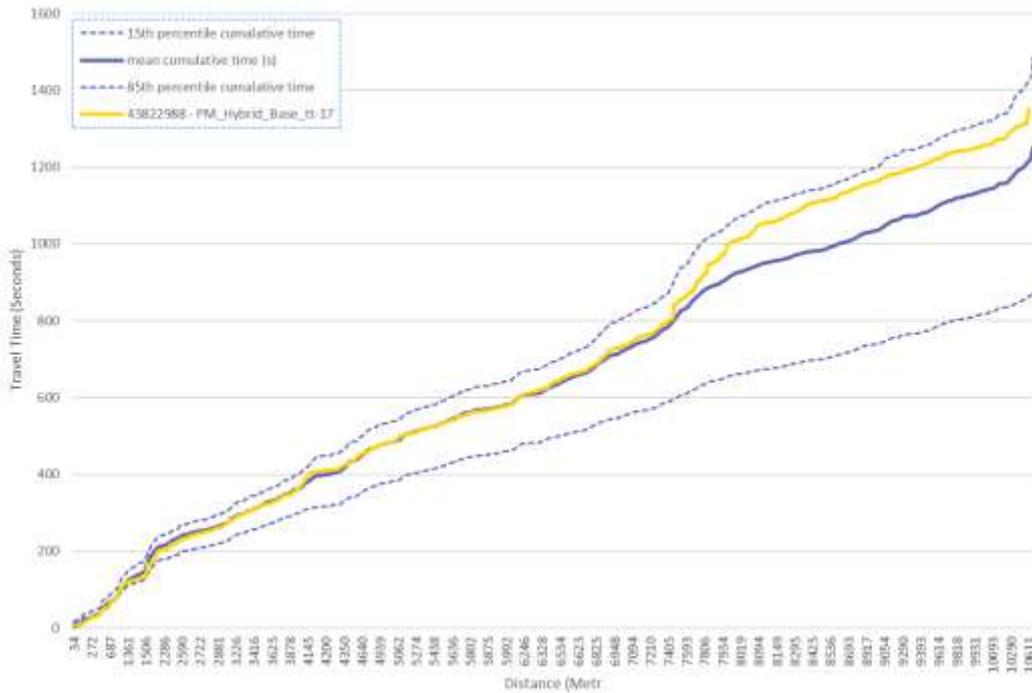
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Tomtom vs Modelled Travel Time



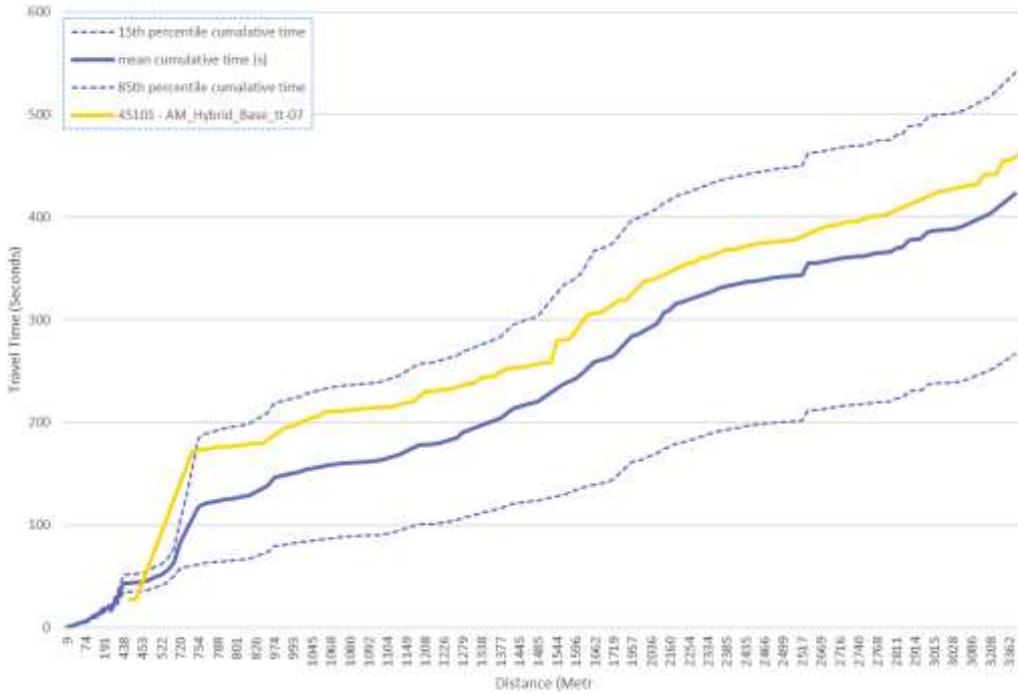
Travel time profile: Cuba St - High St (16-17)

Tomtom vs Modelled Travel Time



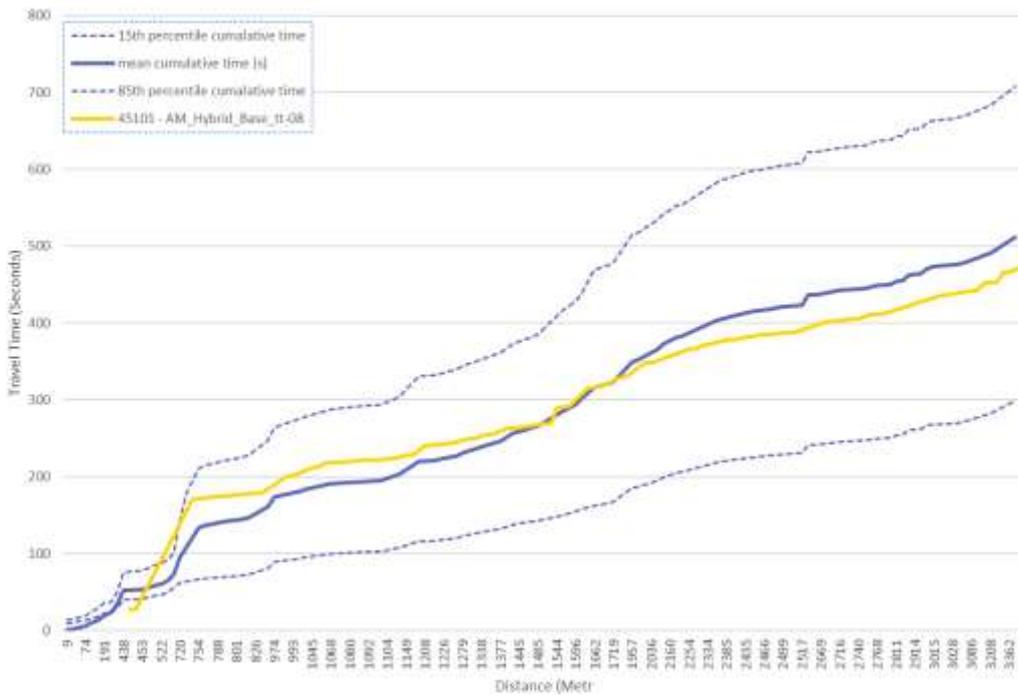
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Tomtom vs Modelled Travel Time



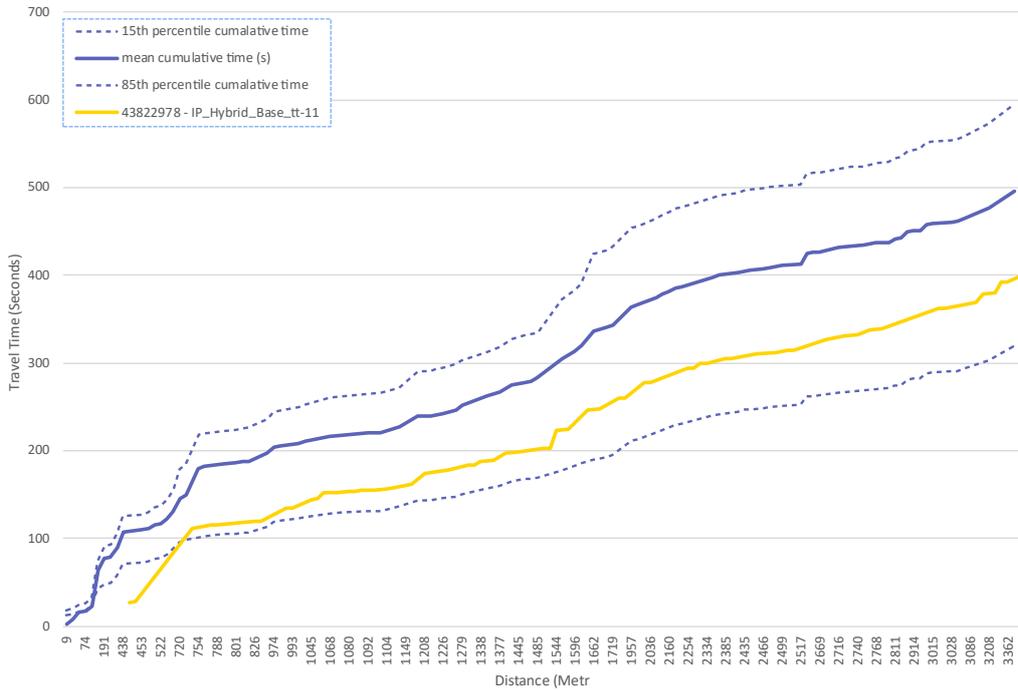
Travel time profile: Harbour View – Waterloo (7-8)

Tomtom vs Modelled Travel Time



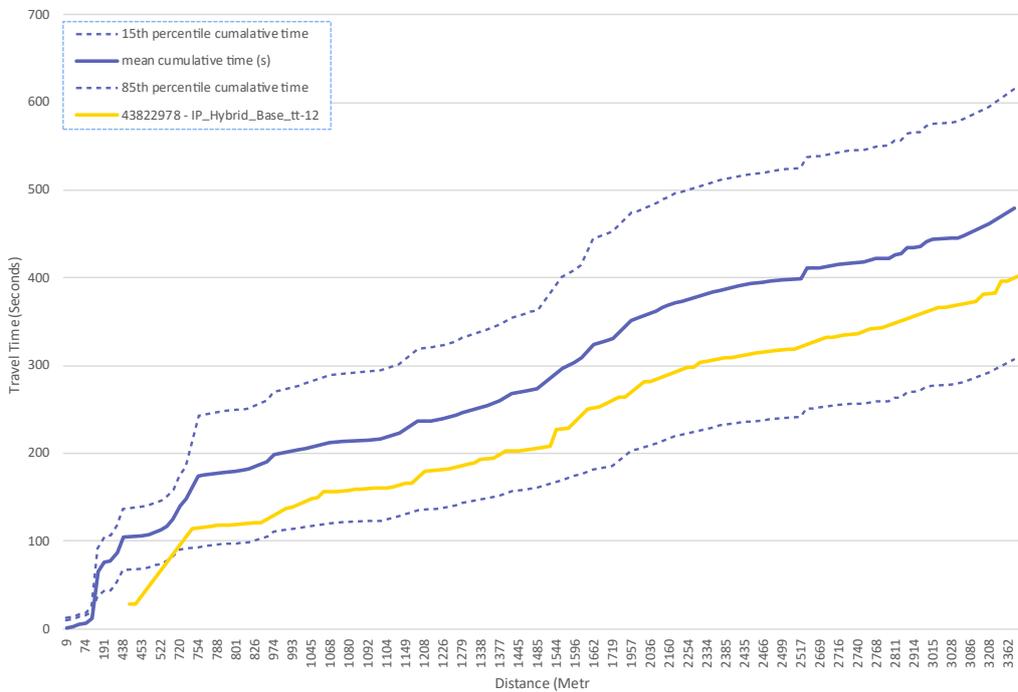
Travel time profile: Harbour View - Waterloo (8-9)

Tomtom vs Modelled Travel Time



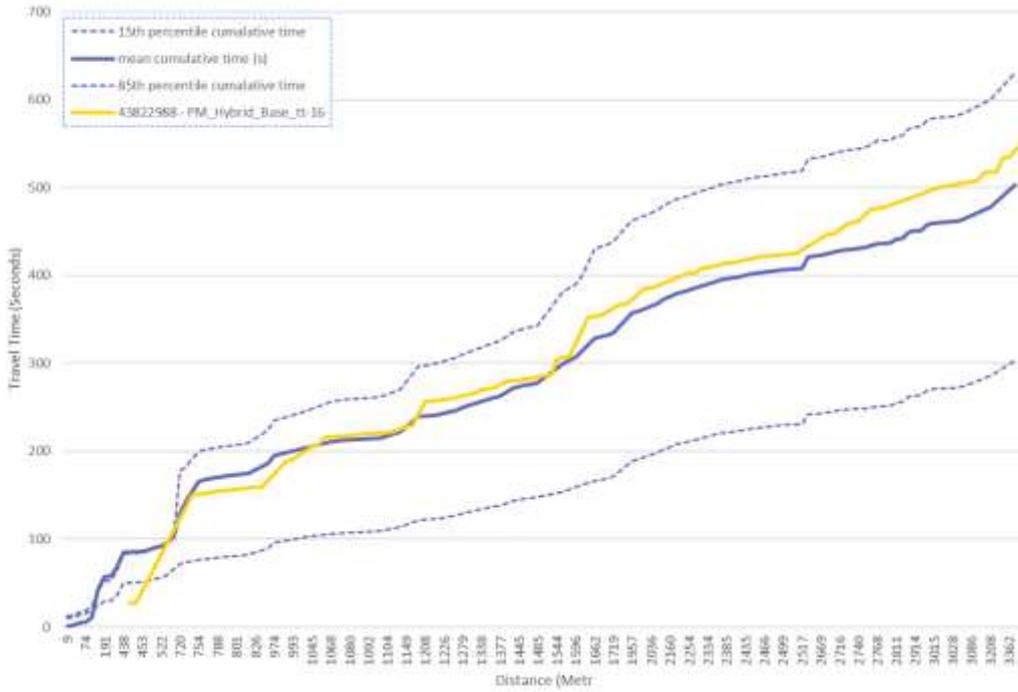
Travel time profile: Harbour View - Waterloo (11-12)

Tomtom vs Modelled Travel Time



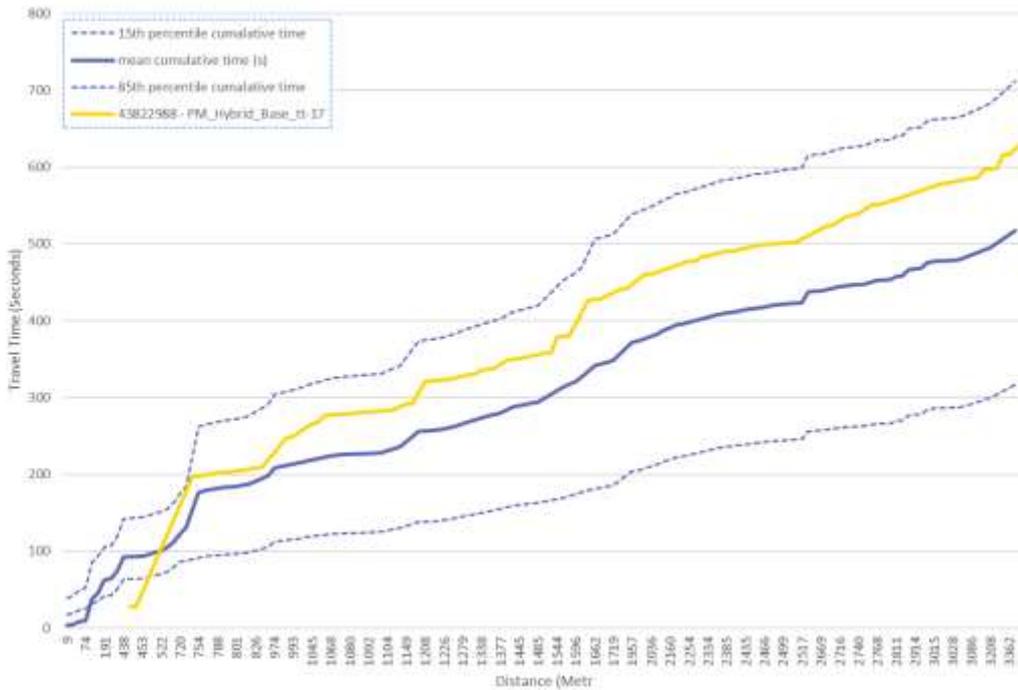
Travel time profile: Harbour View - Waterloo (12-13)

Tomtom vs Modelled Travel Time



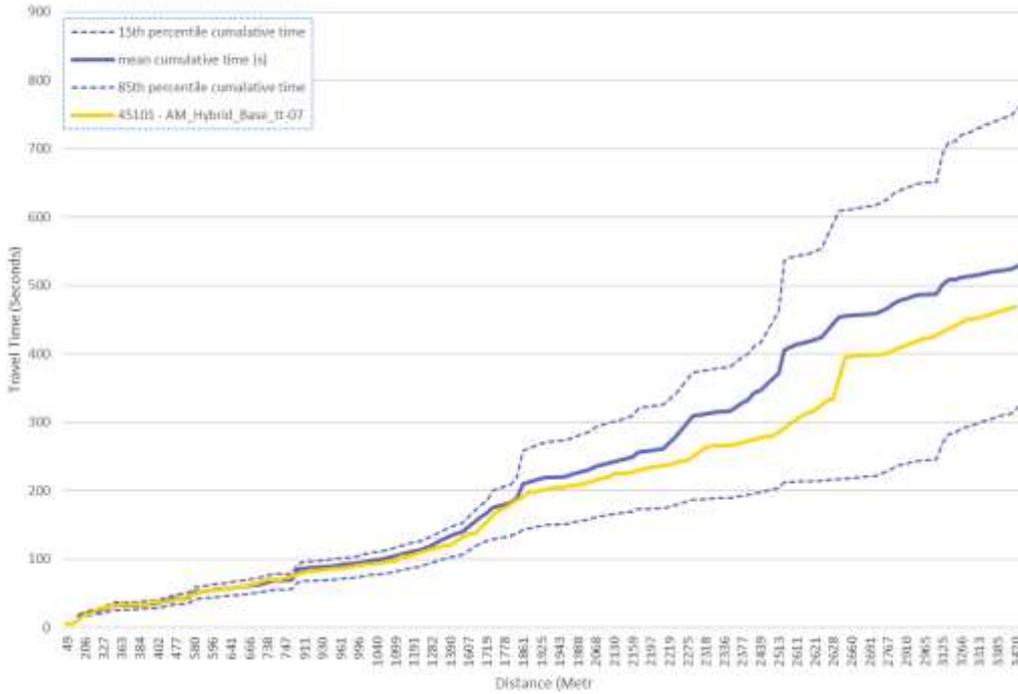
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Tomtom vs Modelled Travel Time



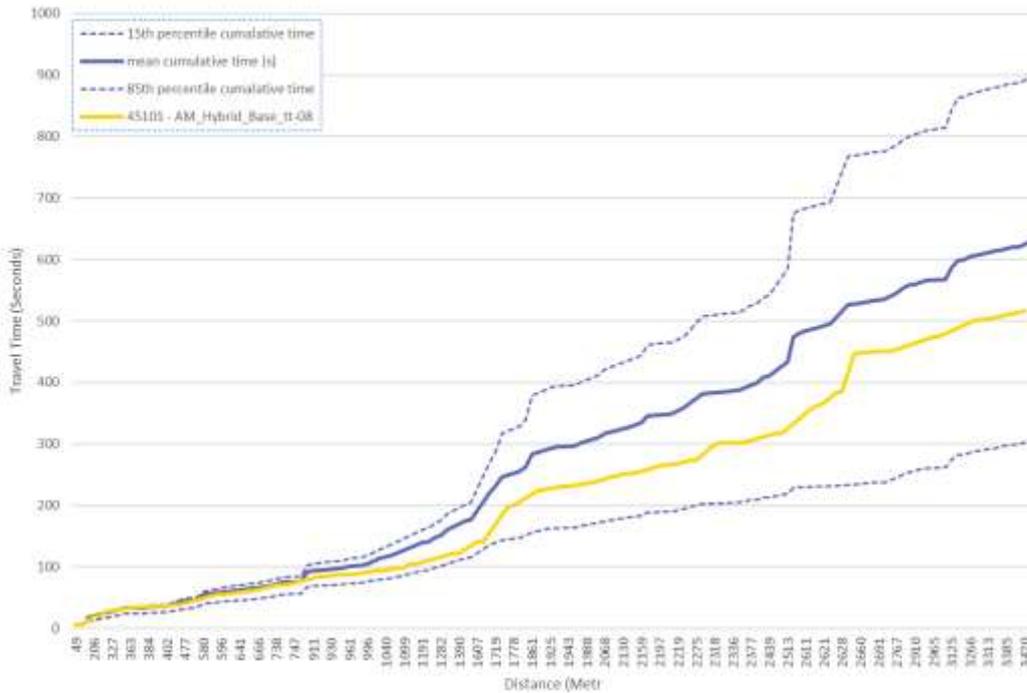
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Tomtom vs Modelled Travel Time



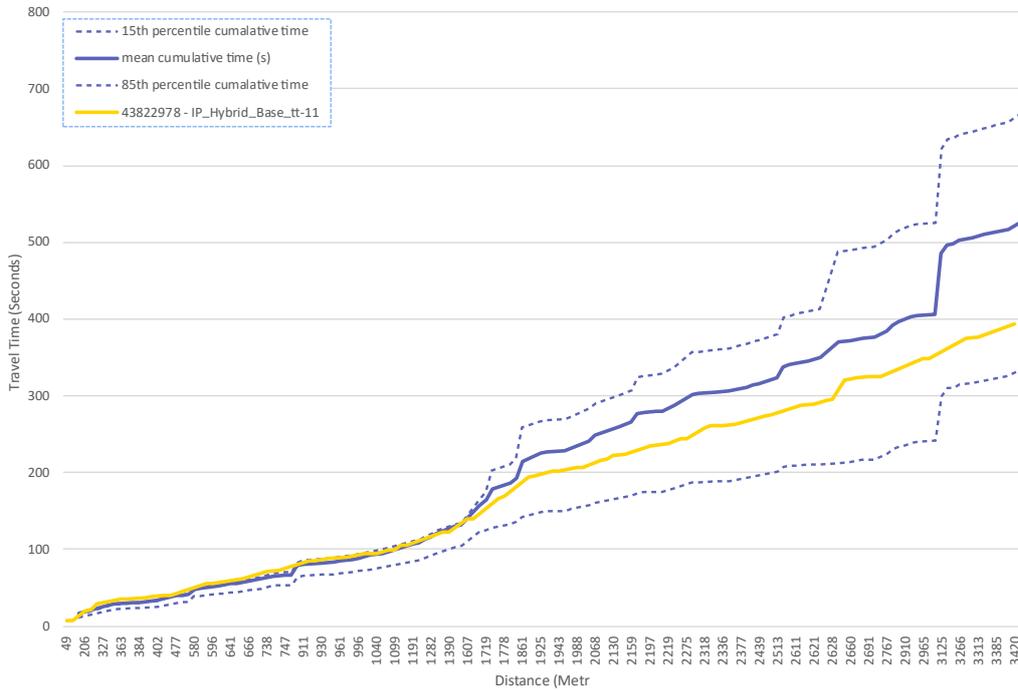
Travel time profile: Waterloo – Harbour View (7-8)

Tomtom vs Modelled Travel Time



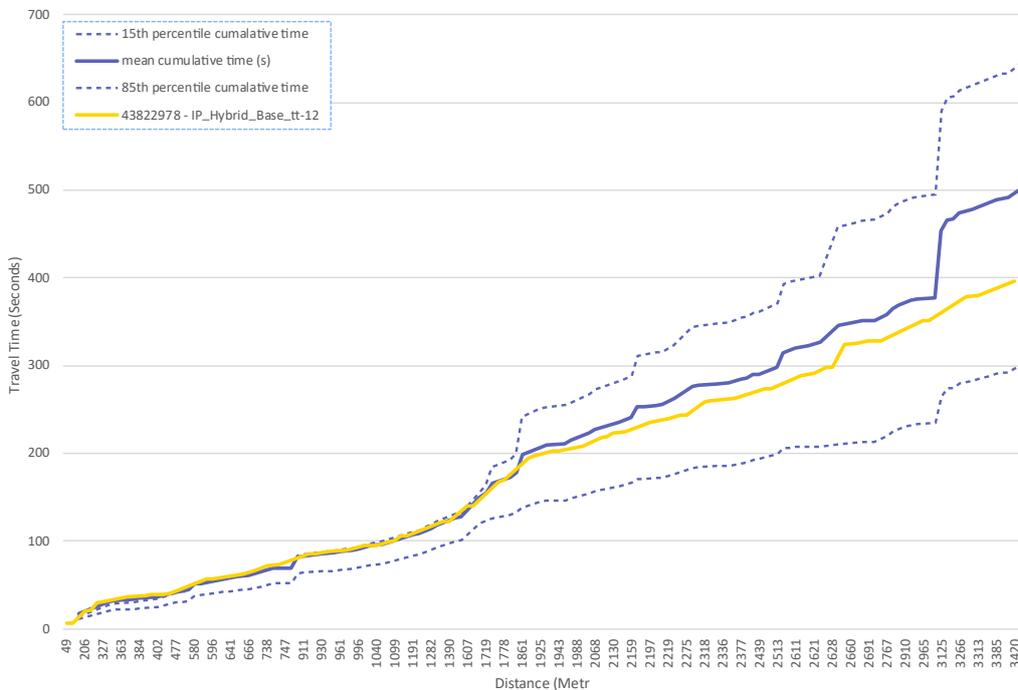
Travel time profile: Waterloo – Harbour View (8-9)

Tomtom vs Modelled Travel Time



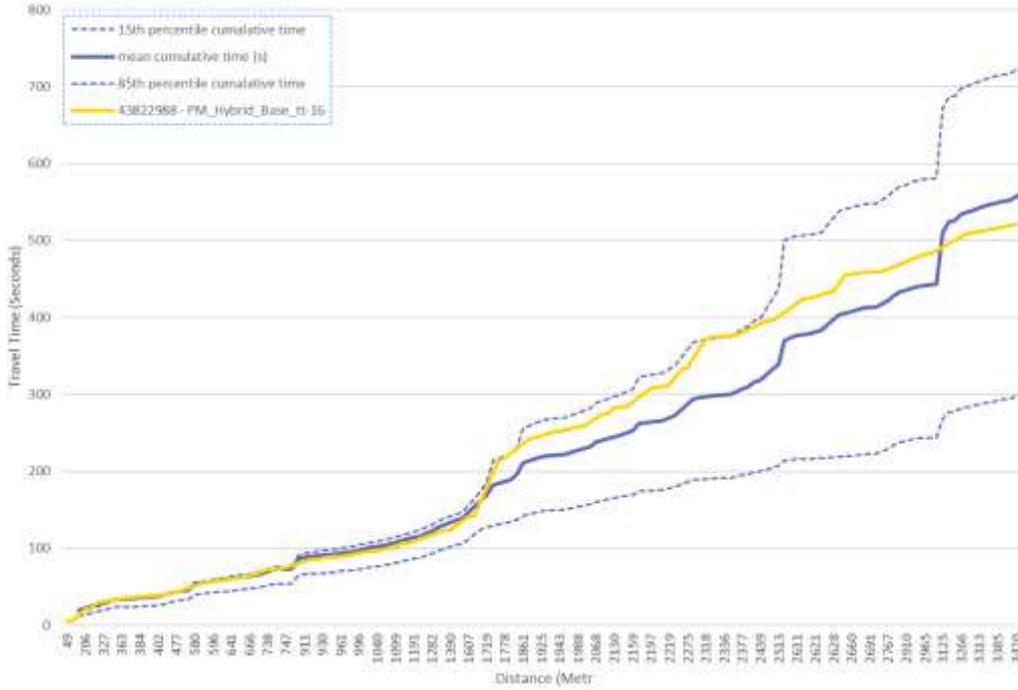
Travel time profile: Waterloo – Harbour View (11-12)

Tomtom vs Modelled Travel Time



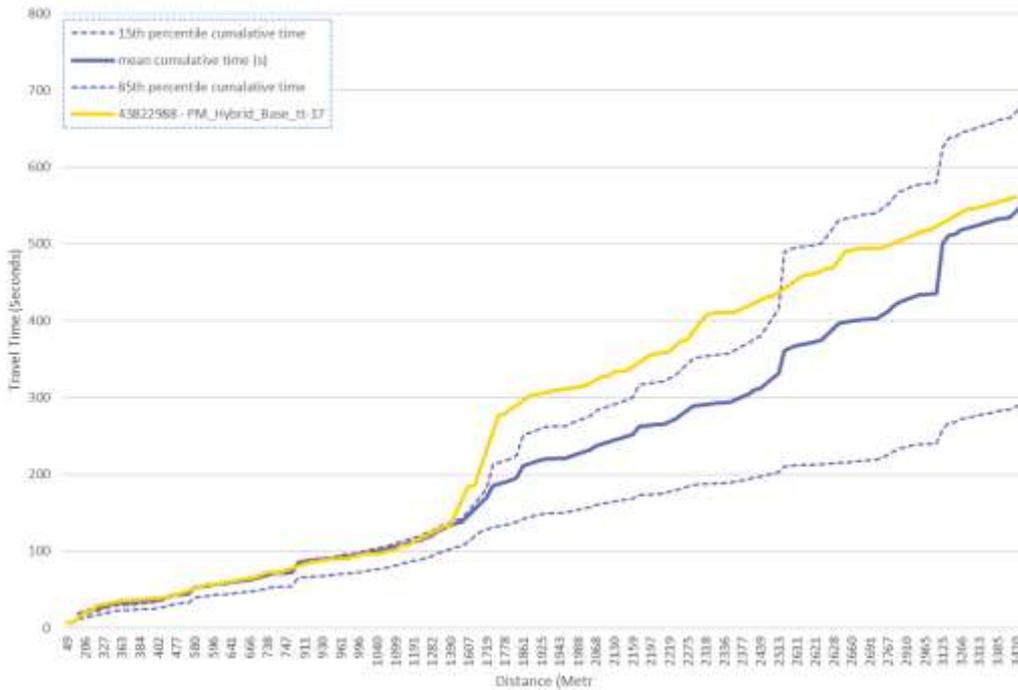
Travel time profile: Waterloo – Harbour View (12-13)

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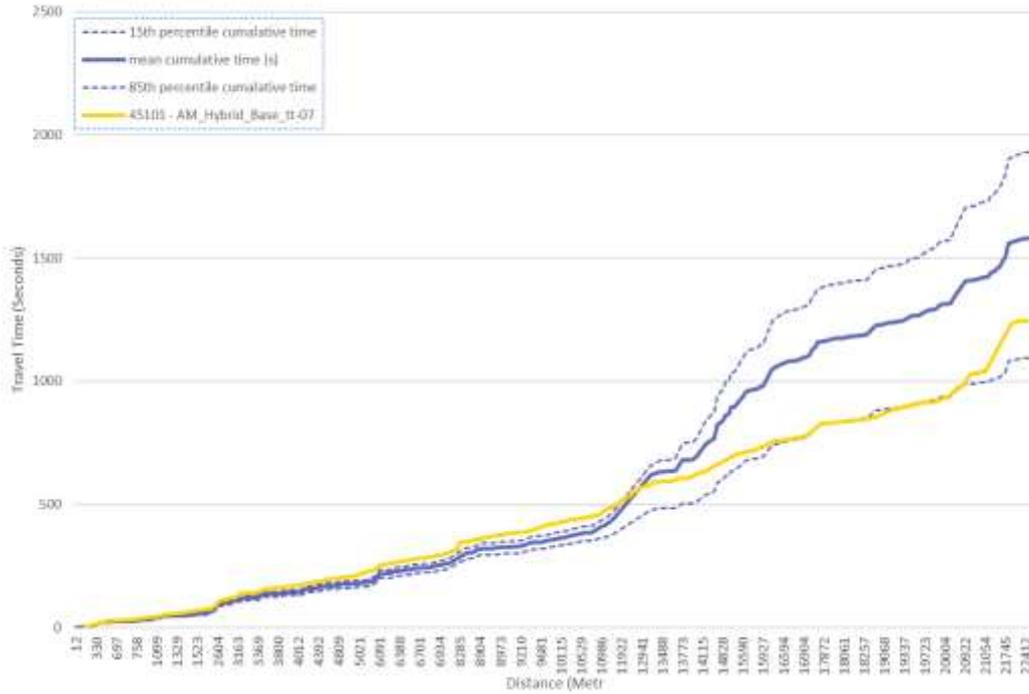
Travel time profile: Waterloo – Harbour View (16-17)

Tomtom vs Modelled Travel Time



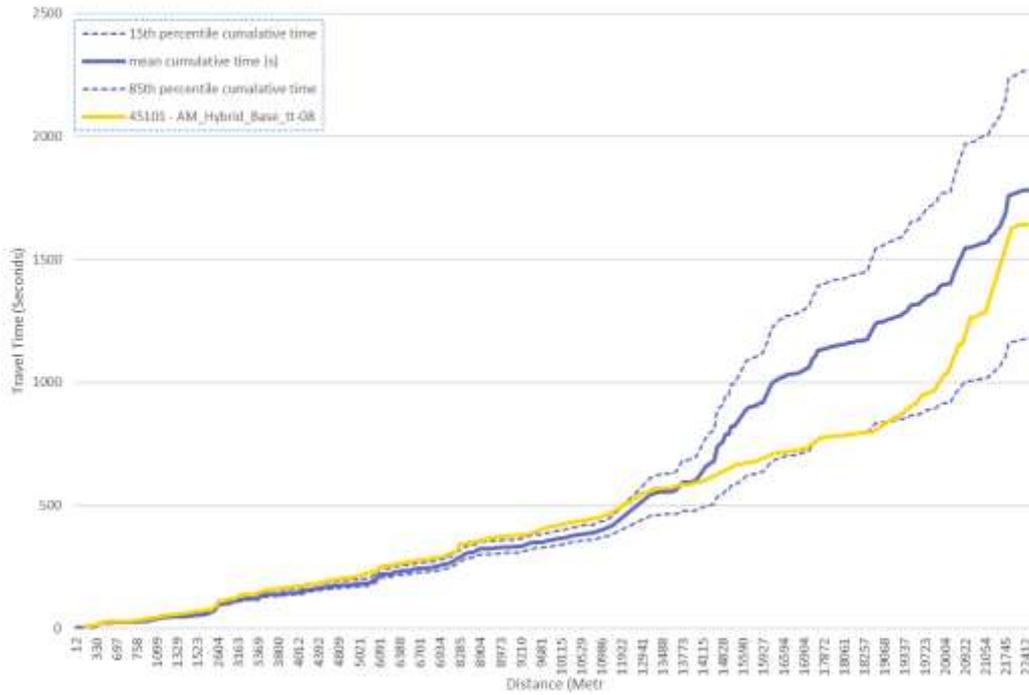
Travel time profile: Waterloo – Harbour View (17-18)

Tomtom vs Modelled Travel Time



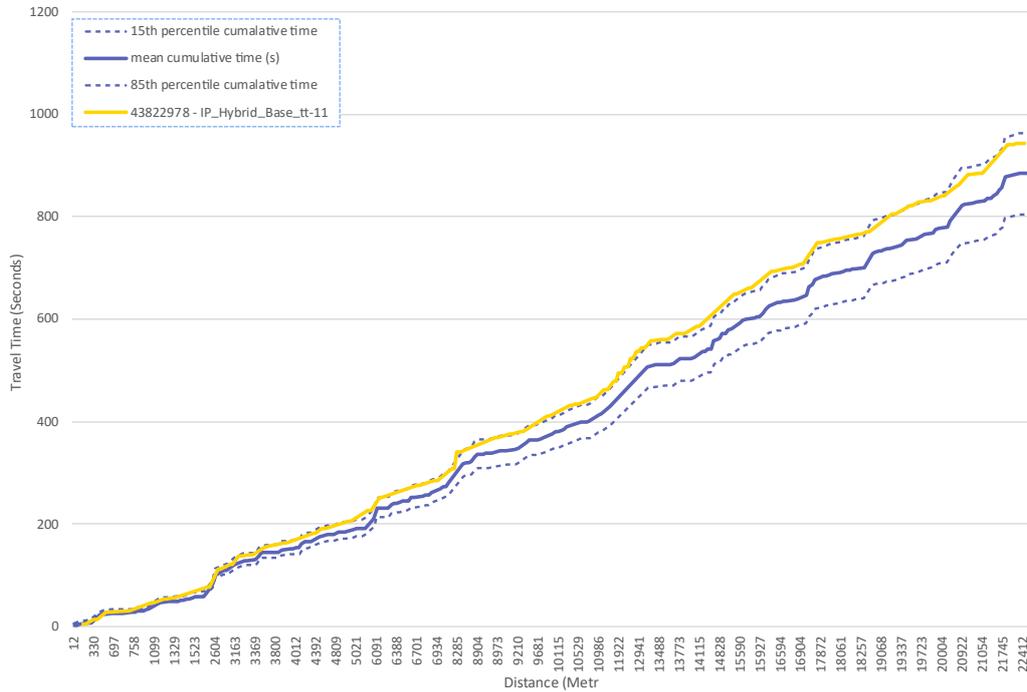
Travel time profile: SH1: TG - Ngauranga (7-8)

Tomtom vs Modelled Travel Time



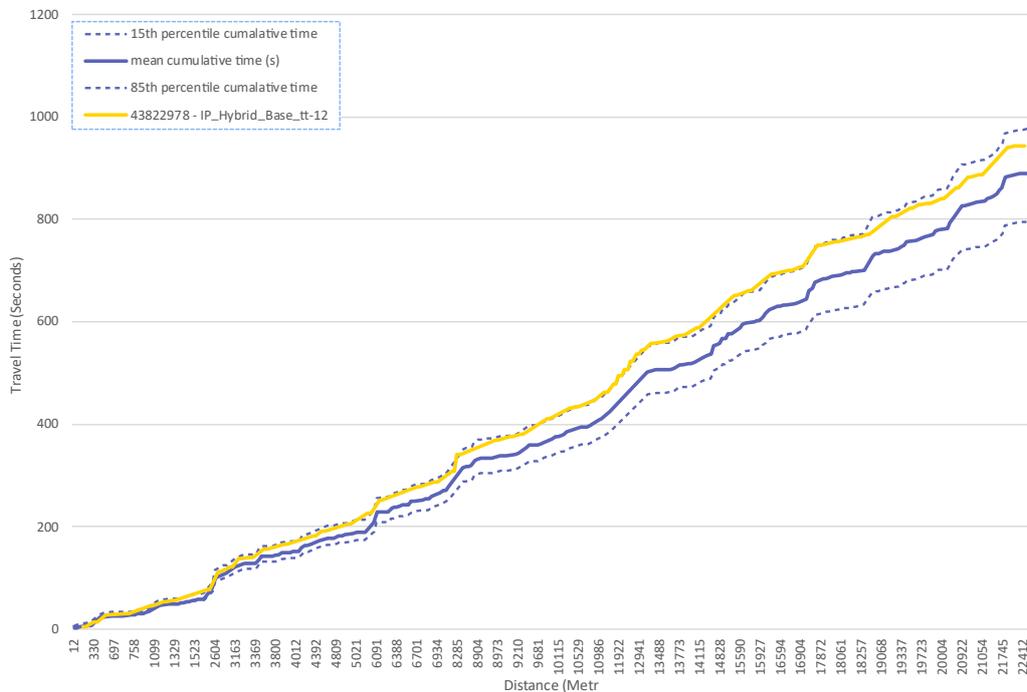
Travel time profile: SH1: TG - Ngauranga (8-9)

Tomtom vs Modelled Travel Time



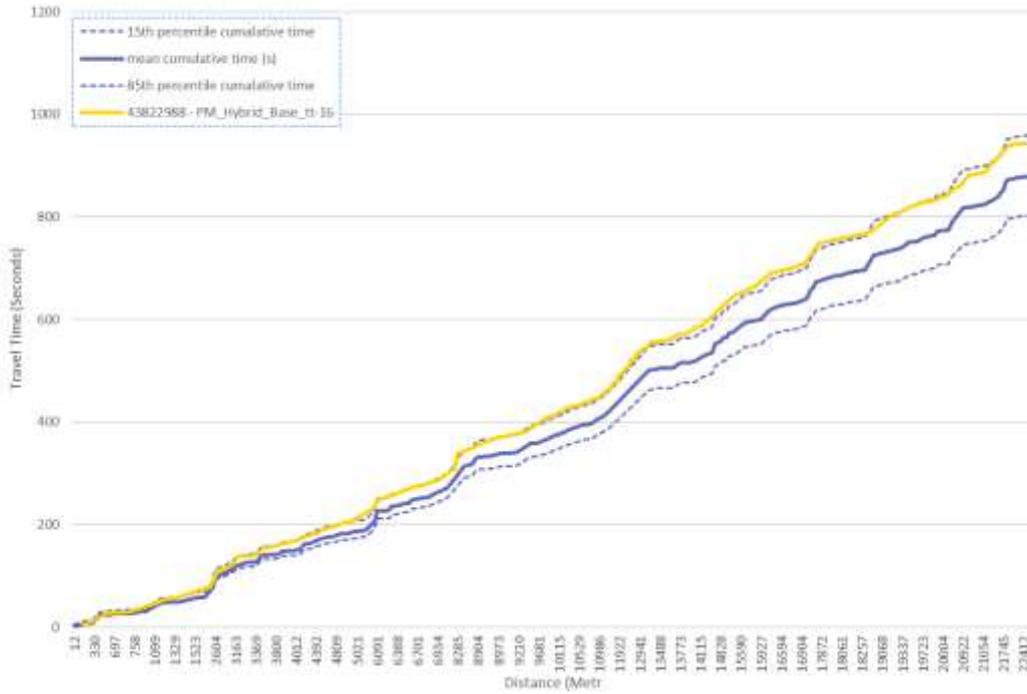
Travel time profile: SH1: TG - Ngauranga (11-12)

Tomtom vs Modelled Travel Time



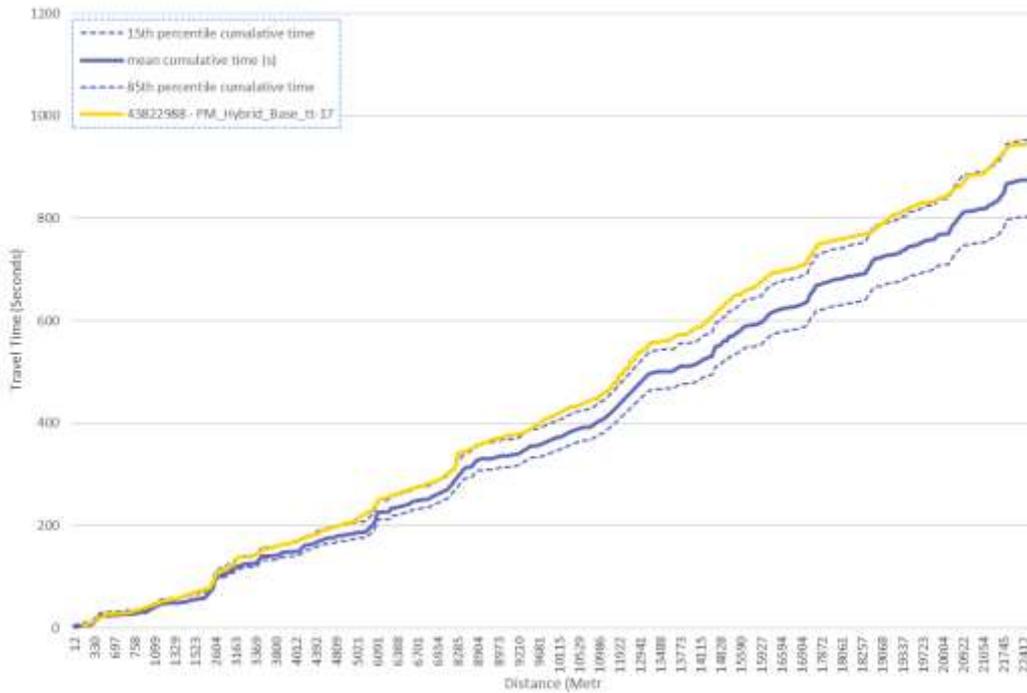
Travel time profile: SH1: TG - Ngauranga (12-13)

Tomtom vs Modelled Travel Time



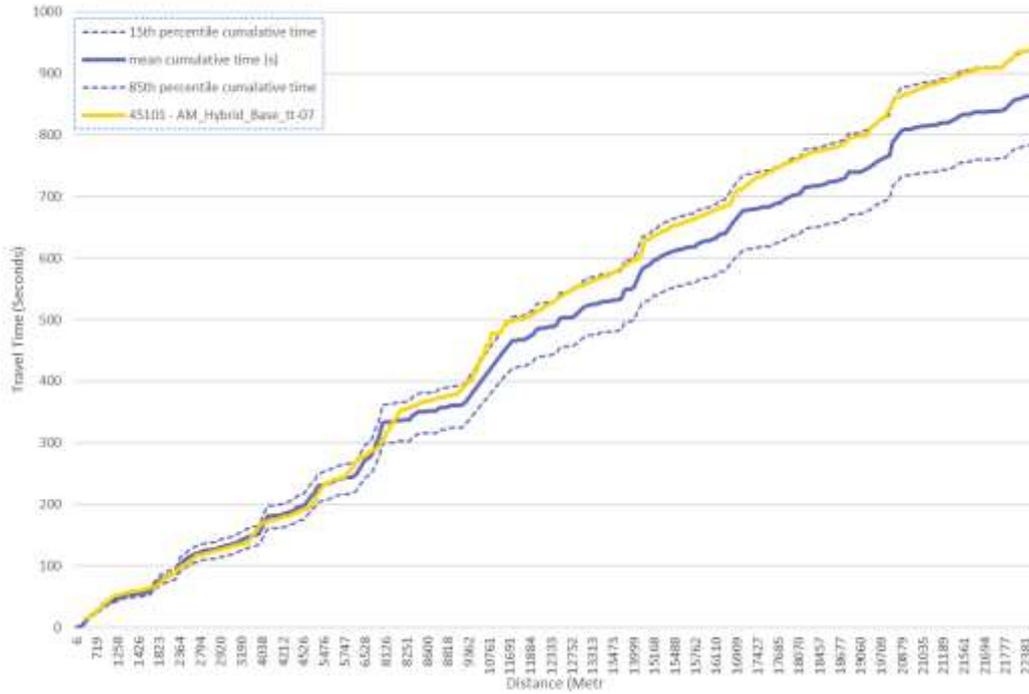
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Tomtom vs Modelled Travel Time



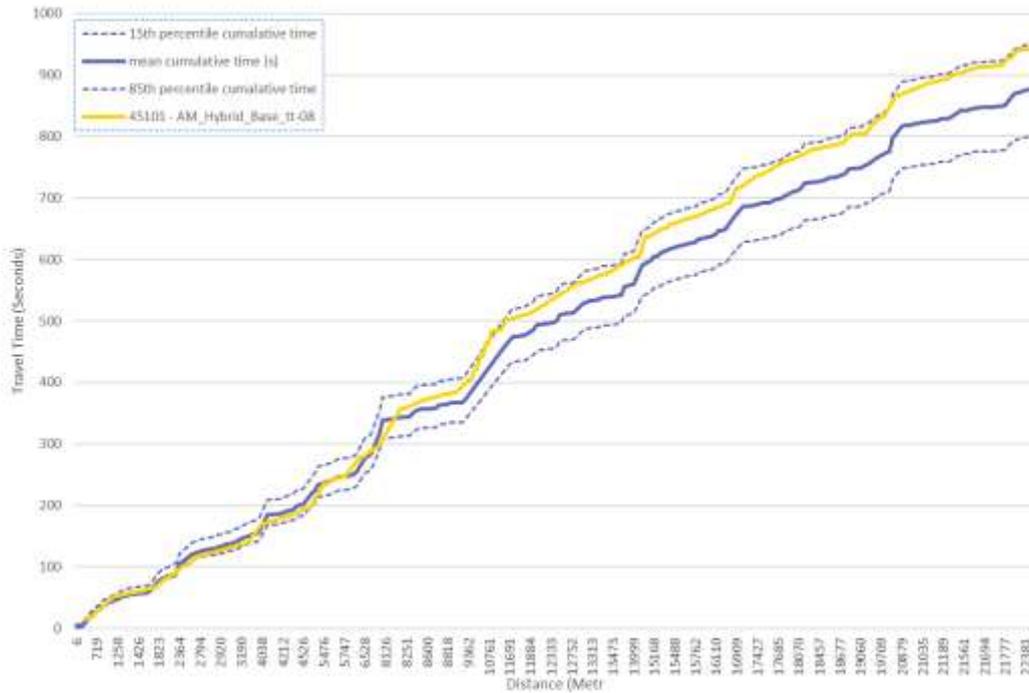
Travel time profile: SH1: TG - Ngauranga (17-18)

Tomtom vs Modelled Travel Time



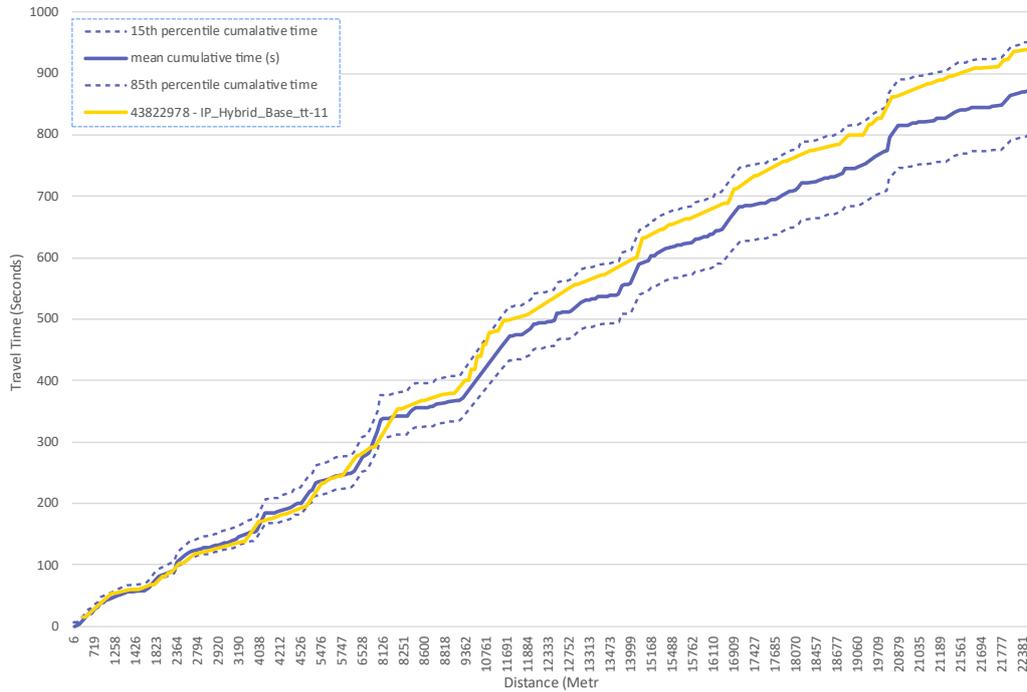
Travel time profile: SH1: Ngauranga - TG (7-8)

Tomtom vs Modelled Travel Time



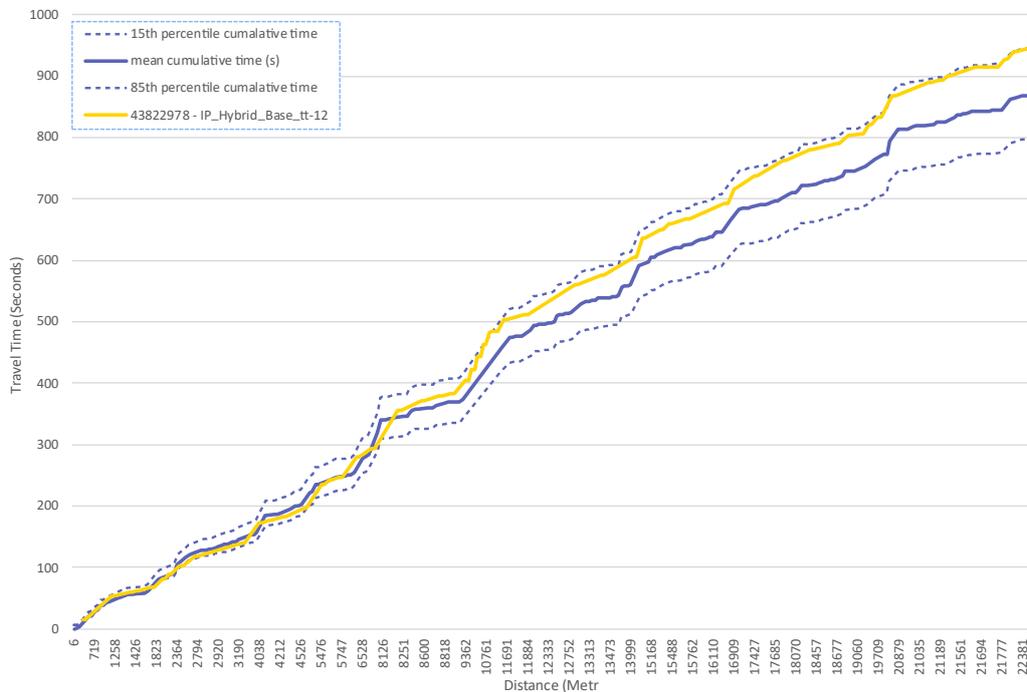
Travel time profile: SH1: Ngauranga - TG (8-9)

Tomtom vs Modelled Travel Time



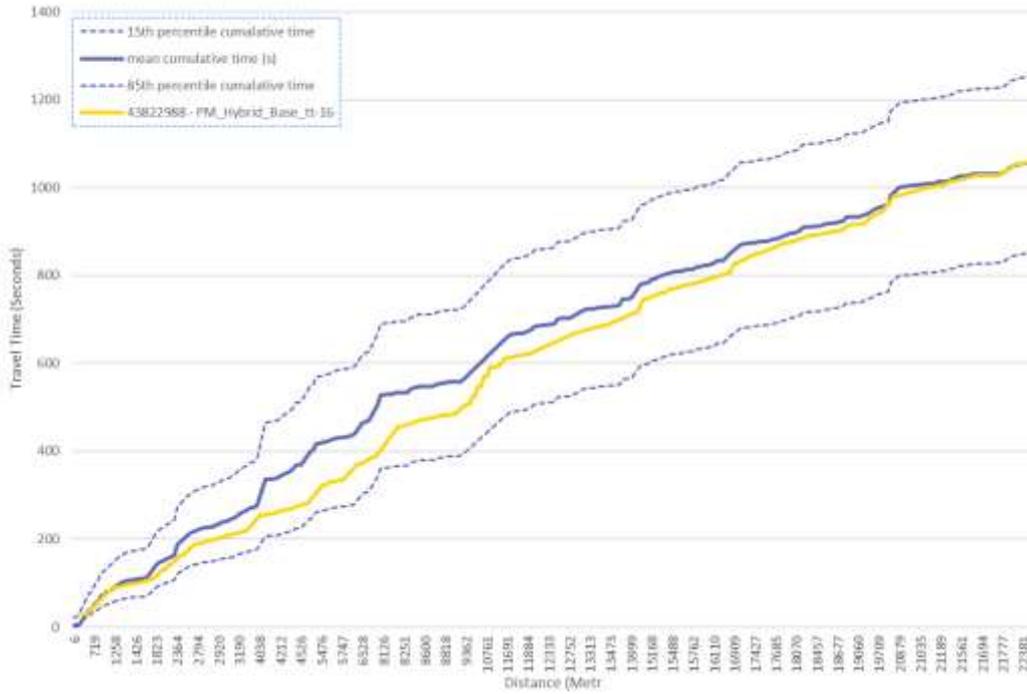
Travel time profile: SH1: Ngauranga - TG (11-12)

Tomtom vs Modelled Travel Time



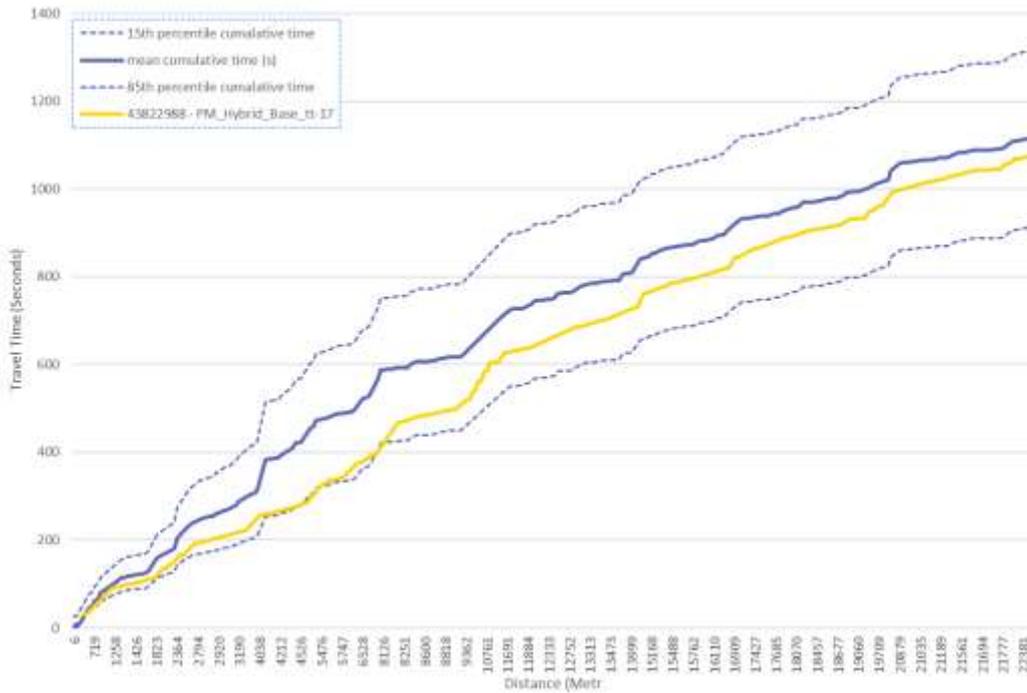
Travel time profile: SH1: Ngauranga - TG (12-13)

Tomtom vs Modelled Travel Time



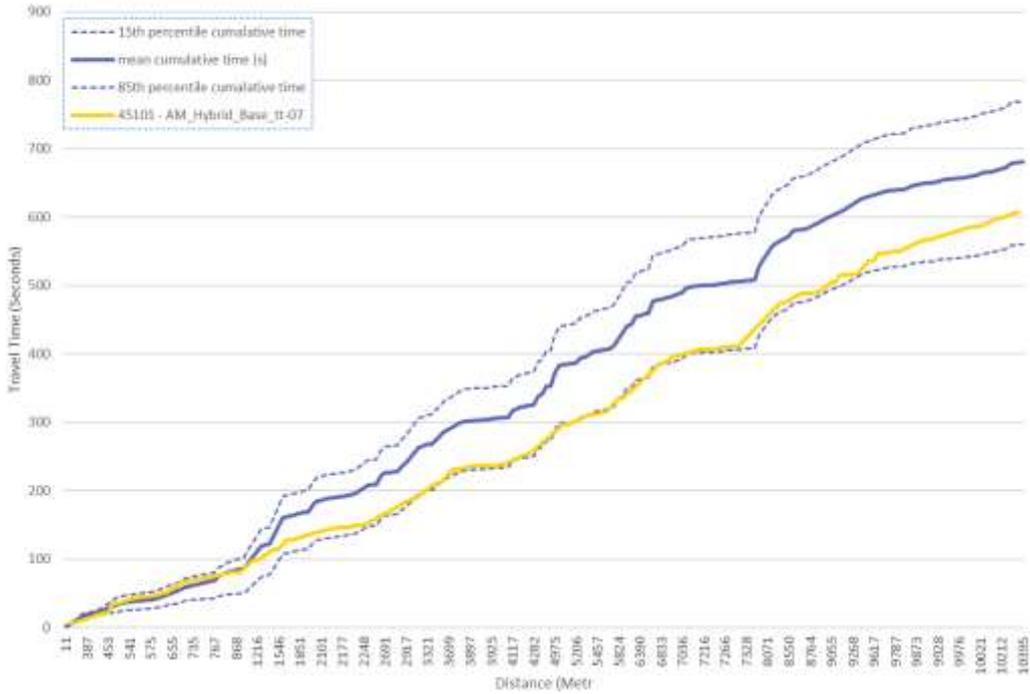
Travel time profile: SH1: Ngauranga - TG (16-17)

Tomtom vs Modelled Travel Time



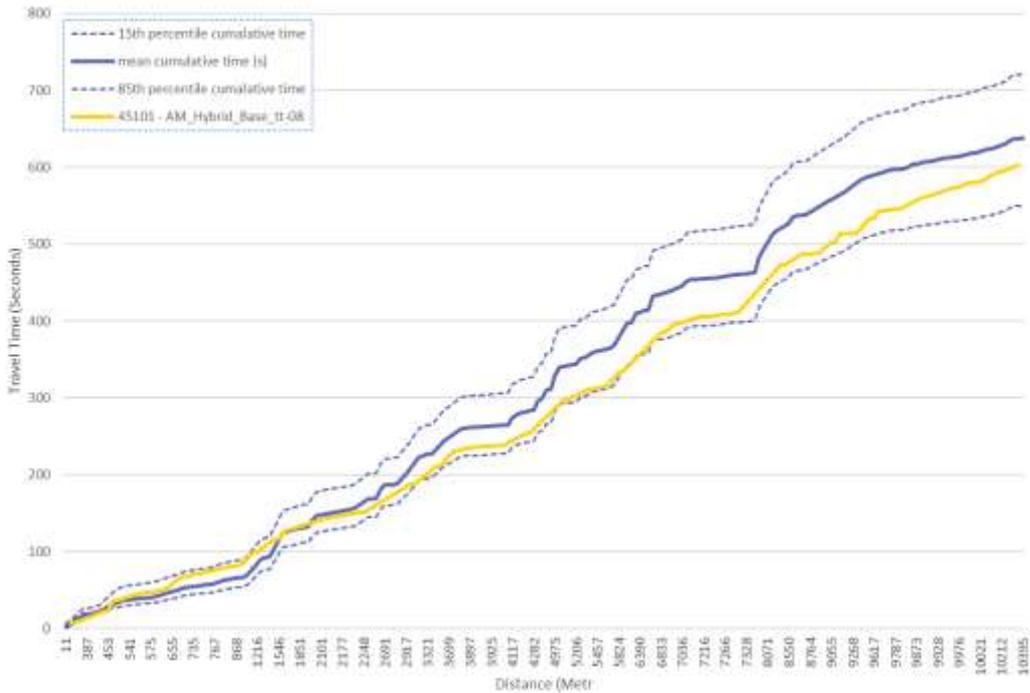
Travel time profile: SH1: Ngauranga - TG (17-18)

Tomtom vs Modelled Travel Time



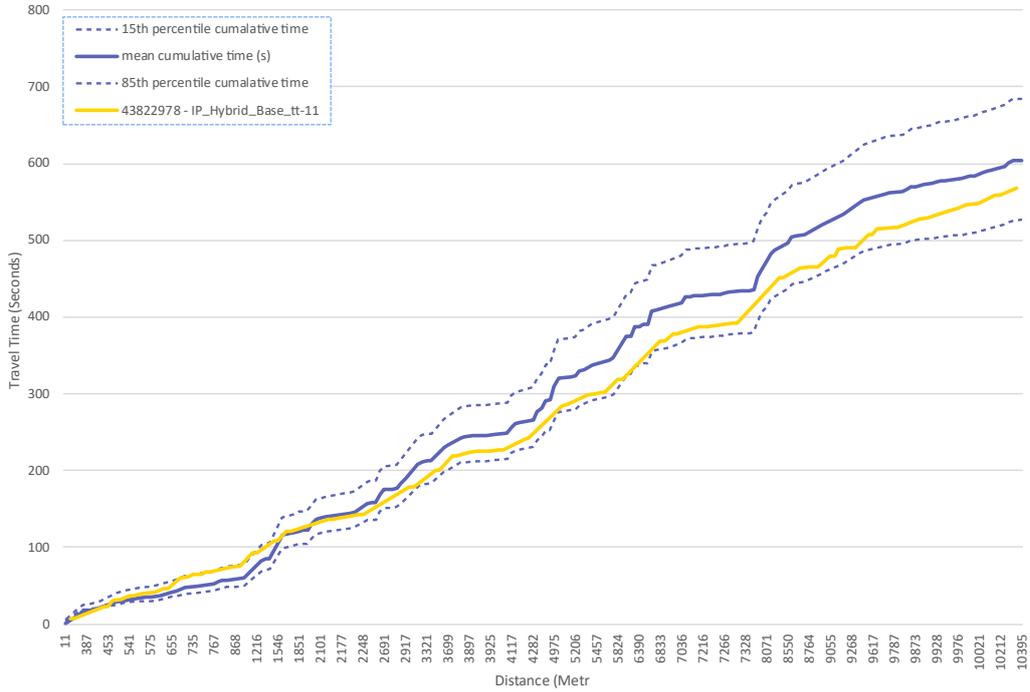
Travel time profile: SH58 EB (7-8)

Tomtom vs Modelled Travel Time



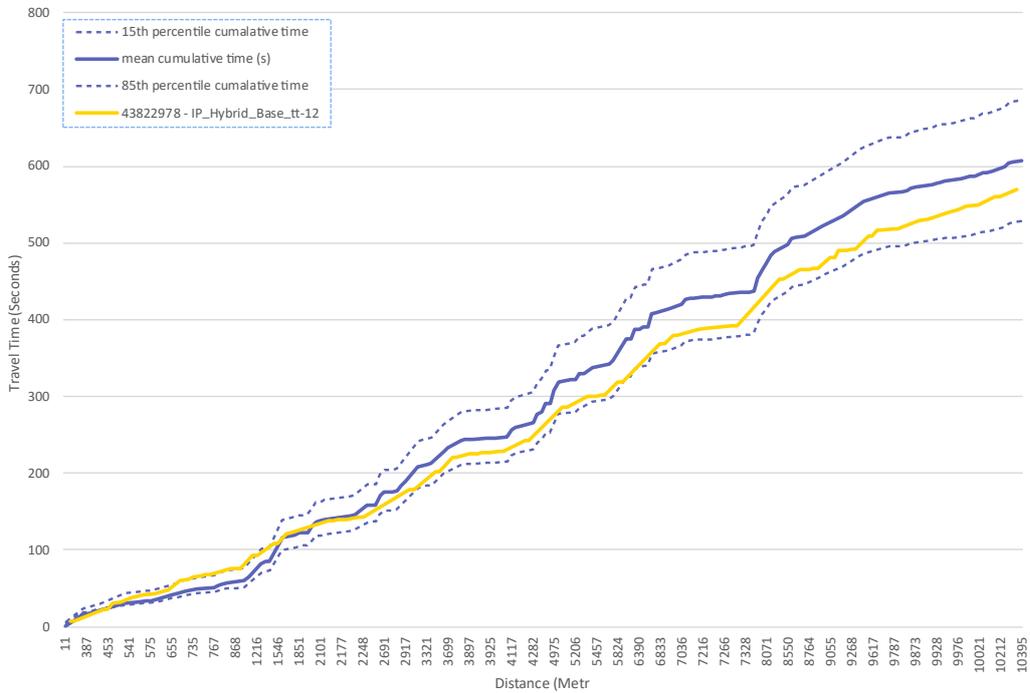
Travel time profile: SH58 EB (8-9)

Tomtom vs Modelled Travel Time



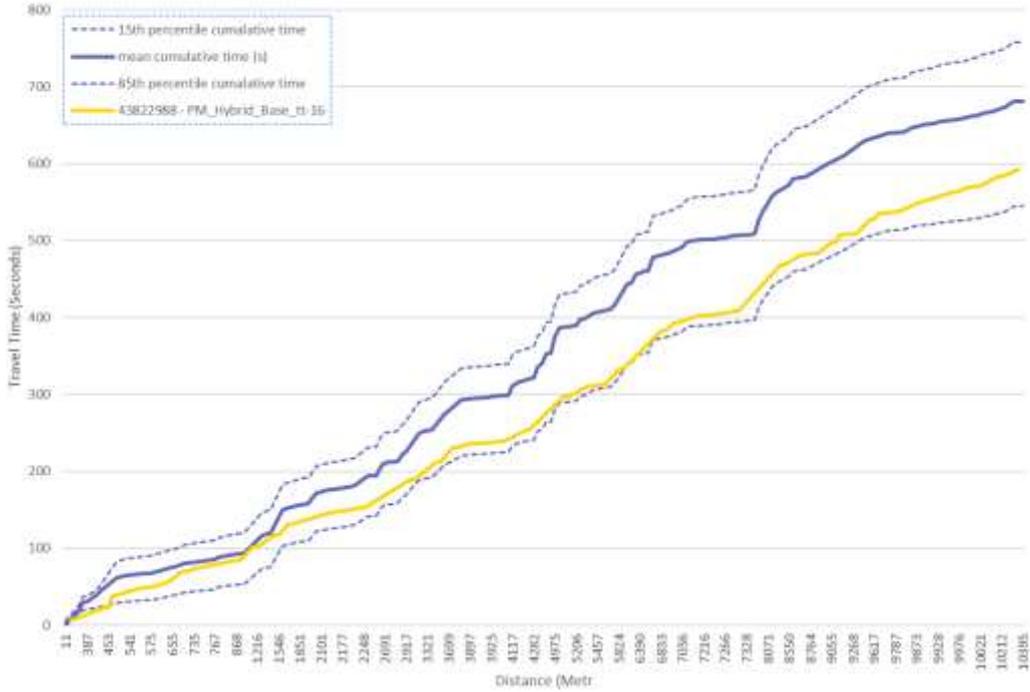
Travel time profile: SH58 EB (11-12)

Tomtom vs Modelled Travel Time



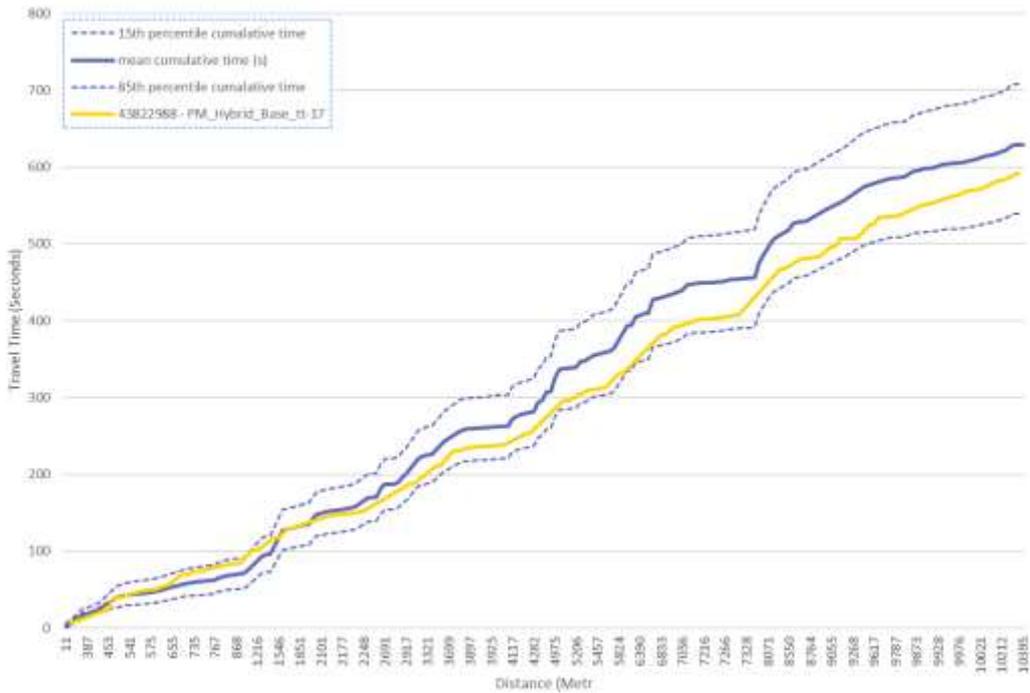
Travel time profile: SH58 EB (12-13)

Tomtom vs Modelled Travel Time



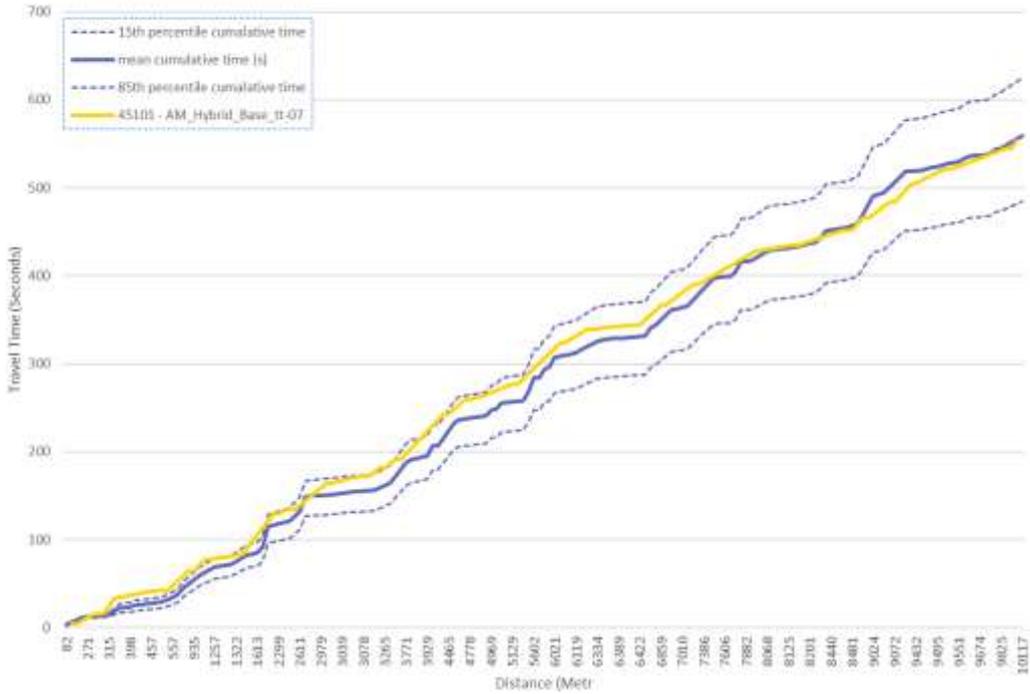
Travel time profile: SH58 EB (16-17)

Tomtom vs Modelled Travel Time



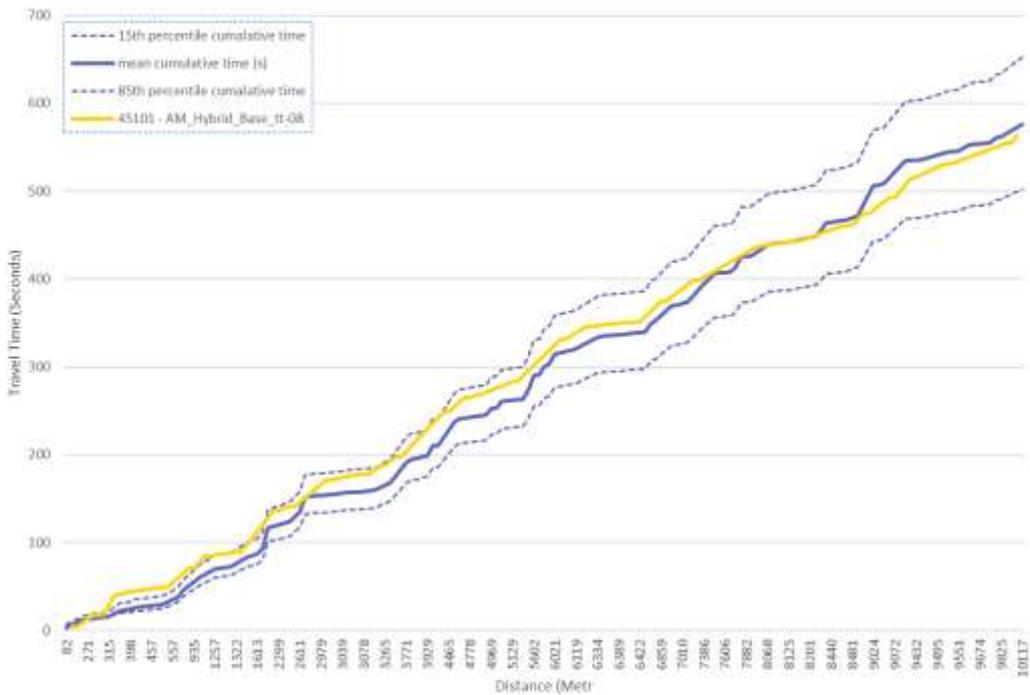
Travel time profile: SH58 EB (17-18)

Tomtom vs Modelled Travel Time



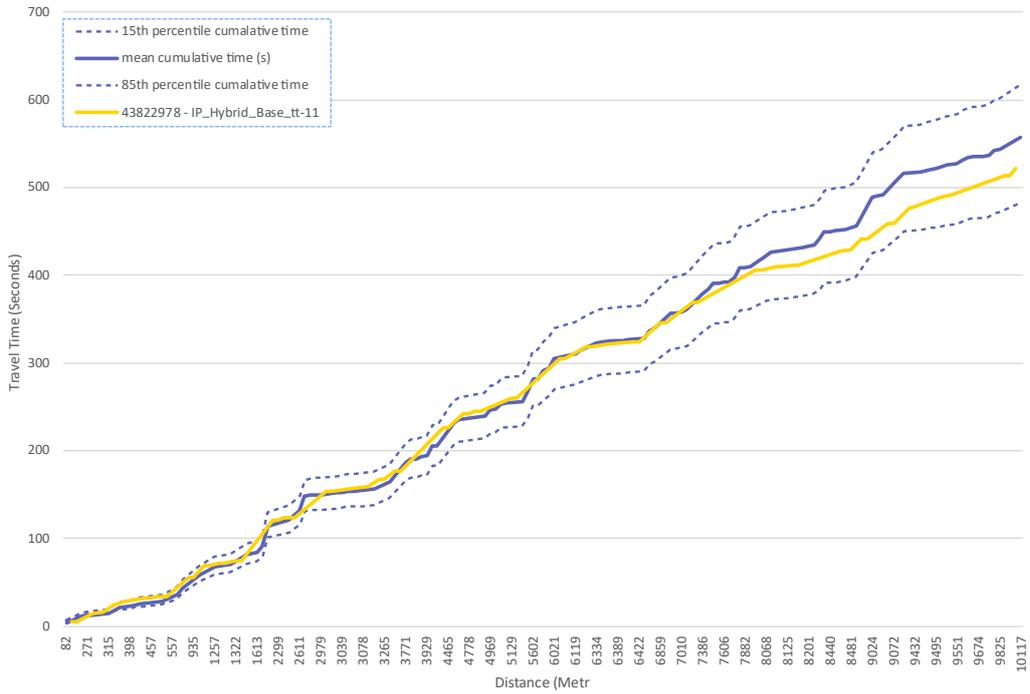
Travel time profile: SH58 WB (7-8)

Tomtom vs Modelled Travel Time



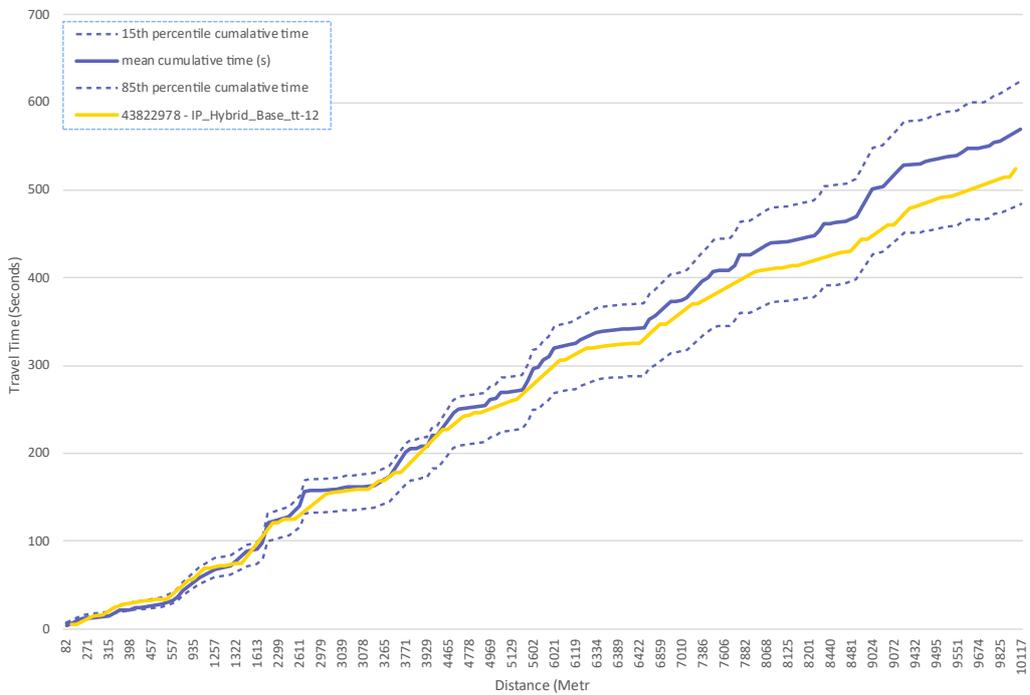
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Tomtom vs Modelled Travel Time



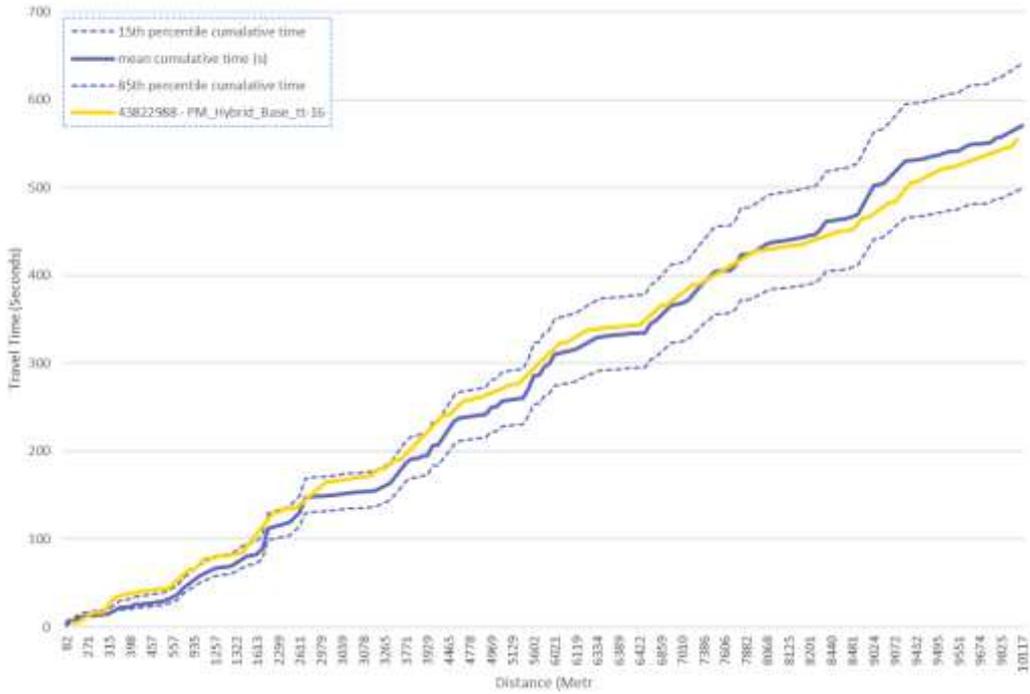
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Tomtom vs Modelled Travel Time



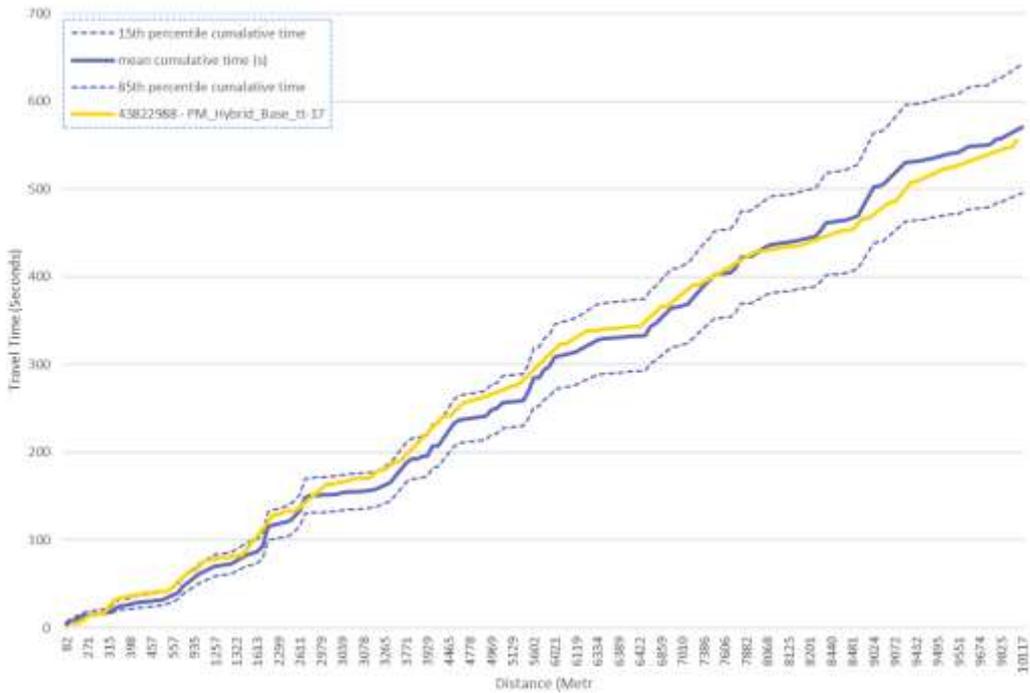
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Tomtom vs Modelled Travel Time



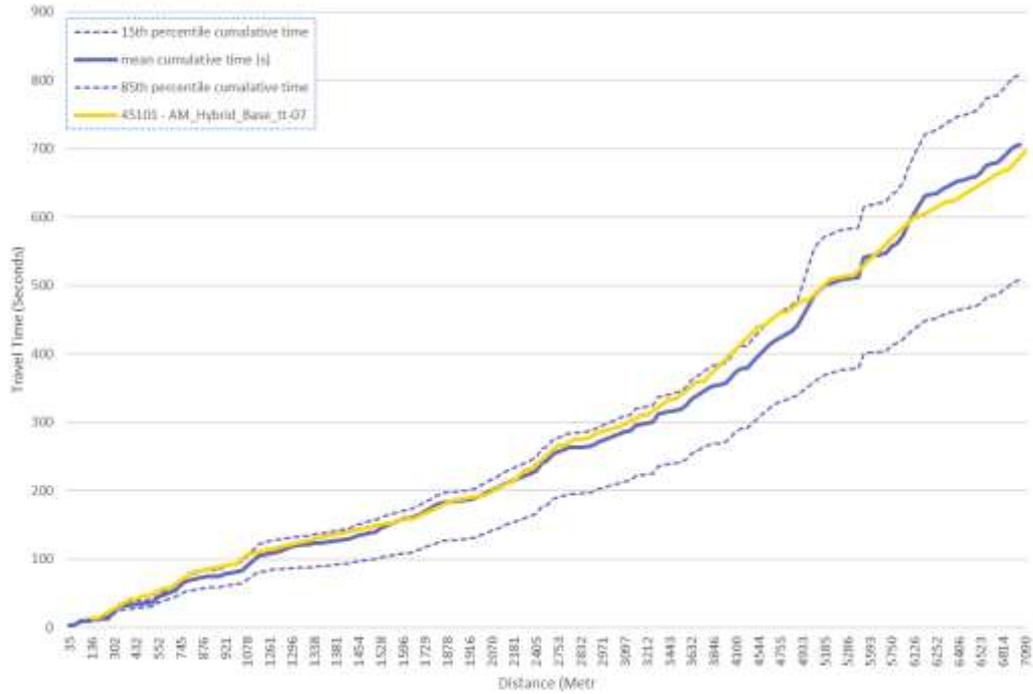
Travel time profile: SH58 WB (16-17)

Tomtom vs Modelled Travel Time



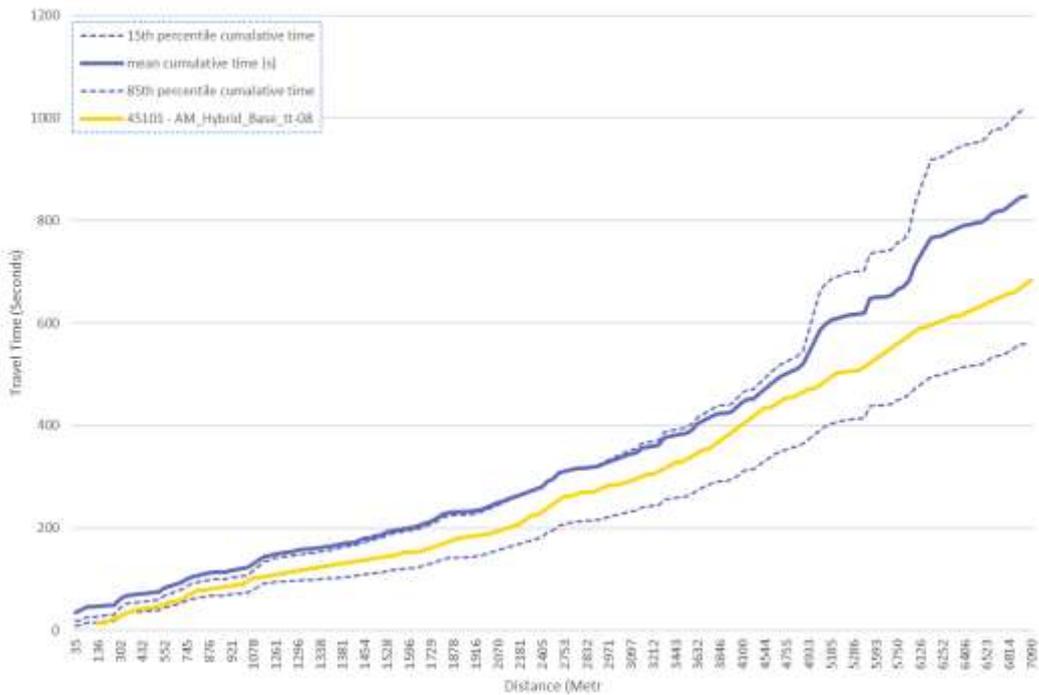
Travel time profile: SH58 WB (17-18)

Tomtom vs Modelled Travel Time



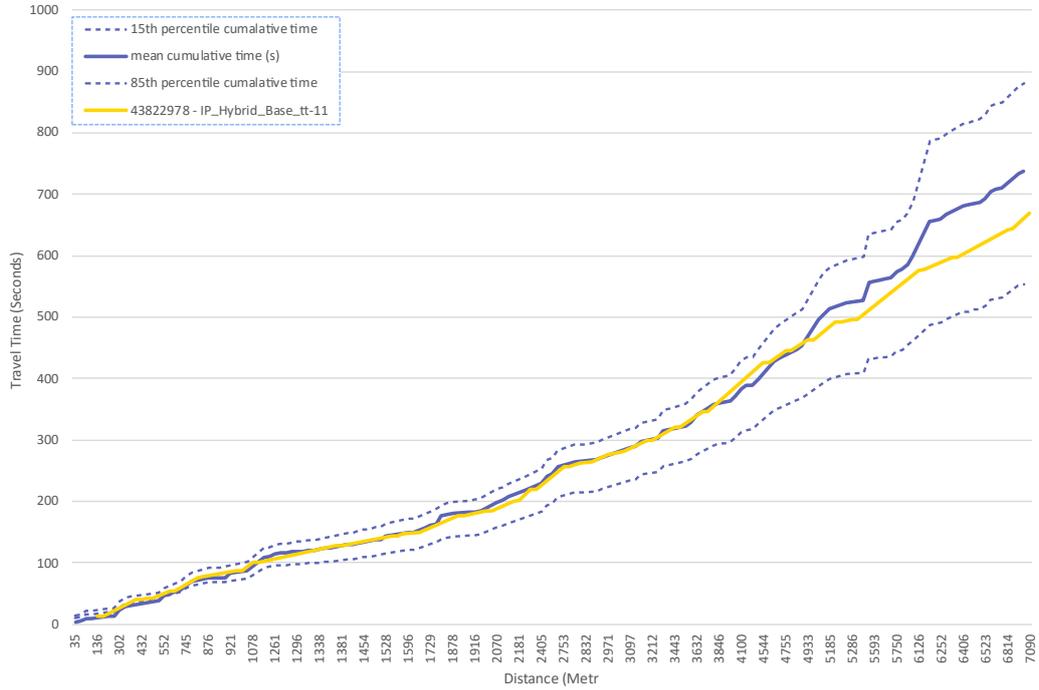
Travel time profile: Eastbourne – Seaview (7-8)

Tomtom vs Modelled Travel Time



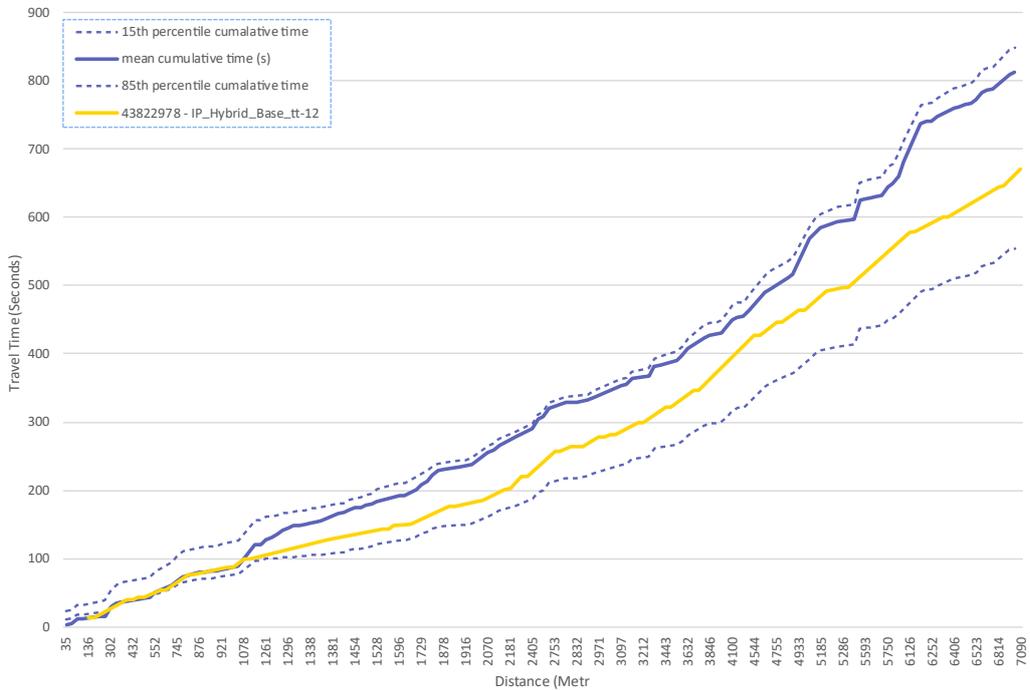
Travel time profile: Eastbourne – Seaview (8-9)

Tomtom vs Modelled Travel Time



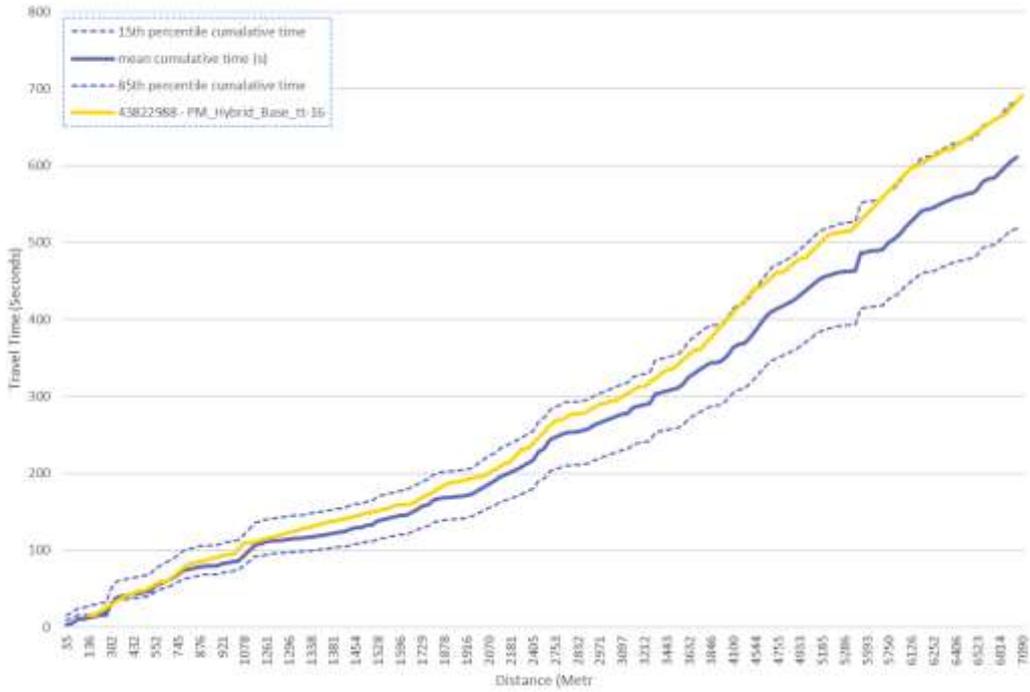
Travel time profile: Eastbourne - Seaview (11-12)

Tomtom vs Modelled Travel Time



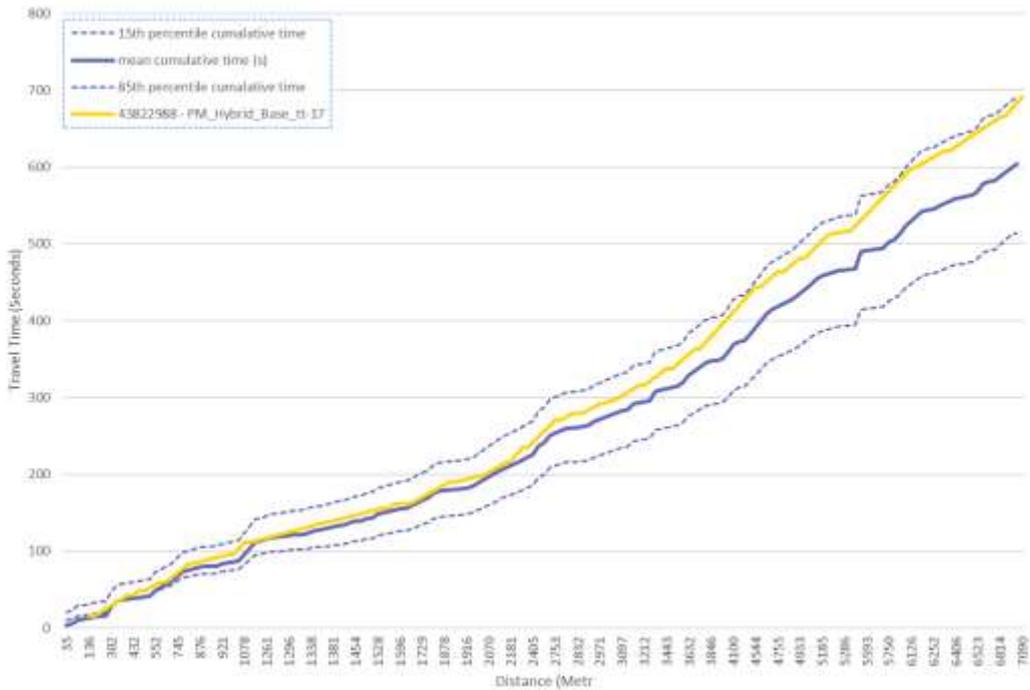
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Tomtom vs Modelled Travel Time



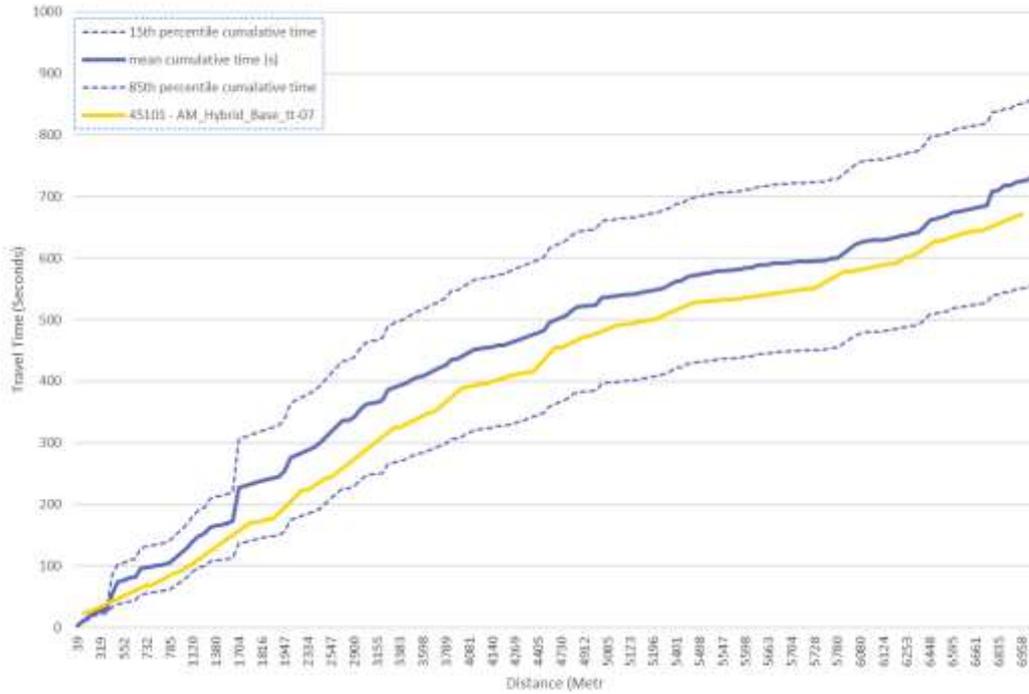
Travel time profile: Eastbourne - Seaview (16-17)

Tomtom vs Modelled Travel Time



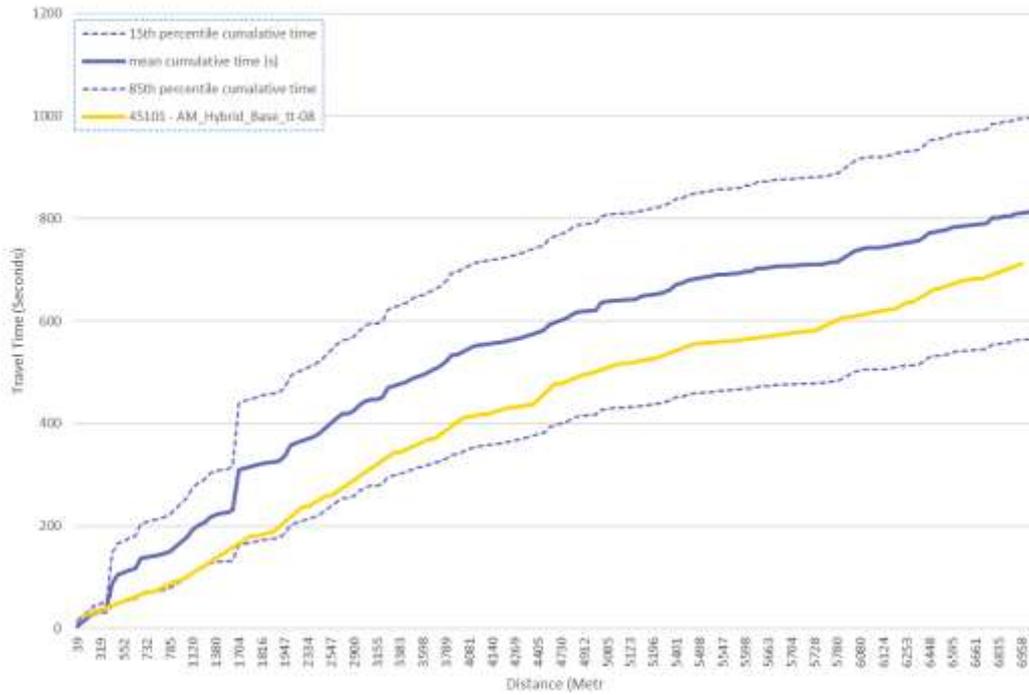
Travel time profile: Eastbourne - Seaview (17-18)

Tomtom vs Modelled Travel Time



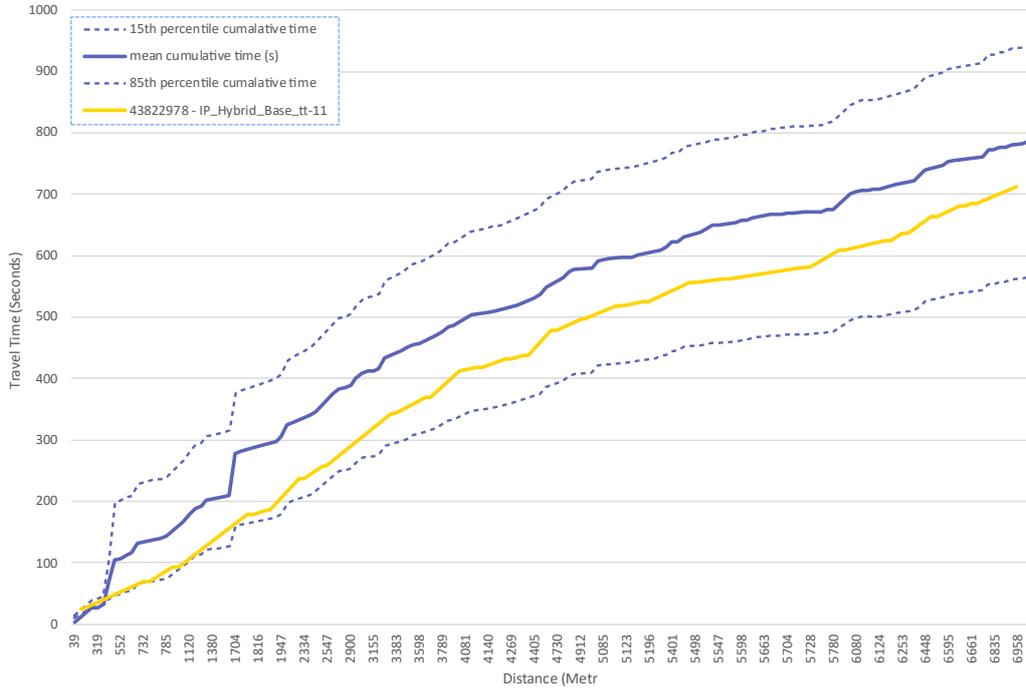
Travel time profile: Seaview – Eastbourne (7-8)

Tomtom vs Modelled Travel Time



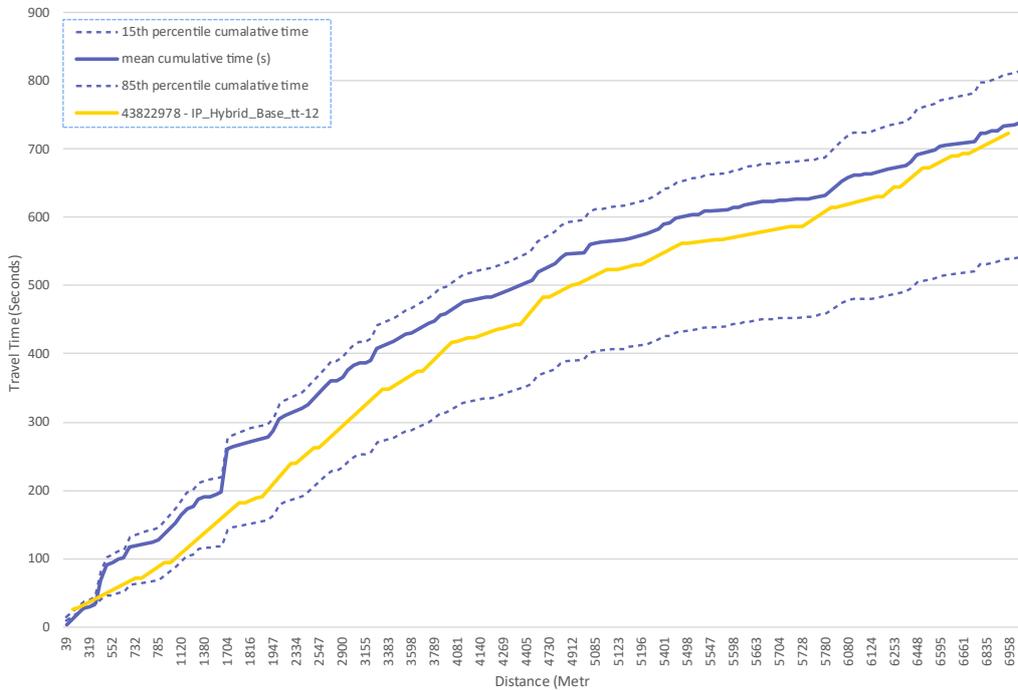
Travel time profile: Seaview – Eastbourne (8-9)

Tomtom vs Modelled Travel Time



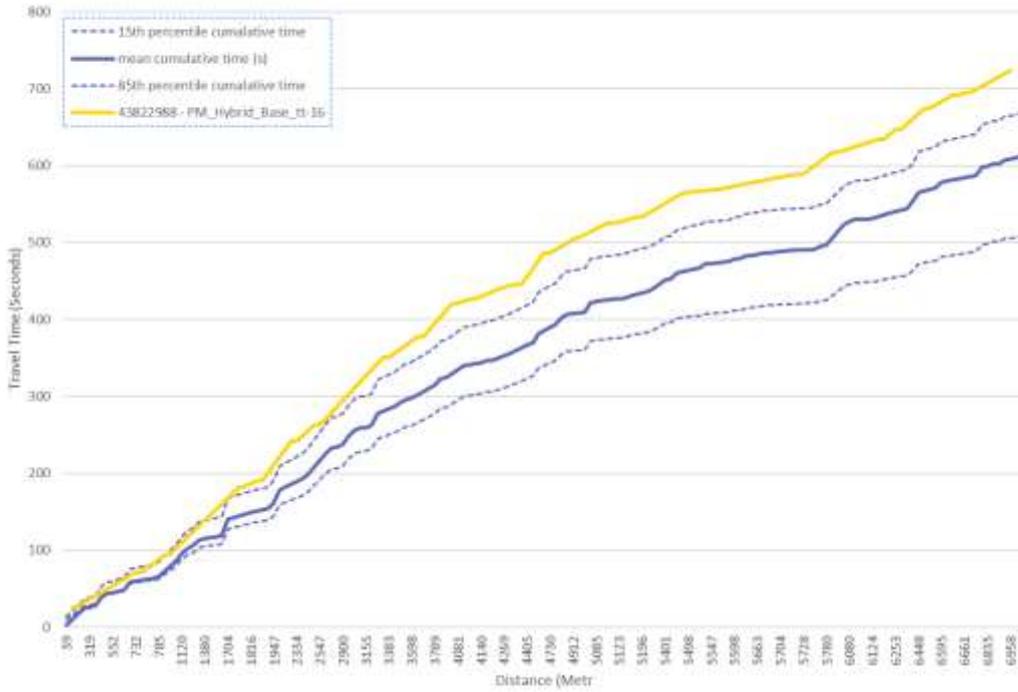
Travel time profile: Seaview – Eastbourne (11-12)

Tomtom vs Modelled Travel Time



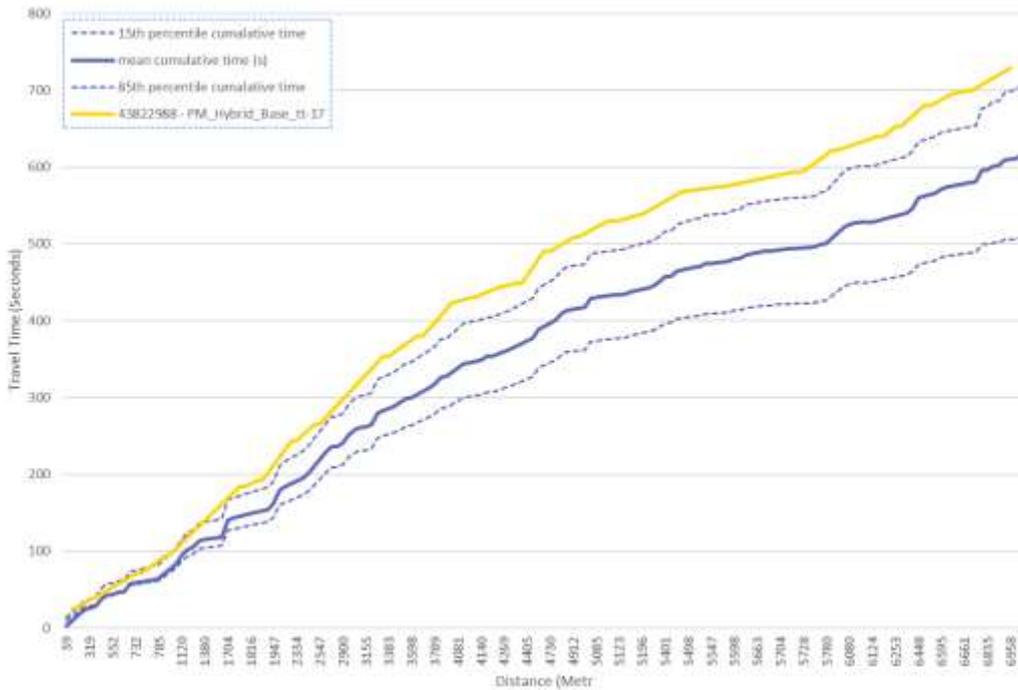
Travel time profile: Seaview – Eastbourne (12-13)

Tomtom vs Modelled Travel Time



Travel time profile: Seaview – Eastbourne (16-17)

Tomtom vs Modelled Travel Time



Travel time profile: Seaview – Eastbourne (17-18)