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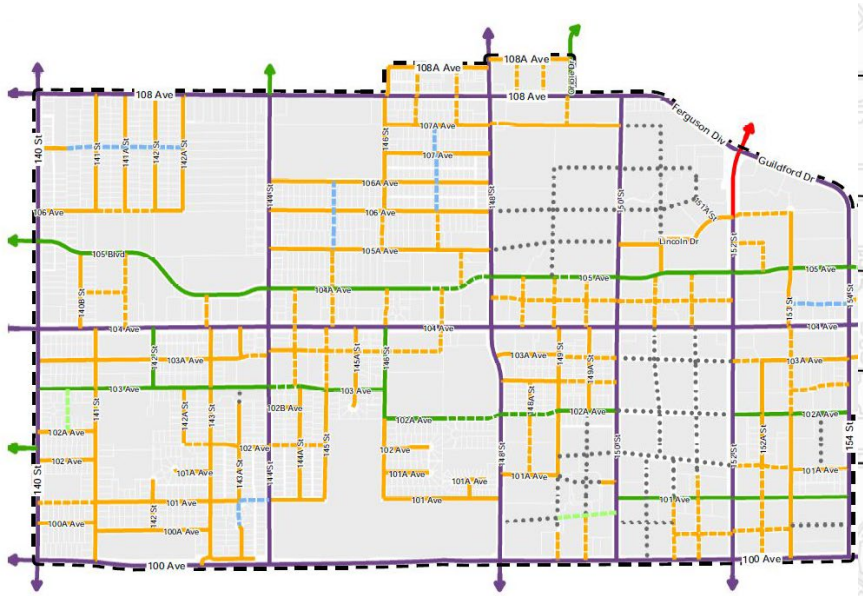

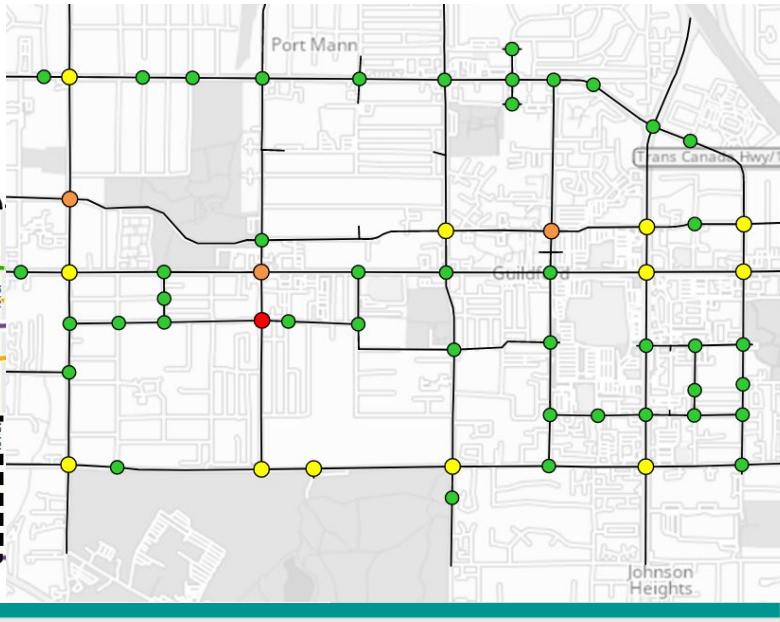

Guildford Town Centre Modelling and Transportation Plan Development

FINAL

FEB 2023 | FINAL

Submitted to: City of Surrey
Prepared by McElhanney

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Division Manager

Permit to Practice # 1003299

Our file: 2121-00666-00

Your Challenge.
Our Passion.

Our File: 2121-00666-00

February 22nd, 2023

City of Surrey
Transportation Division
13450 104th Avenue
Surrey, BC, V3T 1V8

Attention: Cindy Tse, PEng, MASc
Project Engineer

Guildford Town Centre Modelling and Transportation Plan Development

As requested, McElhanney has completed the transportation modelling assignment in support of the City of Surrey's need to understand the potential transportation impacts of anticipated developments within the Guildford Town Centre area and along the 104 Avenue corridor.

This report provides project background, context, and objectives, followed by an overview of the modelling process. Furthermore, this report provides a detailed assessment of the existing and future transportation conditions within the Guildford Town Centre study area using a combination of macroscopic, mesoscopic, and microscopic level traffic analysis tools. Based on these findings, we have set out recommendations to mitigate the impacts of traffic growth to maintain a safe and efficient transportation network.

We trust you will find this summary of the modelling assignment meets the requirements as set out in the scope of work. Please contact us if you have any questions or require any clarification.

Sincerely,
McElhanney Ltd.

Prepared by:

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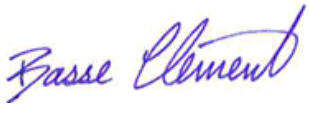
Reviewed by:



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cc: Adolfo Majano, Janelle Frank, Rafael Villarreal

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EXECUTIVE SUMMARY

The City of Surrey has commissioned McElhanney Ltd. (McElhanney) to provide transportation planning and modelling services to assess transportation network impacts of development related to the Guildford Town Centre and the 104 Avenue Corridor Stage 1 plan. An initial road network plan has already been developed while this study developed traffic volumes and assessed operations along key corridors. This 'proof of concept' study provides information to the City of further network elements and improvements that are required for the future horizon years to maintain acceptable levels of service.

PROJECT BACKGROUND AND OBJECTIVES

Guildford Town Centre and the 104 Avenue Corridor are located in the Surrey communities of Guildford and Whalley, extending east from the edge of City Centre to the Trans-Canada Highway (Highway 1). The study area for this project is extensive, covering approximately 500 hectares, and is bound generally by 140 Street, 108 Avenue, Highway 1, 158 Street, and 100 Avenue. As illustrated in **Figure 1**, the plan area is comprised of Guildford Town Centre and two primarily residential areas, flanking it to the east and west, with recommended road network elements to provide a more complete and connected grid network. The Guildford Town Centre is a moderately dense multi-family and commercial area that developed around the Guildford Town Centre shopping centre.

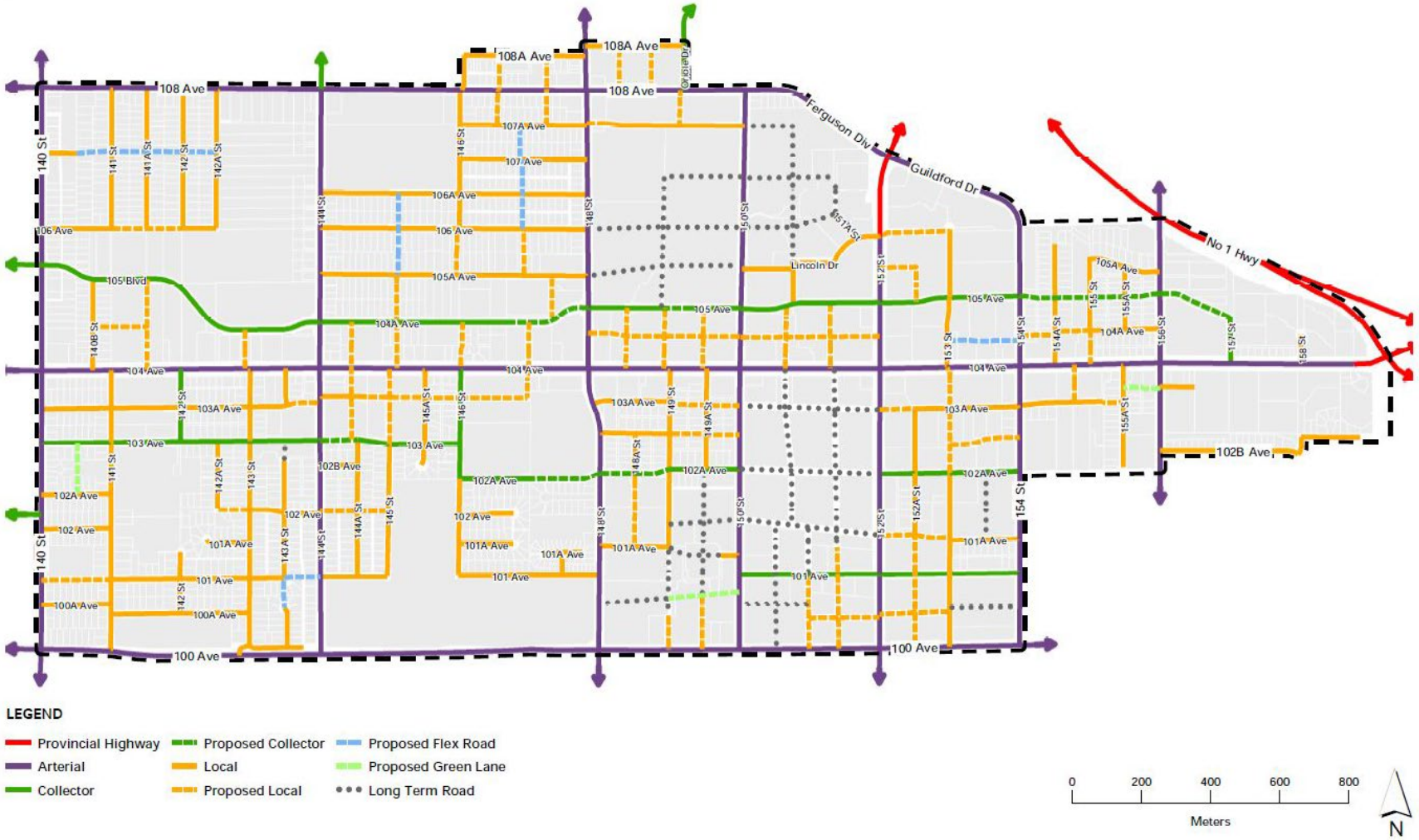
Guildford Town Centre has not had a land-use plan for many years. Older plans identified Whalley and Guildford as two commercial nodes bookending 104 Avenue; however, once SkyTrain arrived in Surrey in 1994, development interest favoured Whalley. That part of Whalley, now known as Surrey City Centre, is now the second largest metropolitan centre of the region. Despite this, Guildford has remained an important town centre and regional shopping destination. In 2016, City Council recognized the need for a land-use plan to guide development in Guildford. On June 27, 2016, Council authorized staff to undertake a planning process for the Guildford Town Centre and the 104 Avenue Corridor.

While the plan area today has a well-established and regular grid of arterial roads, the finer-grained grid is currently incomplete, resulting in relatively larger blocks with limited pedestrian and cycling connectivity. The proposed road network envisions additional connections to be achieved through development and generally establishes block sizes of approximately 100 metres by 200 metres. This is consistent with new urban standards throughout Canada. The block sizes, where appropriate, are modified in consideration of natural and man-made constraints, as well as existing and proposed developments.

A transportation model is required for the study area as part of the Phase 2 Servicing Strategy for the Guildford Plan. This work will compliment the planning process and transportation network and help identify:

- Sufficiency of the transportation road network to achieve mobility and safety objectives;
- Opportunities for operational and capacity improvements required to service growth; and
- The overall transportation servicing strategy to meet the needs of all modes.

Figure 1: Guildford Study Area and Road Network

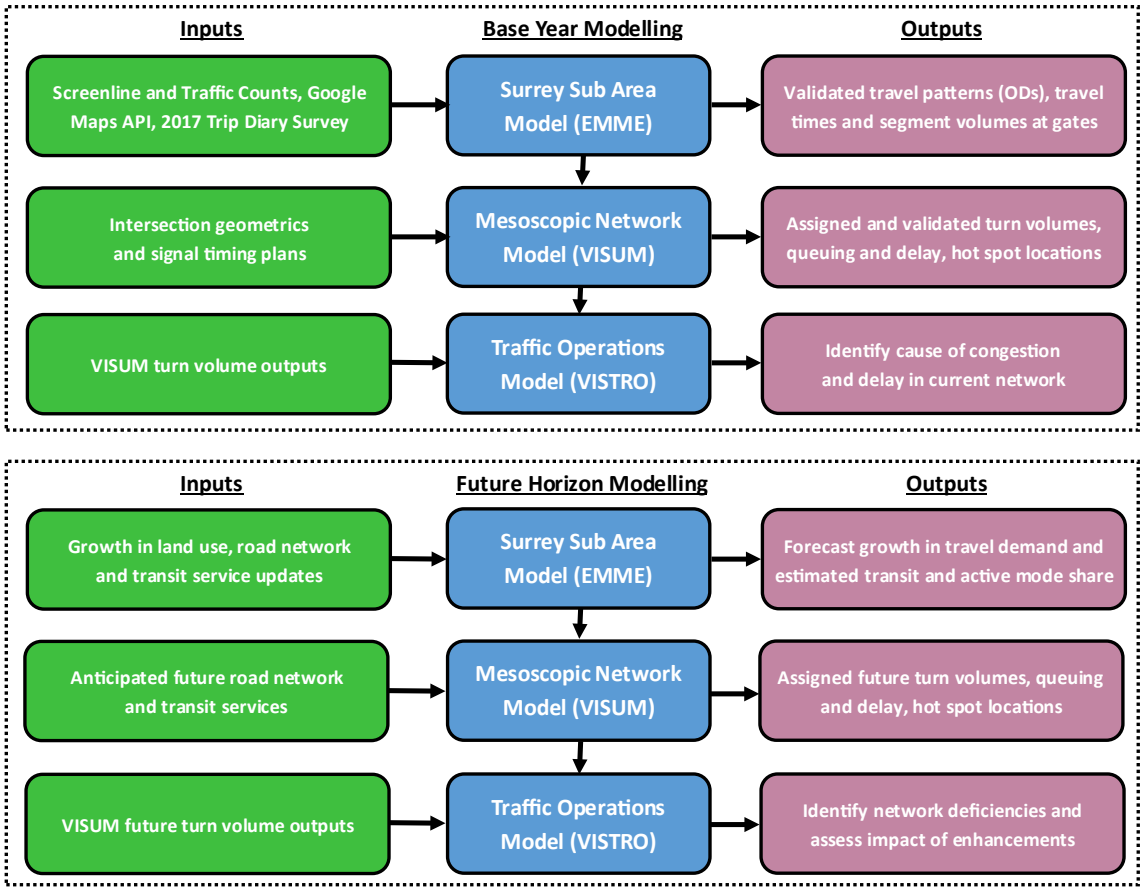


Study Methodology

Due to the extents of the study area and the need for detailed traffic operations analysis, a combination of the Surrey Sub Area Model (SSAM) coded in the Emme software platform, Visum, and Vistro were used for this study. This leverages the advantages of different modelling scales to develop a robust assessment of traffic conditions that considers travel demand and not just traffic throughput. This allows the City to identify and assess impacts of future enhancements with confidence that the models are providing a realistic evaluation of traffic conditions including level of service, delay, and queuing.

Our methodology is illustrated in **Figure 2** showing how data feeds into the different model layers to develop the base and future turn volumes and assessment of traffic conditions. Both the base and future modelling begins with the SSAM to validate overall travel patterns and forecast growth in travel demand for the study area. These outputs are utilized by the mesoscopic network model developed in Visum, which also includes greater network details than the SSAM including signal operations. The Visum base model is validated against observed turn volumes, travel times, queues, and delays. The future Visum model provides traffic operational analysis and traffic impact analysis to identify network hotspots and deficiencies. The outputs of the Visum model (i.e., intersection turn volumes) are imported to the Vistro model, which provides results for the modelled conditions to review hotspots and deficiencies at a greater level of detail, such as identify specific movements that may be deficient. Finally, the Vistro model is also used to identify improvements and their effectiveness in addressing network deficiencies and ability to meet traffic performance thresholds.

Figure 2: Study Methodology



PERFORMANCE METRICS

The key macroscopic metrics are trips by mode and additional trips generated. The metrics are outputs from the SSAM and provide context to overall travel in and around the study area including trip distribution. At the microscopic level, for the purpose of evaluating the network, identifying hot spots, and evaluating mitigation measures, the key metrics are volumes-to-capacity (v/c) ratio, level of service (LOS), delay, and queue lengths (typically reported with the 95th percentile).

Intersection operations are evaluated in LOS, which is a quantitative stratification of the average delay and the v/c ratio. The LOS evaluation ranges from LOS A to F. LOS A indicates operating conditions with little or no delays and ample capacity (or operating at free-flow conditions), while LOS F denotes over-saturated conditions with significant delays and extensive queues. The v/c ratio measures traffic demand against capacity. When v/c is above 1, demand exceeds capacity and congestion is anticipated for that movement, approach, and/or intersection. In this case, operations are designated LOS F regardless of average delay.

Table 1 summarizes the delay ranges, v/c ratio, and operational characteristics associated with each LOS. Acceptable operations are typically considered to be LOS D or better and therefore, any movement or intersection operating at LOS E or worse may require further improvements.

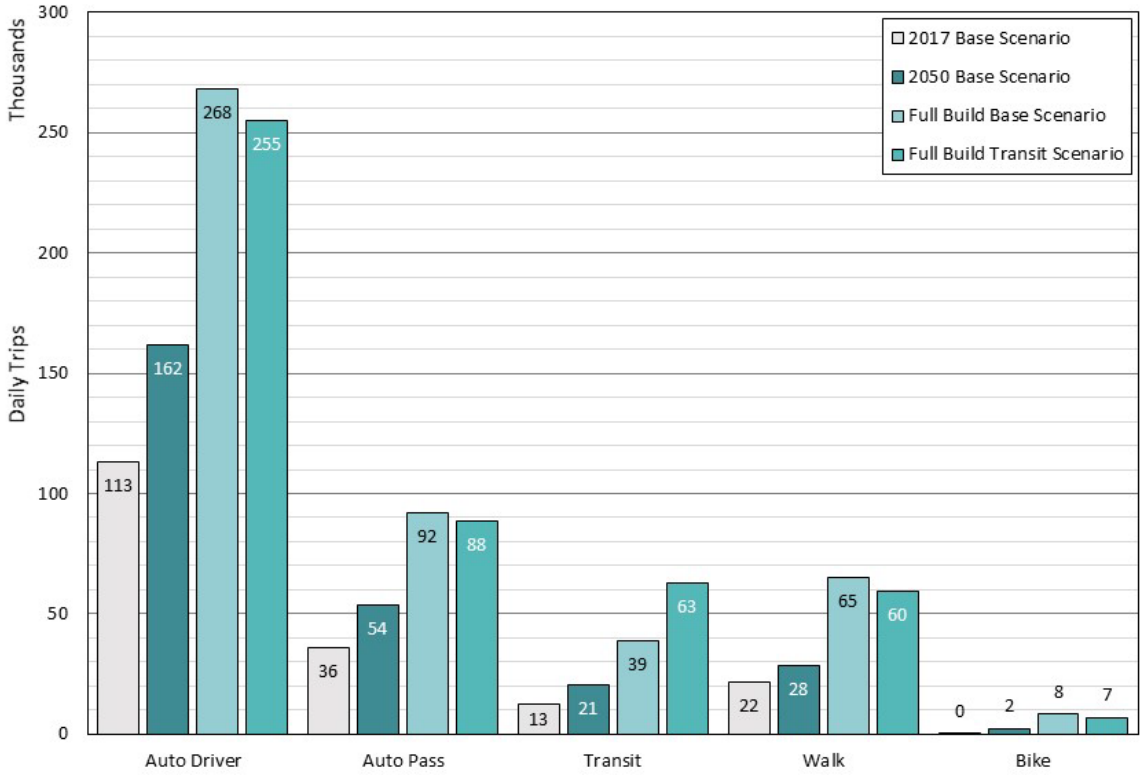
Table 1: Intersection Level of Service Definition

Level of Service	Delay Criteria (sec/veh)		V/C Ratio	Description
	Signalized Intersections	Unsignalized Intersections		
A	≤ 10	≤ 10	≤ 1	Represents free flow conditions. Individual users are virtually unaffected by others in the traffic stream. Usually no conflicting traffic.
B	> 10 to 20	> 10 to 15	≤ 1	Stable flow, but the presence of other users in the traffic stream beings to be noticeable. Occasionally some delay due to conflicting traffic.
C	> 20 to 35	> 15 to 25	≤ 1	Stable flow, but the operations of individual users become affected by interactions with others in the traffic stream. Delay is noticeable.
D	> 35 to 55	> 25 to 35	≤ 1	Represents high-density, but stable flow. Delay is noticeable and further affected by interactions with others in the traffic stream.
E	> 55 to 80	> 35 to 50	≤ 1	Represents operating conditions at or near capacity level. Delay approaching tolerance levels.
F	> 80	> 50	> 1	Represents forced or breakdown flow. Delay exceeds tolerance level and/or volume exceeds capacity.

Mode Share Analysis and Additional Peak Hour Trips

The anticipated demographic growth in Guildford, Surrey, and the region results in a corresponding growth in total trips to and from Guildford, as defined by the TransLink Trip Diary sub-regions. In 2017, there were approximately 183,000 trips to and from Guildford per fall weekday. This daily number of trips is forecasted to increase to 266,000 by 2050, which represents a 46% increase from the 2017 base year. For the full buildout horizon, the total daily number of trips to and from Guildford increases to over 472,000 per fall weekday, representing a 157% increase from the 2017 base year. The total daily trips by travel mode for these scenarios are provided in **Figure 3**.

Figure 3: Daily Trips by Mode for Trips from Guildford



The growth in trips is not balanced across all modes. By the Full Buildout horizon, auto driver and passenger combine for a 142% increase from 2017, while transit and active modes grow by 209% and 231% over the same period. Despite transit and active modes growing significantly faster than auto driver and passenger, there is still a sizeable demand for auto oriented travel throughout Guildford, Surrey, and the region.

Additional shift in transit mode share can be achieved with transit infrastructure and investment as seen by the Full Buildout Transit Scenario. The Full Buildout Transit Scenario is a sensitivity scenario developed in the SSAM to illustrate the transit potential for Guildford and the City. The sensitivity scenario sees a 62% increase in transit trips compared to the Full Buildout Base Scenario with significantly expanded rapid transit services. Total trips remain relatively unchanged. The increase in transit trips is largely offset by less auto trips. This shift illustrates the need for transit infrastructure and investment to support and supplement road projects and provide people with travel choice. Together both road and transit improvements will be required to enable and accommodate growth in Guildford and the City.

The active mode shares do not change substantially between the scenarios. There are several factors that impact active modes which are limited within the current SSAM framework. Active mode infrastructure such as sidewalks and bike lanes are not coded into the model, so they do not directly impact the mode share forecasts. The impact of infrastructure for active modes is researched and tested outside the scope of this study and these findings can be used to supplement these results. Additionally, micro-mobility and electric micro-mobility (e.g., e-bikes) are not included in the SSAM. While these emerging modes do not constitute many trips today, they have the potential to influence travel in the future as their performance characteristics (e.g., speed and range) continue to improve. As use increases, there is an opportunity, and responsibility, to understand their impact, ensure they are accommodated in transportation networks, and leverages their benefits to promote sustainable travel. Finally, policies and societal values change over time. Both impact travel but were not included as they are not integrated into the SSAM framework and are difficult to forecast.

The analysis of trips by mode was focused on the Guildford sub-region as defined by TransLink's Trip Diary. This allowed for consistency with previous work, model validation, and future analysis. Additional trips were also determined for the peak hours for all zones in the study area. Additional trips were determined by calculating the difference between subsequent scenarios. This results in additional trips from 2017 to 2050, from 2050 to Full Build, and from Full Build to the transit sensitivity scenario. The trips were calculated for the AM and PM peak hours, for both inbound and outbound directions. The totals for the study area are provided in **Table 2** below, including both the absolute and percentage change in trips.

Table 2: Additional Trips (AM and PM Peak Hours)

Time of Day	Mode	TRIPS FROM STUDY AREA						TRIPS TO STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
AM	Auto Driver	890	24%	7,430	161%	-1,070	-9%	1,390	48%	2,070	49%	- 330	-5%
	Auto Pass.	420	25%	3,740	177%	- 230	-4%	590	39%	950	46%	- 80	-2%
	Transit	650	59%	3,340	191%	2,020	40%	420	123%	310	41%	680	63%
	Walk	440	42%	2,990	201%	- 310	-7%	490	53%	1,830	129%	- 200	-6%
	Bike	80	80%	490	271%	- 120	-18%	70	95%	130	94%	- 30	-10%
	Total	2,480	32%	17,990	177%	300	1%	2,950	52%	5,300	61%	50	0%
PM	Auto Driver	1,670	43%	4,120	74%	- 590	-6%	1,340	28%	8,140	133%	-1,150	-8%
	Auto Pass.	440	34%	1,420	81%	- 140	-4%	400	28%	2,250	124%	- 210	-5%
	Transit	540	129%	640	67%	1,350	85%	760	74%	2,860	160%	2,490	53%
	Walk	360	68%	2,440	275%	- 410	-12%	360	65%	2,670	296%	- 460	-13%
	Bike	110	137%	310	169%	- 60	-13%	120	124%	550	252%	- 140	-18%
	Total	3,120	50%	8,930	95%	150	1%	2,970	38%	16,470	152%	540	2%

There is an upward trend for trips of all modes from 2017 to 2050 and from 2050 to Full Build. The study area has more outbound trips than inbound trips in the AM peak hour and vice versa in the PM peak hour. This aligns with typical commuter patterns in areas with a surplus of working population over the available employment. In the peak directions, total trips increase by 32% (AM outbound) and 38% (PM inbound) from 2017 to 2050. During this time, the increases in auto driver and auto passenger are between 24% and 28%, while sustainable modes (i.e., transit, walk, and bike) increase significantly more. From 2050 to full build, the peak directions increase by 177% for AM outbound and 152% for PM inbound. Again, the auto driver and auto passenger modes grow slower while the sustainable modes grow faster.

When comparing the Full Build to the transit sensitivity scenario, total trips change by 2% or less. However, there is a significant shift in modes. The increase in transit trips range from 40% to 85%, with the largest changes occurring in the off-peak direction. It should be noted, there is no change in demographics when comparing these two scenarios, therefore the impacts are a direct result of the increase in transit service.

Issue Identification and Classification of Improvements

As illustrated by the mode share analysis, significant growth is anticipated in the study area. To ensure that the road network can accommodate projected traffic volumes for the 2050 and full buildout horizon years, operational deficiencies of intersections in the study area were identified and evaluated using the Visum and Vistro models. The Visum models were applied to identify potential hot spot locations and problematic movements. The Vistro models allow for a more detailed assessment of traffic operations down to the turn movement level. The modes were employed to identify capacity, queuing, and/or travel delay concerns, as well as potential improvements to address these deficiencies. Generally, road network improvements were considered to improve movements with a LOS E or F or where there was significant queuing.

There are several corridors, intersections, and movements that will require improvements/upgrades either by the 2050 or full buildout horizon. Based on these findings, the proposed improvements were grouped into five classifications as shown in **Table 3**. The classifications largely reflect the relative level of effort and costs associated with implementing each type of improvement. Two of the classifications are signal timing changes for improving operations at the intersection and signal timing changes for improving safety (e.g., adding protected left turn phases when crossing three opposing through lanes). The classifications also included new traffic signals or roundabouts, road reallocation, and road network additions or road widening.

Table 3: Classification of Proposed Improvements

Signal Timing Changes (for Operations)
Signal Timing Changes (for Safety)
New Traffic Signal/Roundabout
Road Reallocation
Road Addition / Widening

The order of the classifications indicated the general hierarchy of selecting improvements. For example, all signalized intersections with at least one movement operating at a LOS E or F were considered for signal optimization as the first potential improvement since it is the most cost-effective option. Improving the signal timing and/or coordination enables the signal to operate more effectively to reduce congestion and requires no additional infrastructure costs. All unsignalized intersections with movements operating at a LOS E or F were considered for a new traffic signal and/or roundabout if they experienced significant traffic volumes.

Some locations required additional improvements in the of form of either reallocation of existing traffic lanes, addition of new lanes or turn bays, or road widening. Locations where one lane is shown to be underutilized and another is not provided with enough capacity, road reallocation was considered as a potential improvement to minimize property impacts. An example of such improvement is changing a right-turn lane to a shared through and right lane to provide additional capacity for the through movement. Road additions

or widening was considered last because the construction, time, and cost of an additional lane or turn-bay is relatively high when compared to the other improvement options. Further, property and business impacts can be high at certain locations where additional right-of-way is required.

Recommended Improvements / Mitigation Measures

The recommended network improvements include improvements at the roadway segment level (i.e., road widening) and at the intersection level (i.e., intersection improvements/upgrades or new traffic signals). The road widening recommendations are based on the results of the Visum model, specifically the full buildout scenario, and are listed in the table below.

Table 4: Recommended Road Widenings

Road	Location	Lanes / Direction	
		Current	Proposed
140 Street	105 Ave to Grosvenor Road	1	2
140 Street	Fraser Hwy to 104 Avenue (NB only)	2	3
148 Street	98 Avenue to North of 110 Avenue	1	2
152 Street	98 Avenue to 104 Avenue	2 or 3	3
156 Street	98 Avenue to 108 Avenue	1	2
100 Avenue	156 Street to 160 Street	1	2
104 Avenue	138 Street to 160 Street	2	3
108 Avenue	139 Street to 142 Street	2	3

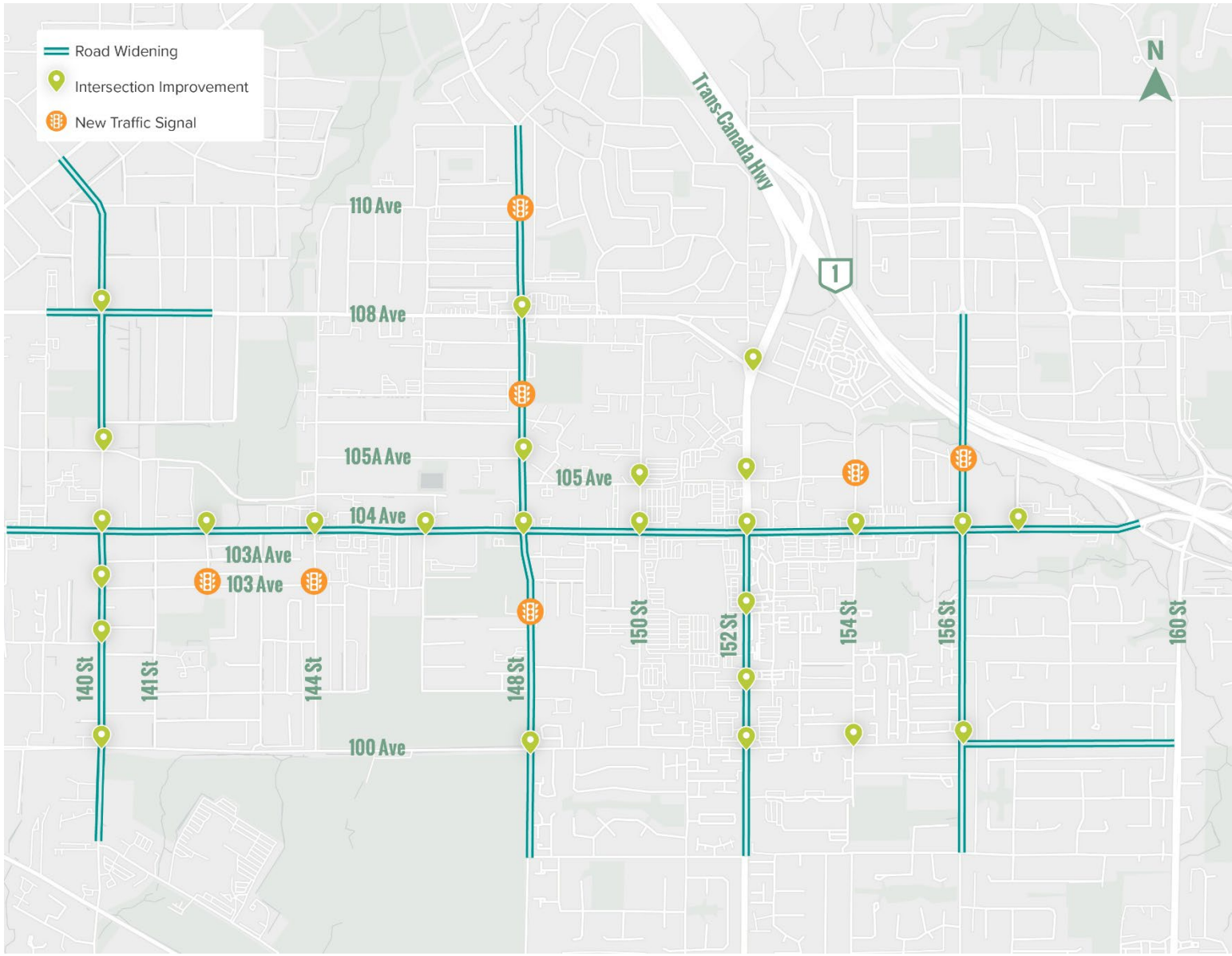
At the intersection level, three new traffic signals are recommended to address the increased travel demand expected by the 2050 horizon year. Five additional traffic signals are recommended beyond 2050 to meet the demands of the full buildout horizon year. These locations are listed in the table below.

Table 5: Recommended New Traffic Signals

Intersction	Horizon Year	Intersection Control	
		Current	Proposed
144 Street & 103 Avenue	2050	2-Way Stop	Traffic Signal
148 Street & 102A Avenue	2050	N/A	Traffic Signal
154 Street & 105 Avenue	2050	Pedestrain Signal	Traffic Signal
142 Street & 103 Avenue	Full Buildout	2-Way Stop	Traffic Signal
148 Street & 110 Avenue	Full Buildout	2-Way Stop	Traffic Signal
148 Street & 106A Avenue	Full Buildout	2-Way Stop	Traffic Signal
150 Street & 104A Avenue	Full Buildout	N/A	Traffic Signal
156 Street & 105A Avenue	Full Buildout	2-Way Stop	Traffic Signal

Other intersection improvements are recommended at over 25 intersections, in addition to the intersections listed above. These improvements range from additional lanes/turn bays to reconfiguration of lanes and/or traffic signal operations. A summary of all recommended network improvements is illustrated in **Figure 4** with further details provided in the body of this report.

Figure 4: Recommended Network Improvements



1. INTRODUCTION

The City of Surrey has commissioned McElhanney Ltd. (McElhanney) to provide transportation planning and modelling services to assess transportation network impacts of development related to the Guildford Town Centre and the 104 Avenue Corridor Stage 1 plan. An initial road network plan has already been developed and this study looks at traffic volumes and operations along key corridors. This 'proof of concept' study provides information to the City of further network elements and improvements that are required for the future horizon years to maintain acceptable levels of service.

1.1. PROJECT BACKGROUND

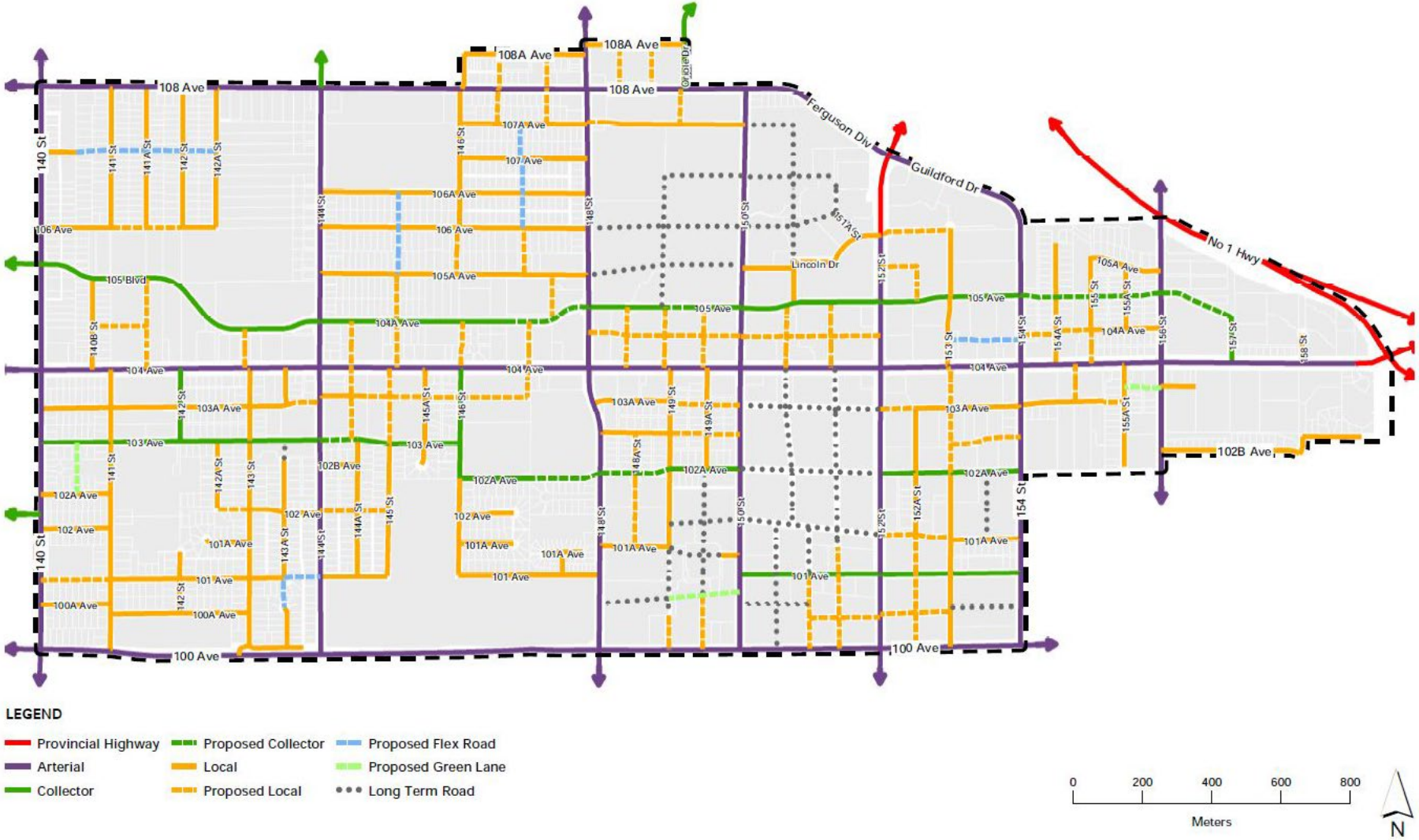
Guildford Town Centre and the 104 Avenue Corridor are located in the Surrey communities of Guildford and Whalley, extending east from the edge of City Centre to the Trans-Canada Highway (Highway 1). The study area for this project is extensive, covering approximately 500 hectares, and is bound generally by 140 Street, 108 Avenue, Highway 1, 158 Street, and 100 Avenue. As illustrated in **Figure 5**, the plan area is comprised of Guildford Town Centre and two primarily residential areas, flanking it to the east and west. The Guildford Town Centre is a moderately dense multi-family and commercial area that developed around the Guildford Town Centre shopping centre.

Guildford Town Centre has not had a land-use plan for many years. Older plans identified Whalley and Guildford as two commercial nodes bookending 104 Avenue; however, once SkyTrain arrived in Surrey in 1994, development interest has favoured Whalley. That part of Whalley, now known as Surrey City Centre, is now the second largest metropolitan centre of the region.

Despite this, Guildford has remained an important town centre and regional shopping destination. In 2016, City Council recognized the need for a land-use plan to guide development in Guildford. On June 27, 2016, Council authorized staff to undertake a planning process for the Guildford Town Centre and the 104 Avenue Corridor.

On November 5, 2018, Council revisited the phasing and technology of the rapid transit investments in Surrey and prioritized the Surrey-Langley Skytrain ("SLS") corridor along Fraser Highway. The 104 Avenue corridor has been maintained as a future rapid transit corridor, which provides rationale for the completion of the Guildford Town Centre and 104 Avenue Plan.

Figure 5: Guildford Study Area



1.2. CONTEXT AND OBJECTIVES

While the plan area today has a well-established and regular grid of arterial roads, the finer-grained grid is currently incomplete, resulting in relatively larger blocks with limited pedestrian and cycling connectivity. The proposed road network envisions additional connections to be achieved through development and generally establishes block sizes of approximately 100 metres by 200 metres. This is consistent with new urban standards throughout Canada. The block sizes, where appropriate, are modified in consideration of natural and man-made constraints, as well as existing and proposed developments.

The proposed road network enhances the walking and cycling experience by breaking up large blocks, while providing more direct access to future rapid transit stations and amenities. All roads, new and existing, will be designed and constructed with sidewalks on both sides, separated from traffic by a treed boulevard.

Grade-separated cycling facilities in the form of protected bike lanes (cycle tracks) are planned for most collector and arterial roads throughout the Plan. Separated cycle tracks help encourage cycling by providing safe and accessible infrastructure.

Some local roads are also planned to have multi-use paths, which would accommodate both pedestrians and cyclists, and provide additional connections within the neighbourhood to destinations such as parks and local amenities.

A Green Connector network is also planned as an enhanced pedestrian and cycling environment to connect parks throughout the plan area. All roads that are designated as part of the Green Connector network will have an additional row of street trees and separated pedestrian and cycling facilities, or a multi-use path.

A transportation model is required for the study area as part of the Phase 2 Servicing Strategy for the Plan. This work will compliment the planning process and transportation network and help to identify:

- Sufficiency of the transportation road network;
- Opportunities for operational and capacity improvements required to service growth; and
- The overall transportation servicing strategy.

Due to the extents of the Plan area, a mesoscopic model was required and developed to include inputs of travel demand from the Surrey Sub-Area Model (SSAM), as well as detailed intersection analysis using a traffic impact analysis model. To achieve these objectives, the following key study tasks were undertaken:

1. Develop a transportation model for the study area based on the City's transportation network and utilizing the SSAM based on TransLink's Regional Transportation Model Phase 3.4 (RTM 3.4) framework.

2. Validate the SSAM for context specific features of the local travel market including land use demographics, trip generation, trip distribution, and mode share using latest available data sources.

3. Perform traffic operational analysis using mesoscopic and traffic impact analysis models to identify network hotspots and deficiencies.

4. Summarize results for a business-as-usual (BAU) condition and identify congestion hotspots and deficiencies in the study area and surrounding network.

5. Identify improvements and their effectiveness in addressing network deficiencies and ability to meet performance thresholds.

1.3. Report Outline

This report is presented in the following sections:

- **Section 2** describes the data and validation metrics that were utilized to establish travel conditions within Guildford for the 2017 base year.

- **Section 3** provides an overview of the SSAM and Guildford scenarios that were utilized for this project, including model validation.

- **Section 4** outlines the development of the Visum model, including calibration and validation of key metrics. It also presents the results of the traffic operations analysis at the mesoscopic level.

- **Section 5** describes the development of the Vistro model and provides a detailed assessment of traffic operations at key intersections.

- **Section 6** identifies the network deficiencies and improvement options, along with the impact of the improvements.

2. DATA AND VALIDATION METRICS

Prior to model development and application, a set of data and validation metrics is required. The data and validation metrics provide the foundation on which the model can be developed, calibrated, and validated providing confidence in travel forecasts. This section assembles data from various independent sources including the 2016 Census, the 2017 TransLink Trip Diary Survey, municipal and regional traffic counts, transit ridership counts, and travel time data. This set of data is used to validate demographic assumptions, inform trip production and distribution characteristics, calibrate model inputs, and validate model outputs.

2.1. DEMOGRAPHICS AND CENSUS 2016

The Census of Population is conducted by Statistics Canada every five years to provide a statistically reliable representation of the country and its population. Demographics developed from the 2016 Census were collected for the City and compared to the RTM 3.4 and the City's assumptions. The primary demographic variables in the model that are used to predict existing and future travel demand include:

- Population by age cohorts
- Households by size
- Employment by sector

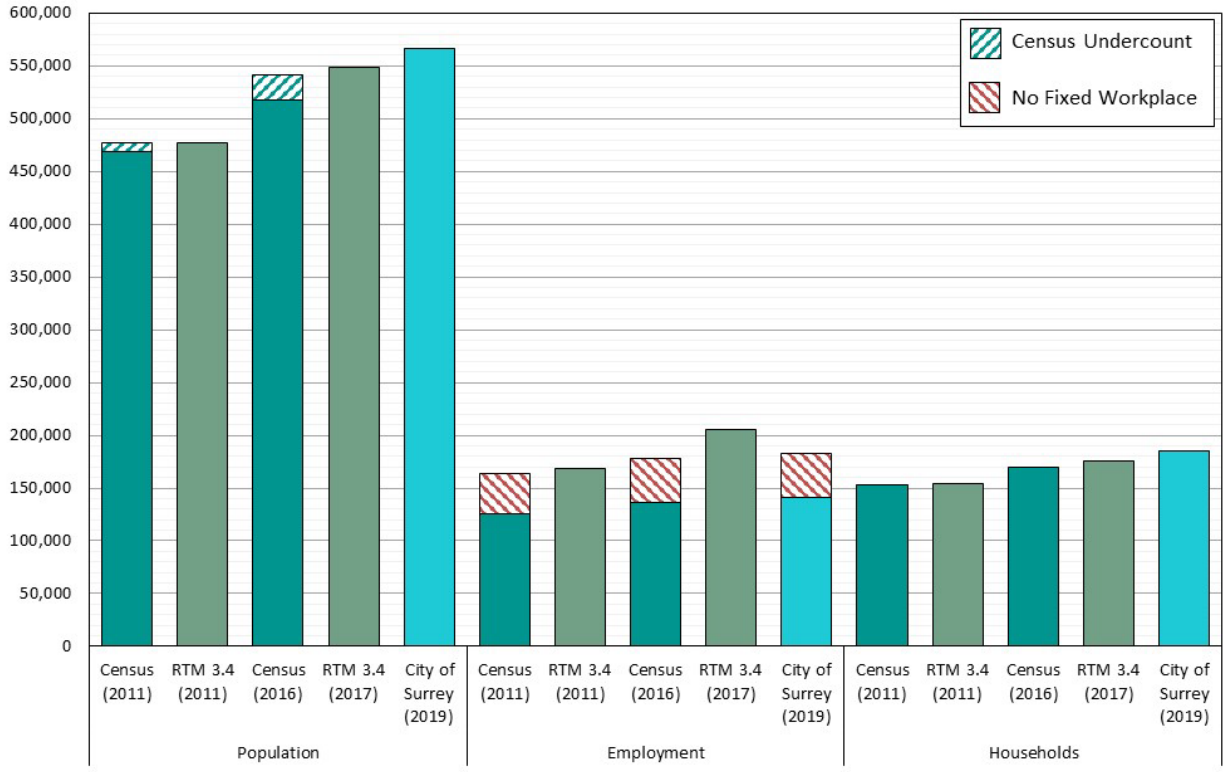
Population is aggregated by similar age cohorts in both the RTM 3.4 and the Census, except for the younger age groups. Census aggregates young age groups into 5-year age cohorts while the RTM 3.4 aggregates them based on typical grade school and university enrollment ages. The RTM 3.4 population includes Metro Vancouver's estimation of undercounts. For the 2011 Census, the population undercount was estimated at 2% for the Metro Vancouver region, and for 2016 Census, the undercount was estimated at 4.5% for the City of Surrey. The population undercount has been included in the City of Surrey's 2019 forecast.

In the RTM 3.4, households by municipality are estimated by Metro Vancouver. The comparable in the Census is the number of dwelling units occupied by usual residents. In both data sets, the households are segmented by household size. The City of Surrey's 2019 households are estimated based on the City of Surrey's 2019 population and the RTM 3.4 household distribution.

The Census Journey to Work provides values of fixed location employment for each municipality such as office workers or other people that have a regular place of employment. The RTM 3.4 employment, produced by Metro Vancouver, includes an estimate of no fixed workplace, therefore the employment statistics are not directly comparable to the Census. Approximately one quarter of the total employment within the City of Surrey has no fixed workplace. Occupations with no fixed workplace (e.g., construction workers, real estate agents, or tradesperson) are represented in the RTM 3.4 as they make trips to service households and businesses. This estimation was applied to the City of Surrey's fixed placed employment.

A comparison of population, employment, and households between the Census, the RTM 3.4, and the City of Surrey's demographic assumptions are provided in **Figure 6**. The figure highlights the Census population undercount and the no fixed workplace employment adjustments.

Figure 6: Demographic Comparison



2.1.1. RTM 3.4 Demographics

Metro Vancouver has produced updated population, employment, and household estimates and forecasts for the RTM 3.4 incorporating the latest information from the 2016 Census, final population undercount adjustments, employment information from the Journey to Work survey, and other municipal control totals. This update supersedes the previous interim updates incorporated in the RTM which included proxy information from the 2011 Census where data was not yet available from the 2016 Census.

The demographic and socio-economic data sets were produced at the RTM 3.4 traffic analysis zone (TAZ) level for the historical calibration year (2011), base year (2017), and future years (2035, 2050). These represent the current planning horizons used in the region and the data set includes the following categories:

- Population by age cohorts:
  - 0 to 4 years
  - 5 to 12 years
  - 13 to 17 years
  - 18 to 24 years
  - 25 to 34 years
  - 35 to54 years
  - 55 to 64 years
  - 65 years and above

- Households by number of occupants
  - 1
  - 2
  - 3
  - 4 +

- Employment by sectors
  - Construction and Manufacturing
  - Finance, Insurance, and Real Estate
  - Transportation, Communication, Utilities, and Wholesale
  - Retail
  - Business and Other Services
  - Accommodation, Food, Information, Culture
  - Health, Education, and Public Administration

2.1.2. City of Surrey Demographics

The latest Surrey demographic inputs were provided by City staff at the RTM 3.4 TAZ level. This included 2019 estimates and forecasts for the 2035, 2050, and full buildout horizons. Demographics for TAZs outside of Surrey are not adjusted as part of this update from the City and values from the RTM 3.4 are maintained. Furthermore, the full buildout horizon assumes full buildout for Surrey only; the rest of the region maintains their 2050 demographic assumptions.

The existing population estimates and future population forecasts provided by the City included adjustments for the Census undercount, therefore no further adjustments were required prior to incorporating into the model. The existing household estimates and future household forecasts were produced by adjusting the RTM 3.4 values using the City's updated population estimates and forecasts. While the RTM 3.4 demographic and the road network are for 2017, the 2019 demographic from the City was used as it is the latest and best information available from the City.

The City's 2019 employment estimates do not include the undercount adjustment nor the no fixed workplace employment. Therefore, a 4.6% undercount adjustment (from the 2016 Census) was applied to the existing employment estimate. Existing no fixed workplace employment for the Lower Mainland (Metro Vancouver and Fraser Valley Regional District) and Surrey were obtained from Census 2016. It is assumed that half of each municipality's no fixed workplace employment remains within that municipality and the other half is distributed to other municipalities. The allocation to other municipalities is based on the municipality's share of the no fixed workplace employment. For Surrey, this allocation of no fixed workplace employment results in a 29.5% increase to the City's employment estimates.

The future employment forecasts provided by the City include no fixed workplace employment and do not require the undercount adjustment. Therefore, they are taken as is for the 2035, 2050, and buildout horizon years. The total population, employment, and households for the City for each model horizon years are shown in **Figure 7** along with the growth from the 2017 Base. Additionally, the demographics for Guildford, as defined by the TransLink Trip Diary sub-region boundaries, are shown in **Figure 8**.

Figure 7: City of Surrey Demographics (Total and Growth from 2017 Base)

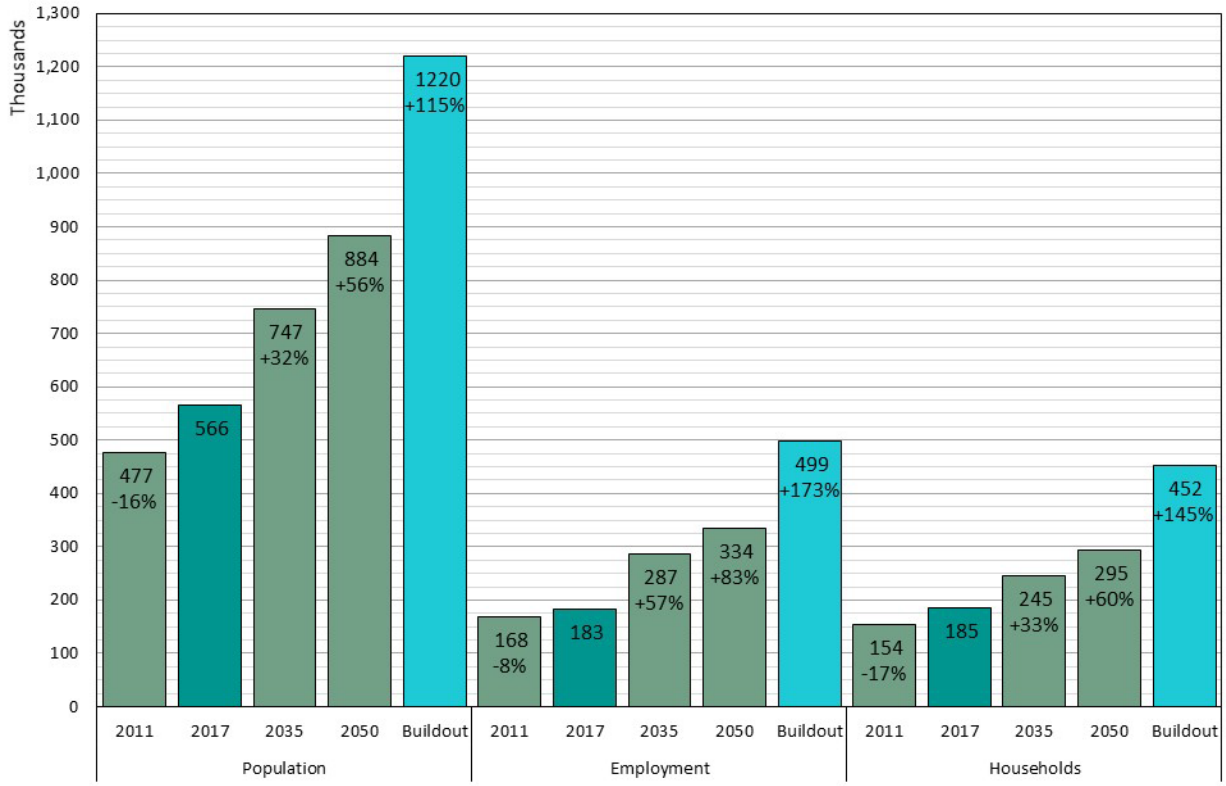
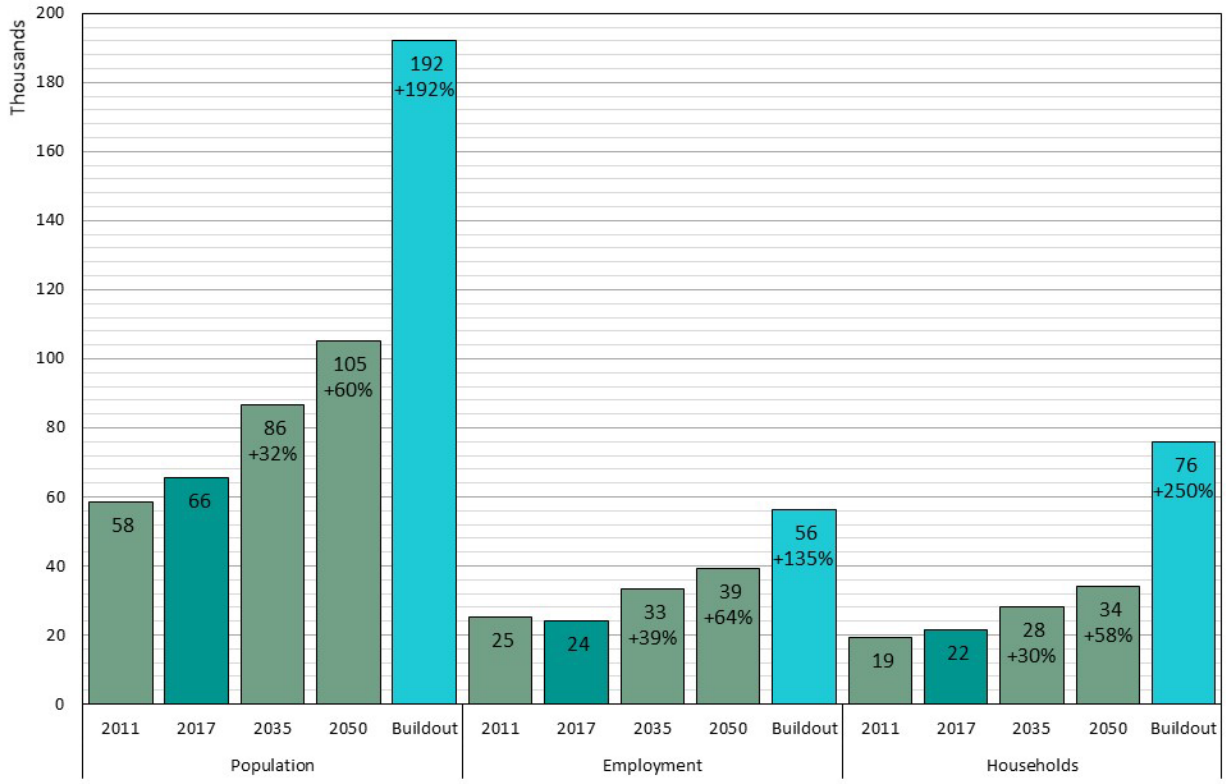


Figure 8: Guildford Demographics (Total and Growth from 2017 Base)

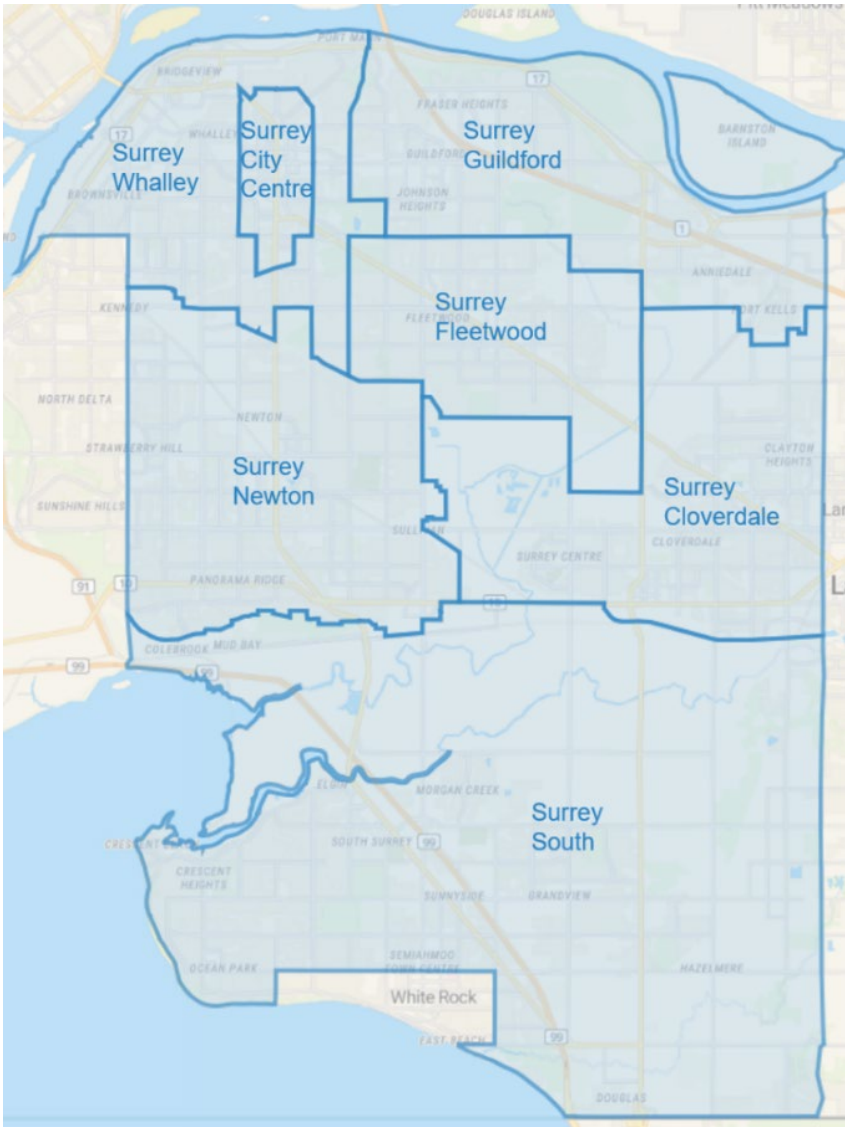


The final population, employment, and household totals for all model horizon years at both the RTM 3.4 and SSAM TAZ level are provided in **Appendix A**.

2.2. Trip Diary

The Regional Trip Diary survey administered by TransLink is a household-level travel survey representing approximately 2.5% of households in the Lower Mainland. This survey is performed every five to six years with the latest survey taking place in Fall 2017. The survey includes a diary of all trips made by all members of the household on a randomly selected weekday. Detailed information is collected for each trip including trip origin, trip destination, travel mode(s), trip purpose, and time of trip. Socio-economic and demographic information is also collected for each surveyed household. The 2017 TransLink Trip Diary was released in Fall 2019 and is the most current source of information on trip-making patterns and behaviour in the region. The 2017 TransLink Trip Diary release includes 53 sampling sub-areas in the region. The Trip Diary sub-areas within Surrey are identified in **Figure 9**.

Figure 9: TransLink Trip Diary Sub-Region Boundaries



The daily mode shares for trips made to and from Surrey are presented in **Figure 10**. Auto is the dominant mode for travel to and from Surrey with auto driver accounting for 60% of all daily trips and auto passengers accounting for 20%. Sustainable modes (i.e., transit, walk, and bike) make up the remaining 20% of travel. The daily mode share for travel to and from Guildford (**Figure 11**) shows a similar pattern to Surrey.

Figure 10: Daily Mode Share for Trips to and From Surrey

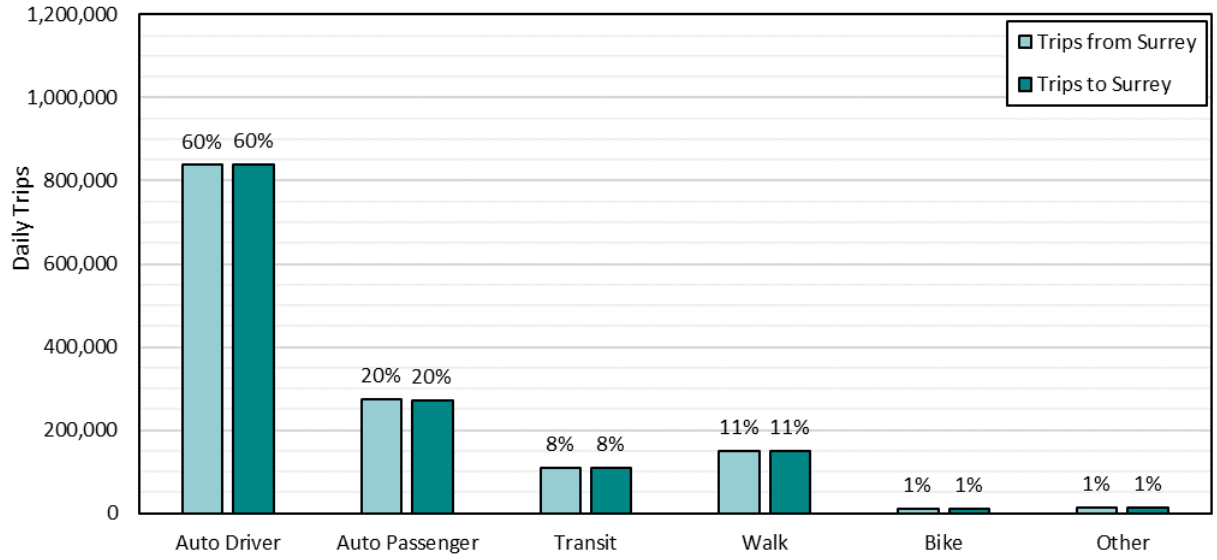


Figure 11: Daily Mode Share for Trips to and from Surrey Guildford

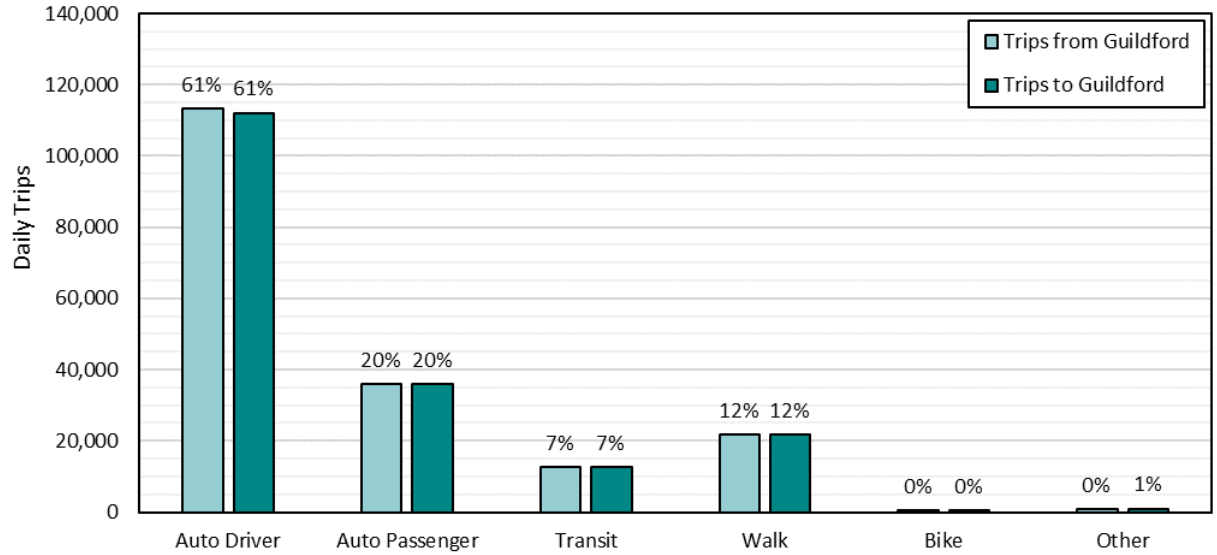


Figure 12 shows the distribution of the trip destinations for all trips originating from Surrey on a daily level. Most of these trips are internal with 70% remaining within Surrey. The remaining 30% comprises of trips made to other municipalities. As indicated in the figure, most of the external trips are made to Surrey's neighbouring municipalities with approximately 8% headed to Langley / S FVRD, 5% headed to Delta, and 2% to White Rock. A similar distribution is shown for the trips made to Surrey, as illustrated in **Figure 13**.

Figure 12: Daily Trip Distribution of Trips made from Surrey

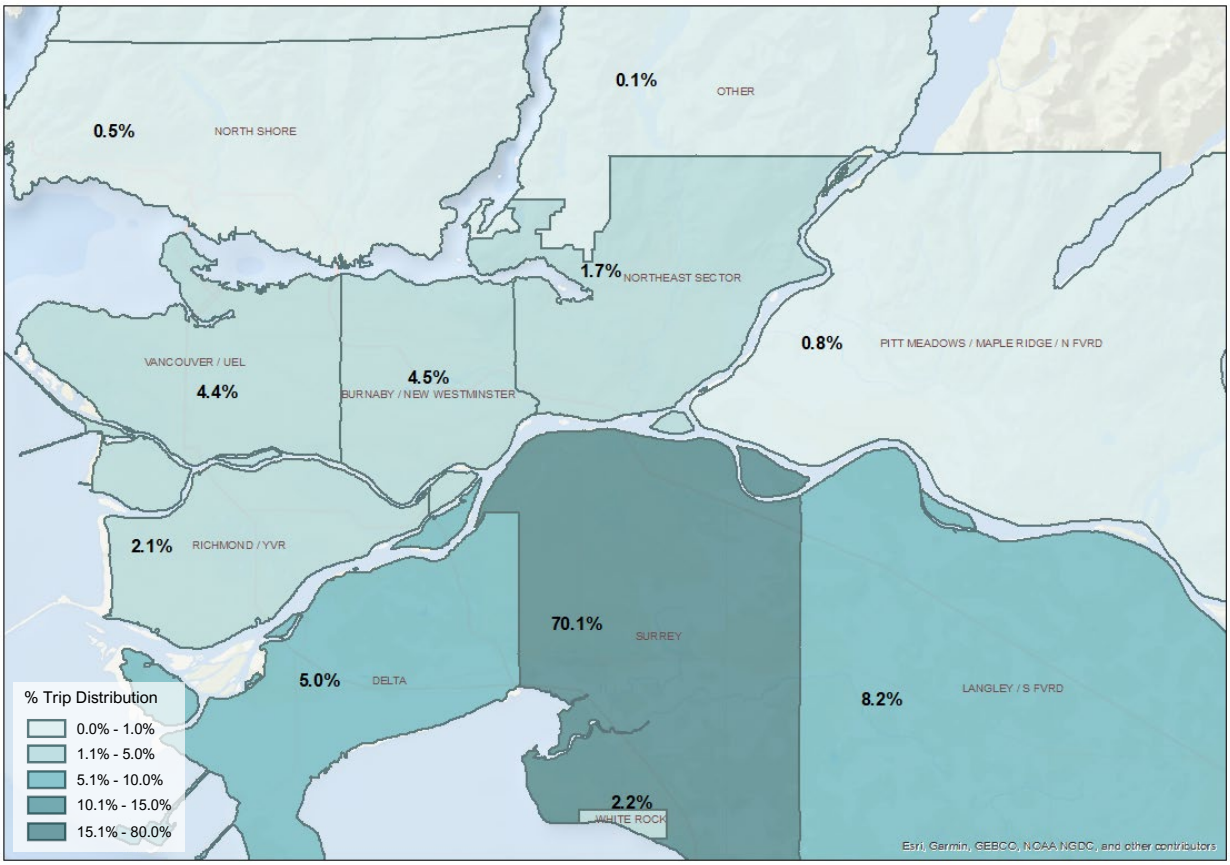
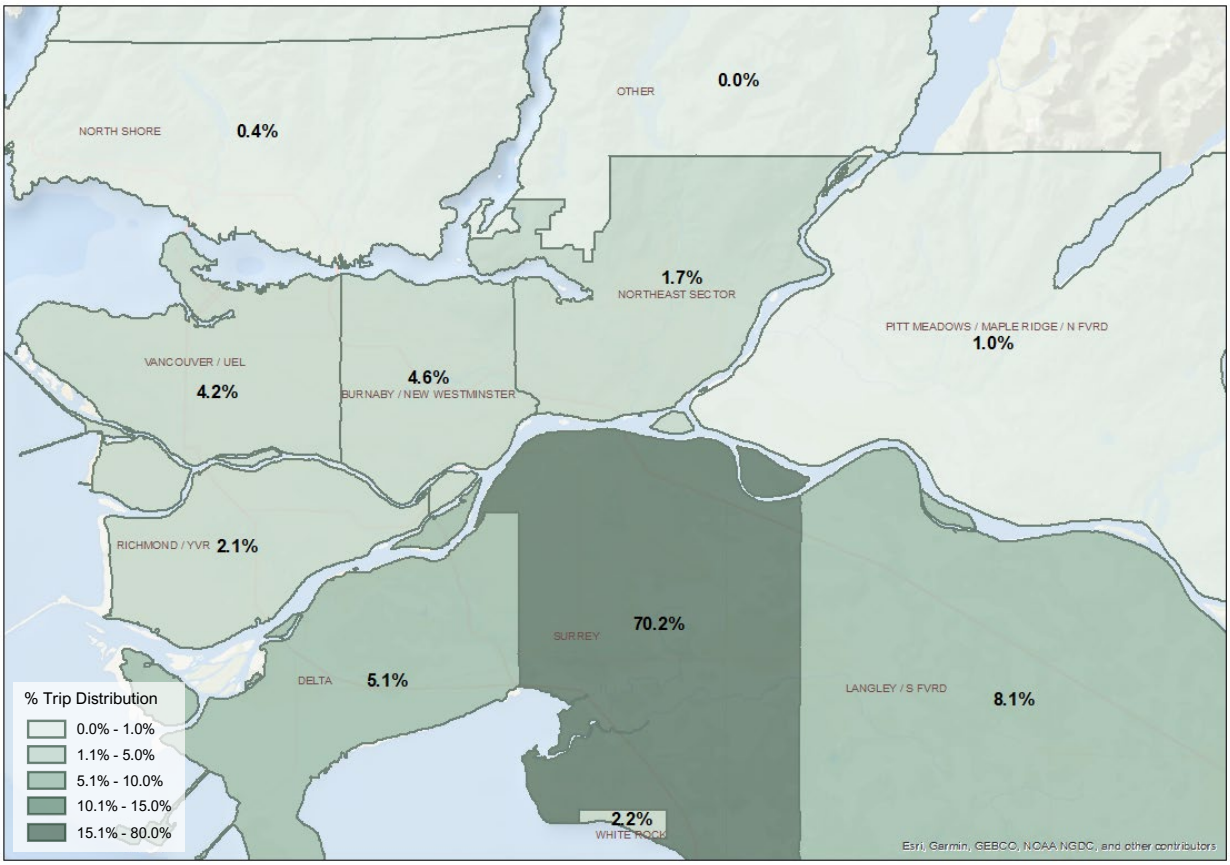


Figure 13: Daily Trip Distribution of Trips made to Surrey



The RTM 3.4 models regional travel demand at the daily level but provides time sliced analysis of the AM, midday, and PM peak hours with auto and transit assignments at the network level. The time slicing factors are developed from the Trip Diary. Trip Diary mode share and trip distribution patterns for these time periods can be found in **Appendix B**.

2.3. Traffic Counts

Link level traffic volumes are one of the key outputs of the model assignment. These outputs are critical for many applications of the model including neighbourhood and corridor level analysis, business case studies, major infrastructure project analysis, and testing of transportation policies. Therefore, it is important to have a sufficient level of validation for existing traffic volumes.

The SSAM was validated with counts from the Surrey Langley SkyTrain Project, TransLink's 2017 Regional Screenline Survey, the BC Ministry of Transportation and Infrastructure's (MoTI) Traffic Data Program, and counts provided by the City of Surrey. For this Guildford Town Centre modelling assignment, validation was performed using a select subset of these counts that are within the study area. In total, link level traffic counts were summarized for 25 locations resulting in 95 points of data for both the AM and PM peak hours. A complete list of all locations and the corresponding hourly volumes can be found in **Appendix C**.

Validation metrics were established to determine if the resulting volume validation is sufficient for the applicable modelling work. It should be noted that a substantial number of the traffic counts are short counts (i.e., single day counts) and do not capture day-to-day variations and seasonal fluctuation. There are variations due to the year the count was conducted, construction (e.g., 100 Avenue widening), network changes (e.g., temporary closures on Pattullo Bridge), policy changes (e.g., removal of tolls on Port Mann Bridge and Golden Ears Bridge), and other external factors (e.g., weather, accidents). Based on recent analysis of traffic data in the Lower Mainland, on any given day, roadway volumes can fluctuate up to 25%, while specific hours (e.g., AM peak hour) can fluctuate up to 40%.

Taking this into consideration, two metrics were selected for the volume validation metric: the R^2 of the best fit line and the GEH statistic. R^2 is a statistical measure of how close the data is to the fitted regression line. An R^2 of 1.0 indicates perfect fit. For the purpose of this project, the target R^2 is 0.9. The GEH statistic measures the level of fit while also considering the magnitude of the traffic count volume. For example, a 20% error on a count of 50 vehicles (i.e., 10 vehicles) is significantly less variation than a 20% error on a count of 1,000 vehicles (i.e., 200 vehicles). The target is for 85% of all locations to have a GEH statistic less than 15. The GEH statistic is calculated as follow:

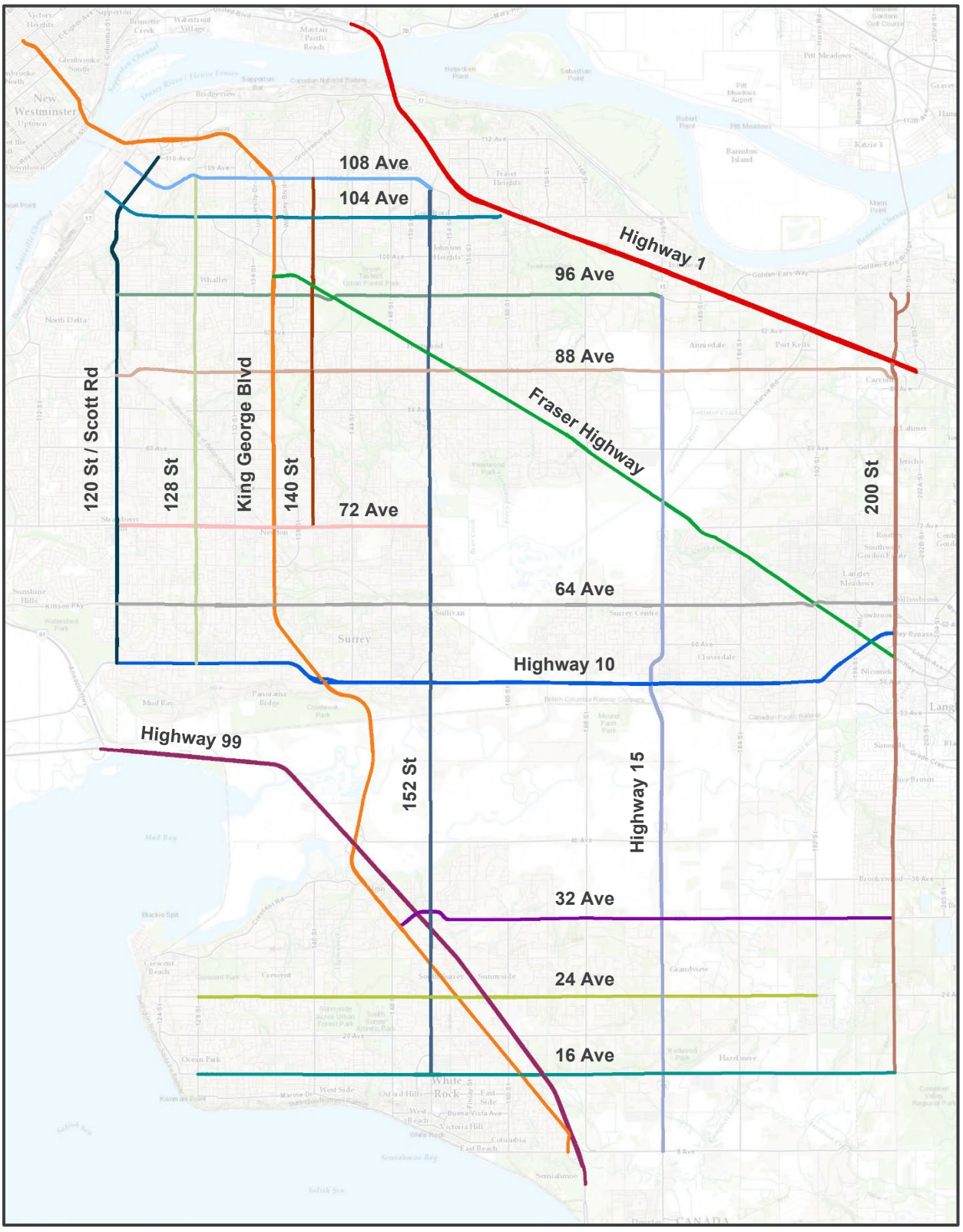
$$GEH = \sqrt{\frac{(V-C)^2}{(V+C)/2}} \quad where: V = model\ volume; C = count\ volume$$

2.4. AUTO TRAVEL TIME

With the widespread adoption of smart connected devices (smartphones, tablets, in-car GPS devices, etc.), crowd-sourced passive information on traffic travel time has become readily accessible through sources such as the Google Maps API. Google Maps bases travel time estimates on historical and real-time data. Application of these travel time estimates has proven to be valuable in efficiently and accurately validating modelled travel times on a large number of corridors. To ensure that the models provide reliable travel times, modelled travel times were compared to Google Maps' best guess, pessimistic, and optimistic travel time estimates for the corridors.

To ensure that the RTM 3.4 provides reliable travel times, modelled travel times were compared to Google Maps' best guess, pessimistic, and optimistic travel time estimates for the corridors shown in **Figure 14**.

Figure 14: Travel Time Corridors



As part of Surrey's Advanced Traveller Information System (ATIS), the City installed Bluetooth sensors at key signalized intersections throughout the City. These sensors detect travellers' Bluetooth-enabled device (e.g., phones, tablets, vehicle Bluetooth systems) as they travel throughout the City. This information is sent to the City's Traffic Management Centre to produce travel time estimates. This has allowed the City to install Dynamic Message Signs (DMS) to provide real time travel information on adjacent corridors so drivers can make informed routing decisions.

This data was leveraged for this project as a supplementary travel time validation dataset. Comparison of the Google Maps API outputs and the City's Bluetooth travel time results corroborate the use of Google Maps API for the other corridors and the reliability of the City's program. The City summarized one-year's worth of travel time data for the following 16 corridors within the Guildford study area:

- 108 Avenue: 132 Street to 150 Street
- 104 Avenue: 120 Street to 154 Street
- 96 Avenue: 120 Street to 152 Street
- 88 Avenue: 120 Street to 140 Street
- 72 Avenue: 120 Street to 140 Street
- 64 Avenue: 120 Street to 152 Street
- Scott Road: 64 Avenue to 104 Avenue
- King George Boulevard: 64 Avenue to 120 Street Offramp
- 140 Street: 72 Avenue to 108 Avenue
- 152 Street: 64 Avenue to 108 Avenue
- Fraser Highway: 140 Street to 184 Street
- 100 Avenue: 140 Street to 154 Street
- 144 Street: 100 Avenue to 108 Avenue
- 148 Street: 100 Avenue to 108 Avenue
- 150 Street: 100 Avenue to 108 Avenue
- 154 Street: 100 Avenue to 104 Avenue

3. TRANSPORTATION DEMAND MODELLING (SSAM)

A regional Transportation Demand Model (TDM) is a tool consisting of several interlinked components. It is used by transportation professionals, such as planners and engineers, to estimate the number of vehicles or people on a transportation network for a given set of assumptions. The TDM can be used to assess the regional and local impacts of proposed transportation projects, land use development, and policy initiatives, including rapid transit projects, urban densification, and the tolling of a road facility. Some of these impacts include changes in commuting patterns, travel times savings, shifts in travel mode, and changes in green-house gas emissions.

The Metro Vancouver region has relied on TDM for over 35 years to evaluate everything from multi billion-dollar transportation projects to transit routes and support its sustainable and economic vision for the future. Many of the region's signature rapid transit facilities and major river crossings have been and continue to be evaluated using its TDM. The region's first TDM was developed in the mid-80s and was used to forecast ridership on the Expo Line which became operational in 1986. Since then, the TDM has undergone updates to reflect shifts in the region's socio-economic attributes, transportation networks, and travel behaviour. In addition, ongoing advancements in computing power and data collection efforts have allowed for more sophisticated modelling processes to become standard practice within the TDM framework.

There are a few specialized software platforms available for regional transportation demand modelling. The software used for the RTM 3.4 is Emme by INRO, a company based in Montreal, Canada that specializes in travel demand and simulation modelling software development.

TDMs are developed, calibrated, and validated to reflect current travel patterns and network conditions. Afterwards, they may be used to produce forecasts under other travel conditions, including future horizons. Future horizons for these forecasts can typically range from 20 to 30 years and sometimes beyond. Several inputs are required before a transportation professional can begin to develop the TDM's components. These include a representation of the transportation network, demographic inputs (e.g., population, employment, households, and school enrollment), and a travel survey or diary which provides information on current travel behaviour and patterns.

The RTM 3.4 generally follows the industry standard four-step demand modelling approach. The four-step model is a sequential framework that was first developed and implemented in the 1950s for the Detroit and Chicago Metropolitan Areas. In this approach, a metropolitan region is split into smaller geographical components, referred to as traffic analysis zones (TAZs). The four model steps are trip generation, trip distribution, mode choice, and trip assignment.

3.1. Regional Transportation Model Phase 3.4 (RTM 3.4)

The RTM 3.4 provides a significant update to the Regional Model revised in 2008 (RM-08) that provided the basis for the previous Surrey sub-area model. The RM-08 and RTM 3.4 are enhancements of the earlier 641 TAZ regional model. The RM-08 had 965 zones, with the additional zones concentrated along MoTI's Gateway Program corridors which included Highway 1, South Fraser Perimeter Road, Golden Ears Bridge, Pitt River Bridge, and Port Mann Bridge. The RTM 3.4 has 1,741 zones, with the additional zones distributed across the entire region, roughly proportional to where existing regional zones were located and generally proportional to population and employment densities. This configuration allows the model to evenly assign trips to and from the road and transit networks.

The RTM 3.4 provides better zonal resolution along rapid transit corridors over the primarily auto-oriented detailing found in the RM-08. Updated demographic from the 2016 Census, travel behaviour from the 2011 Trip Diary and updated truck demand information from 2014 to represent the four primary freight market sectors were included in the RTM 3.4 update providing insight into present travel conditions in the region.

The RM-08 only represented the AM peak hour and all travel parameters, trip purposes and demand profiles were specific to that single time period. The RTM 3.4 models 24-hour regional travel demand and provides time slices for analysis of the AM, midday, and PM peak hours at the network level. This provides better ability to evaluate projects during the entire travel day rather than expanding a single peak hour to the entire day. It also provides insight into the midday off-peak period which is growing quicker than the peak periods.

Five additional travel purposes have been added to the RTM 3.4 over those found in the RM-08 to represent trips that predominantly occur outside of the AM peak. The key explanatory variables in the RTM 3.4 have been updated to be household and employment based instead of population and employment based which is a departure from the previous regional model formulations.

Significant enhancements to the representation of auto and transit travel have been made in the RTM 3.4. Value of time has been added based on income segmentation and analysis of the 2011 Trip Diary so that different purposes respond to costs on the roadways differently. The RM-08 included some segmentation, but the values were asserted based on the initial value of time parameters and a sensitivity range.

Travel time validation of the RTM 3.4 found that the representation of auto delay was largely faster than observed when using the volume-delay formulation found in RM-08. These volume delay curves were based on highway travel time validation and tended to underestimate the delays found in the urban context with closely spaced signalized intersections and multiple property accesses. An updated set of assumptions are used in the RTM 3.4 to correct for this. The under-representation of auto travel time provided an implicit bias against transit services as they were competing with the auto mode running faster than observed, even when significant enhancements to transit travel time were assumed in future rapid transit projects. This tended to under-represent the responsiveness of the travel market to transit investment.

Transit services in the RTM 3.4 have been updated to explicitly represent capacity and stopping procedures which allows evaluation of service performance as demand exceeds capacity. Transit users were also segmented into bus and rail users and assigned separately as a distinct difference in travel behaviour for these users as was seen in the Trip Diary. The inability of previous modelling to represent transit capacity

constraints also underestimated the benefits of providing transit services with sufficient capacity to serve transit demand. The RTM 3.4 includes both a congested and capacity constrained transit assignment which provides a more realistic representation of the transit network and transit demand. A comparison of key model differences between the RTM3.4 and previous versions of the Surrey sub-area model is provided in **Table 4**.

Table 6: Key Model Differences

Regional Network Traffic Modelling		
	Previous Surrey Sub-Area Model	**RTM 3.4**
1. Model Version	• Regional Model 2008 (RM-08) (based on Gateway Sub-area Model)	• Regional Transportation Model Phase 3.4 (RTM 3.4)
2. Road Networks	• 2011, 2021, 2031 • Gateway Program Projects • Bridge tolls on Port Mann and Golden Ears	• 2011: Base calibration • 2017: Port Mann/Golden Ears Bridge (No Toll) • 2035 and 2050 Future Networks • Mayor's Vision Projects
3. Transit Networks	• Evergreen Line • Surrey Langley Extension • 104 Ave / KGB Rapid Transit / LRT Options	• Evergreen Line • Assume Broadway SkyTrain to Arbutus • Surrey Langley SkyTrain • B-Line Routes (Mayor's Vision 10-Year Plan: Phase 1)
4. Major Projects	• Gateway Program • 16 Ave Widening & Extension • South Surrey Hwy 99 Interchanges	• 216th Street Interchange • 72nd Street Interchange • Alex Fraser Counter Flow • Hwy 91 / Hwy 17 Improvement Project • Pattullo Bridge Replacement (4 lane; No toll) • Hwy 1 Lower Lynn Interchanges Phase 1,2,3,4
5. TAZ, population, employment	• 1,048 Zones (1,007 Internal Zones) • Growth Management Strategy land use, population, and employment • Future Growth: Growth Management Scenarios	• 1,741 Zones (1,700 Internal Zone) • 2017 Demographics (pop / emp / household) based on Census 2016 and BC stats employment forecasts • Future Growth: Regional Growth Strategy (RGS)
6. Time slices	• AM 07:30 - 08:30	• AM 07:30 - 08:30 • MD 12:00 - 13:00 • PM 16:30 - 17:30
7. Base traffic volumes	• 2011	• 2017 TransLink Screenline Survey
8. Origin-destination patterns	• OD from GSAM Model • Adjustments for 2011 Trip Diary	• Calibrated to 2011 Trip Diary • Highway 1 travel time validation
9. Value of time per hour	• SOV: $10.45 • HOV: $10.45 • LGV: $29.55 • HGV: $41.90 • Transit: $9.96	• SOV1: $6.32; SOV2: $10.34; SOV3: $15.38; SOV4: $18.18 • HOV1: $6.32; HOV2: $10.34; HOV3: $16.67 • LGV: $29.56 • HGV: $41.96 • Transit: $12.24

3.2. SURREY SUB-AREA MODEL DEVELOPMENT

The RTM 3.4 is as an effective tool for understanding how land use growth, transportation investments, and policies will affect the regional transportation network. However, to understand the impact at a subregional or municipal level and to evaluate municipal projects, the City of Surrey required a refined municipal level model built on top of TransLink's RTM 3.4. The key considerations for the development of the Surrey Sub-Area Model (SSAM) included:

- Refined TAZ system
- Review and update of the transportation network, including centroid connectors within Surrey
- Model calibration and validation to the 2017 TransLink Trip Diary
- Compatibility with future RTM versions
- Ability for further refinements for neighbourhood and corridor level studies

3.2.1. Traffic Zones and Demographics

The RTM 3.4 has 374 TAZs within Surrey and 1,700 TAZs across the region. To represent the loading and unloading of trips more accurately onto the transportation network, the number within Surrey was increased to 487. Seven additional TAZs were included along Surrey's boundary for a total of 1,820 TAZs in the region. The final TAZ system was developed in collaboration with City of Surrey Staff who are more familiar with local development and planning areas. McElhanney provided the initial set of recommendations, which the City used to develop a draft. The draft was reviewed by McElhanney to develop the final TAZ system. The recommendations took into consideration the following factors:

- Existing RTM 3.4 TAZ system
- City of Surrey town centres
- Existing and planned rapid transit corridors
- Anticipated high population growth centres
- Anticipated high employment growth centres

Figure 15 shows the final SSAM TAZ system for the City of Surrey overlapped on the RTM 3.4 TAZ System. The detailed SSAM TAZ map for Guildford is shown in **Figure 16**.

As discussed in **Section 2.1**, demographic inputs were provided by the City at the RTM 3.4 TAZ level. Therefore, corresponding demographic at the SSAM TAZ would have to be calculated using TAZ split factors that allocate inputs from the RTM 3.4 parent TAZ to the more detailed SSAM TAZs. These factors were developed for the following categories: population, employment, households, and school enrollment. The school enrollment factors were developed based on existing or anticipated location of school(s). The other split factors were developed using the City's land parcel data for existing and future horizon years.

Figure 15: SSAM vs RTM 3.4 Traffic Analysis Zones

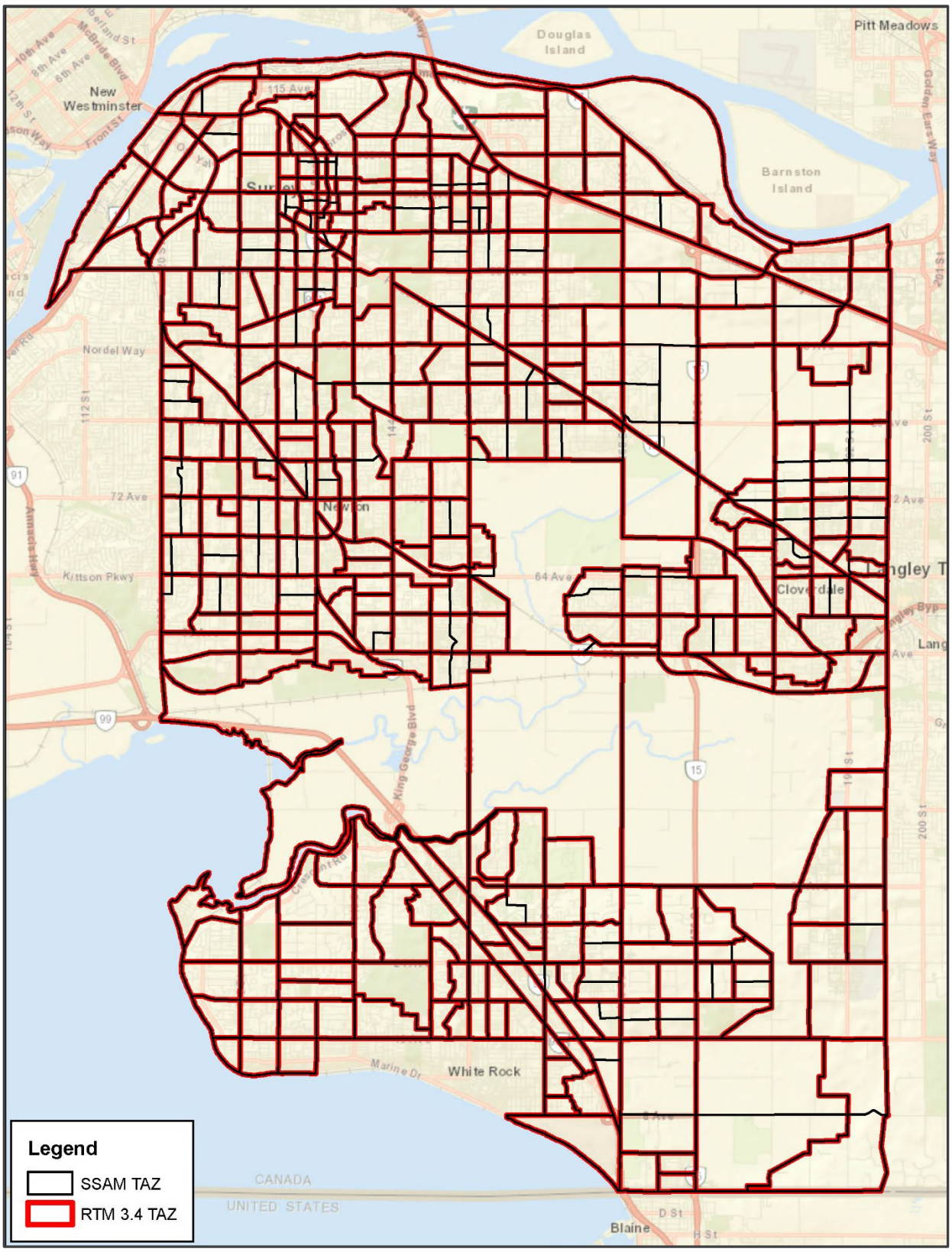


Figure 16: SSAM vs RTM 3.4 Traffic Analysis Zones (Guildford)

3.2.2. Model Scripts and Inputs

As part of the SSAM development, the RTM 3.4 scripts and input files were updated to reflect the increase in the number of TAZs in the network. The demographic files were updated using the split factors for each horizon year. Other input files such as the geographics, ensembles, dummy variables, park and ride, various trucking sectors, and seed demands were also updated as required. Finally, model scripts such as the model initiation and data import were also updated to reflect the increase in TAZs and changes to the input files.

3.2.3. Road and Transit Networks

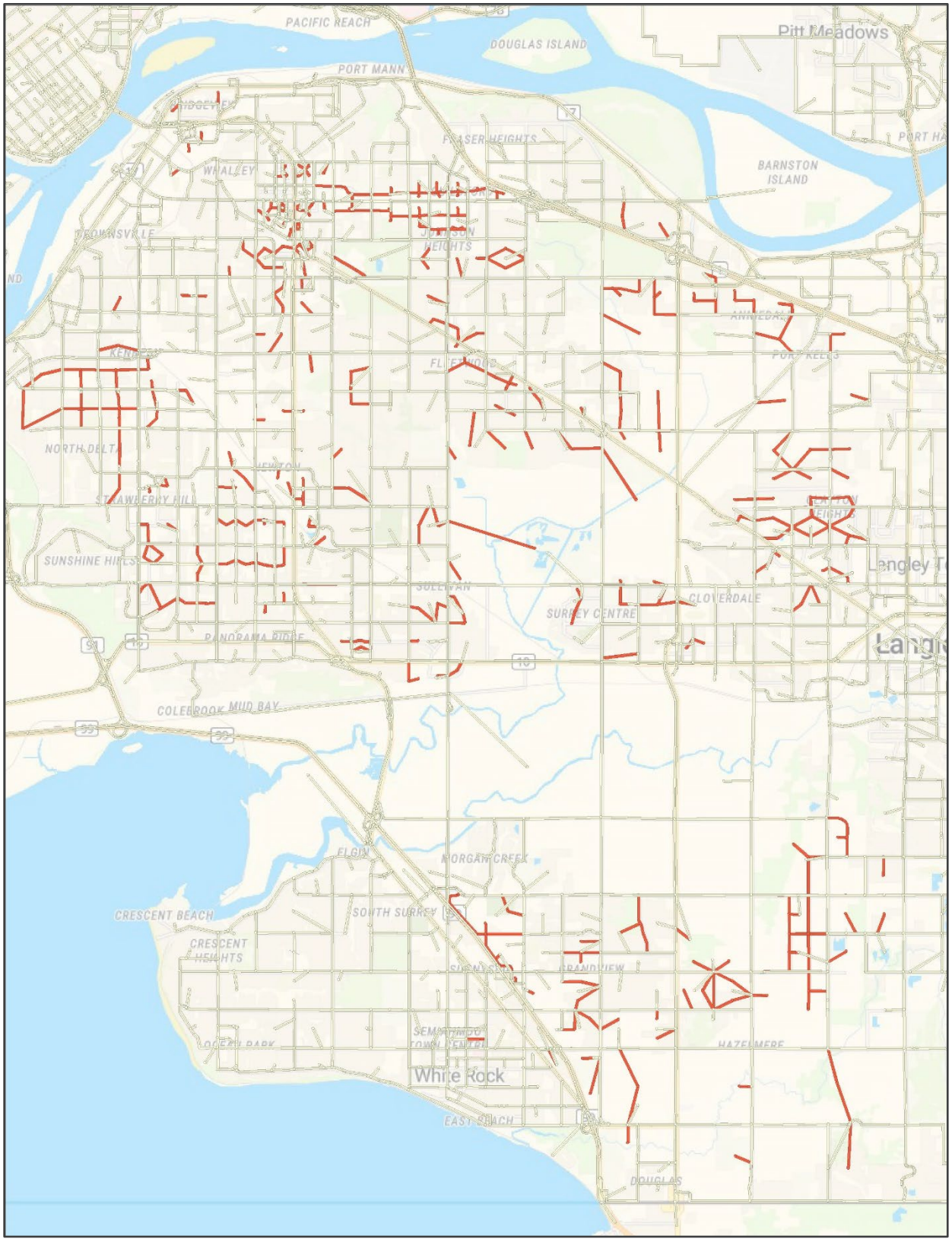
As part of model development, the road and transit networks were reviewed and updated as required. The initial scenario was taken from the Surrey Langley SkyTrain project. The network had already undergone a network review and model validation along the project corridor. This provided a solid base for further review and refinement. This scenario is defined as Scenario 1600 in the SSAM.

The SSAM network development started with the addition of the new TAZs and removal of corresponding parent TAZs. Next, new centroid connectors were coded, and existing centroid connectors were reviewed. Additional centroid connectors and roadways were coded to the network to improve loading and unloading of trips and to allow better traffic access including walk access to transit services. The additional roadways and centroid connectors that were added to the network are highlighted (in red) in **Figure 17**.

Due to the regional nature of the RTM 3.4, several signalized intersections in Surrey, specifically those that had recently been installed, were not captured in the network. Therefore, a review of all existing signal-controlled intersections was completed based on the latest database from the City. This complemented the overall review of the Surrey road network to ensure model attributes such as number of lanes, speed limits, intersection configurations, and lane capacities were accurately coded in the model. This network review was also assisted by the travel time validation data.

A review of the transit itineraries was also completed with a focus on key routes operating within Surrey. This included a review of the transit route alignment, time of day headways, and transit vehicle assumptions. The transit services in Central Fraser Valley and Chilliwack were also updated based on the GTFS (General Transit Feed Specification) 2017 Fall release.

Figure 17: New SSAM Links (including Centroid Connectors)



3.3. SCENARIO 1701: 2017 BASE SCENARIO

As mentioned earlier, Scenario 1600, which was taken from the Surrey Langley SkyTrain Project, provided a good starting point for the development of the 2017 Base Scenario. Once adjustments were made to reflect the new traffic analysis zones and accurately represent Surrey's road and transit networks, the SSAM underwent several iterations of model validation and calibration which eventually led to the development of the final SSAM scenario. Based on the validation metrics, this scenario, referred to as Scenario 1700, was considered fit for simulating existing traffic patterns in Surrey and was therefore used as the 2017 baseline scenario in the SSAM.

As part of the Guildford Town Centre Modelling assignment, further review of Scenario 1700 revealed minor coding errors. A through movement along one of the segments at the Highway 1 / 160 Street interchange was incorrectly banned. This movement was fixed to allow motorists to cross over the interchange along 160 Street. Additionally, there were a few links outside the Guildford study area that were coded with different capacities for the three time periods (AM peak period, Midday period, PM peak period) included in the SSAM. These were also corrected to ensure that the road capacities on these links are consistent for all time periods. All of these adjustments were incorporated into the latest version of the 2017 Base Year Scenario, referred to as Scenario 1701, which was used for modelling the 2017 base conditions for the Guildford Town Centre study area.

3.4. MODEL CALIBRATION AND VALIDATION

Model calibration is an iterative process that requires a thorough review of the model inputs and coefficients and their impact within the study area. Model inputs that are reviewed and updated as part of the model calibration include network attributes, model assumptions, and trip rates. The review and validation of network attributes is the first step as it ensures network costs are calculated correctly and the model trips are assigned to the network based on the latest and most accurate information.

The RTM 3.4 trip rates were calibrated to the 2011 TransLink Trip Diary. At the time of development that was the latest information available. Since then, TransLink has conducted and released the results of the 2017 Trip Diary. A complete recalibration of the model against the latest survey has not been undertaken by TransLink yet and was not within the scope of work for this assignment given the objectives, budget, and timeline. However, with the release of the 2017 Trip Diary, adjustments could be included in the SSAM to ensure better validation within the study area.

As part of the calibration process, the following outputs were validated against the latest available data:

- Daily trips by mode and mode share for trips to/from Surrey and Guildford
- AM and PM peak hour trips by mode and mode share for trips to/from Surrey and Guildford
- Auto traffic volumes at key regional locations and within Guildford
- Auto travel times along key corridors in Guildford and Surrey

Due to several reasons (data accuracy, variation in travel, timing of data collection, etc.) the individual data sets may not always align with each other. For example, an adjustment may improve the validation of auto trips in comparison to the Trip Diary but worsen the validation against the auto traffic counts. Therefore, all

validation metrics must be considered collectively when calibrating the model. While the goal is to achieve the highest level of validation across all metrics, it is important to understand the model is not expected nor capable to replicate all observed travel patterns and behaviour with absolute precision. Therefore, it is important to determine the level of model validation that the SSAM has achieved before any macroscopic modelling outputs can be relied upon. The level of model validation also identifies the limitations of the SSAM and potential opportunities for improvement in subsequent neighbourhood and corridor level projects.

As mentioned earlier, Scenario 1600 refers to the initial model scenario that was taken as a starting point for developing the 2017 Base Year Scenario in the SSAM while Scenario 1701 refers to the final scenario. In the following subsections, each validation chart shows a comparison between Scenario 1600 and Scenario 1701 to highlight the level of improvement achieved after applying adjustments.

3.4.1. Daily Trips & Mode Share

The daily total number of trips to and from Guildford in Scenario 1600 was found to be about 17% lower than the outputs from the 2017 TransLink Trip Diary. A review of the trips by trip purpose was undertaken and trip adjustment factors were developed to improve the validation of the daily total trips for Surrey overall and for Guildford, while considering the other validation metrics. The final adjustments included in Scenario 1701 increased the number of daily trips to and from Guildford by about 5% to fall within 12% of the outputs from the 2017 Trip Diary. The distribution of daily trips by mode was also calculated to ensure the model was replicating observed mode share patterns in Guildford. As shown in **Figure 18** and **Figure 19**, the trip adjustments improved the overall validation of daily trips by mode and daily mode share for trips from Guildford. Similarly, **Figure 20** and **Figure 21** illustrate similar observations for trips to Guildford. Overall, Scenario 1701 replicates observed mode share patterns reasonably well. As noted previously, Guildford refers to the TransLink Trip Diary sub-regions. This ensures consistency between model outputs and the validation dataset. Similar plots for the AM and PM peak hours are provided in **Appendix D**.

Figure 18: Daily Trips by Mode: Trips from Guildford

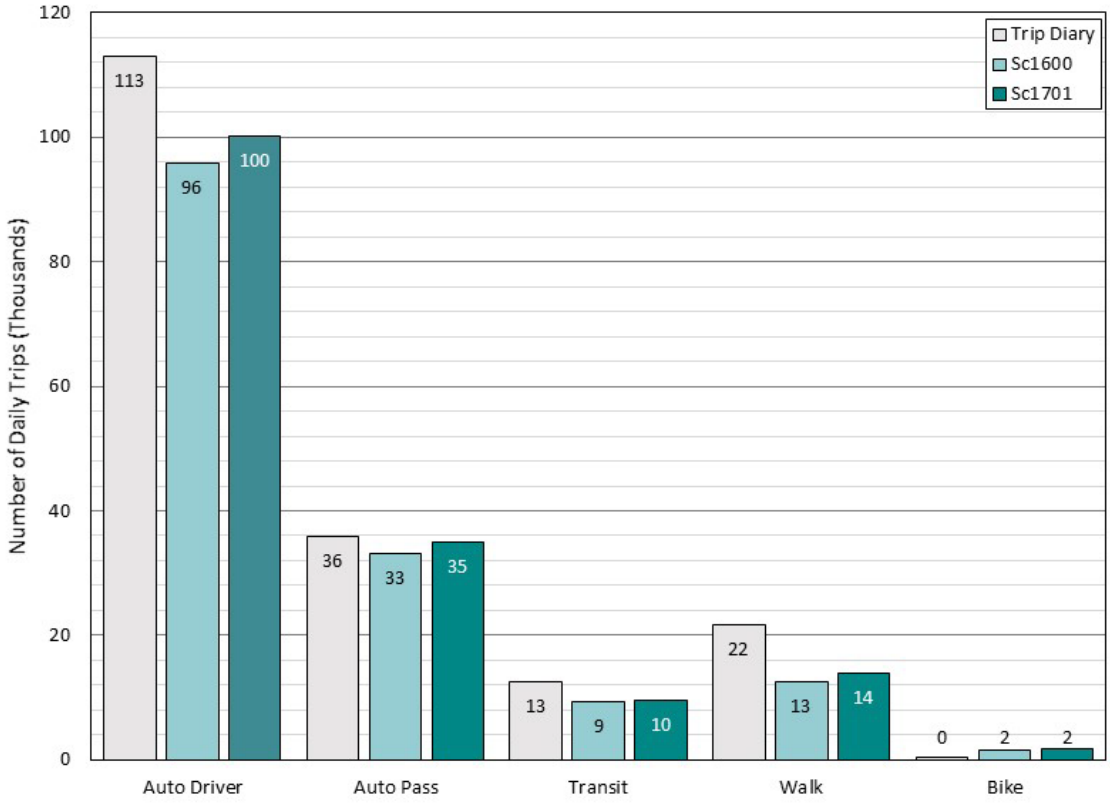


Figure 19: Daily Mode Share: Trips from Guildford

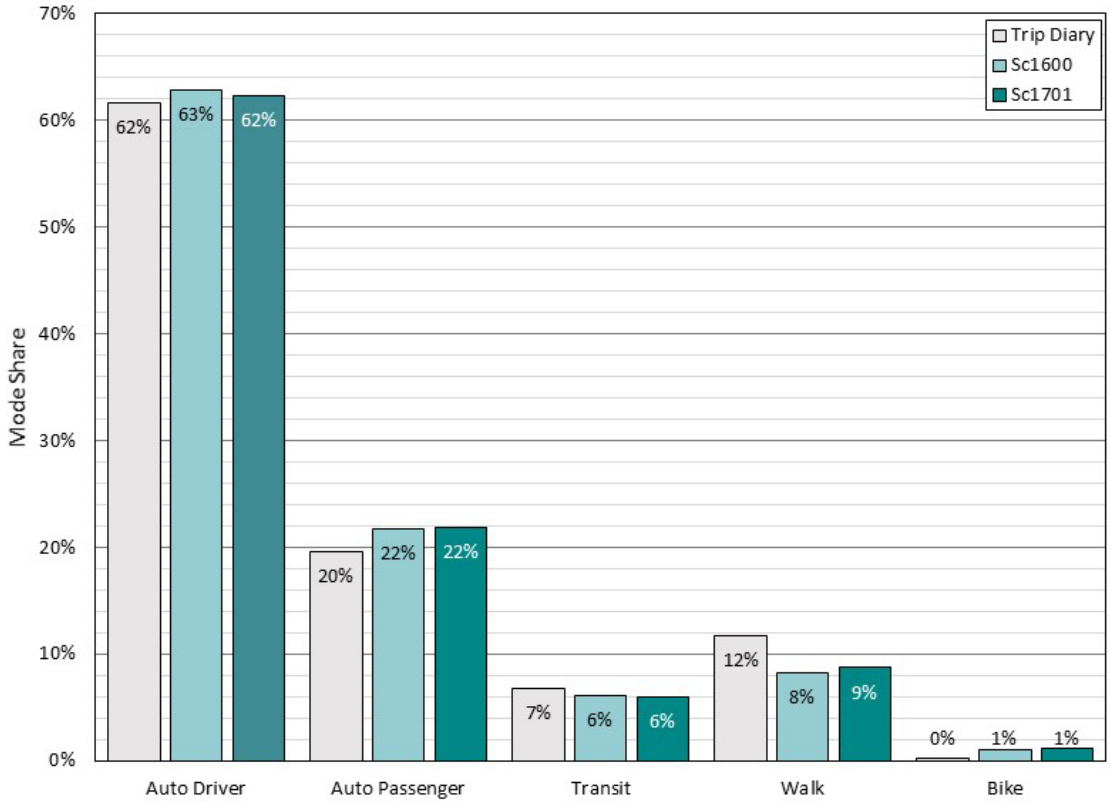


Figure 20: Daily Trips by Mode: Trips to Guildford

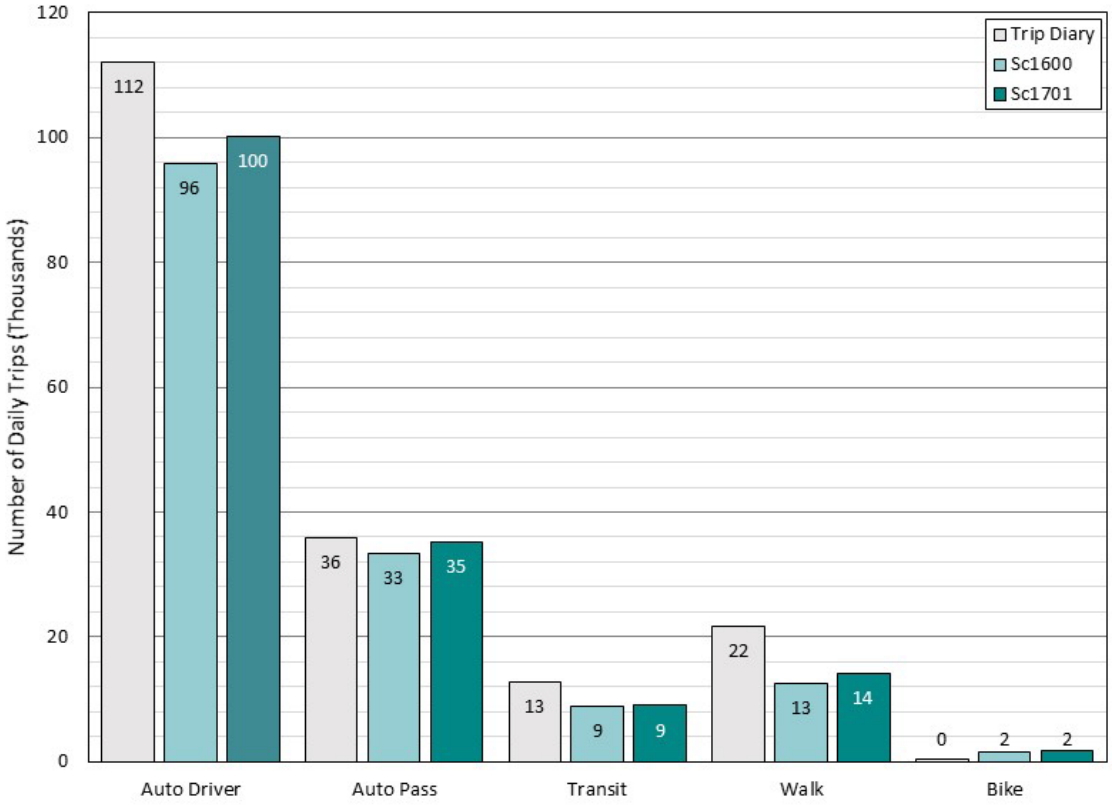
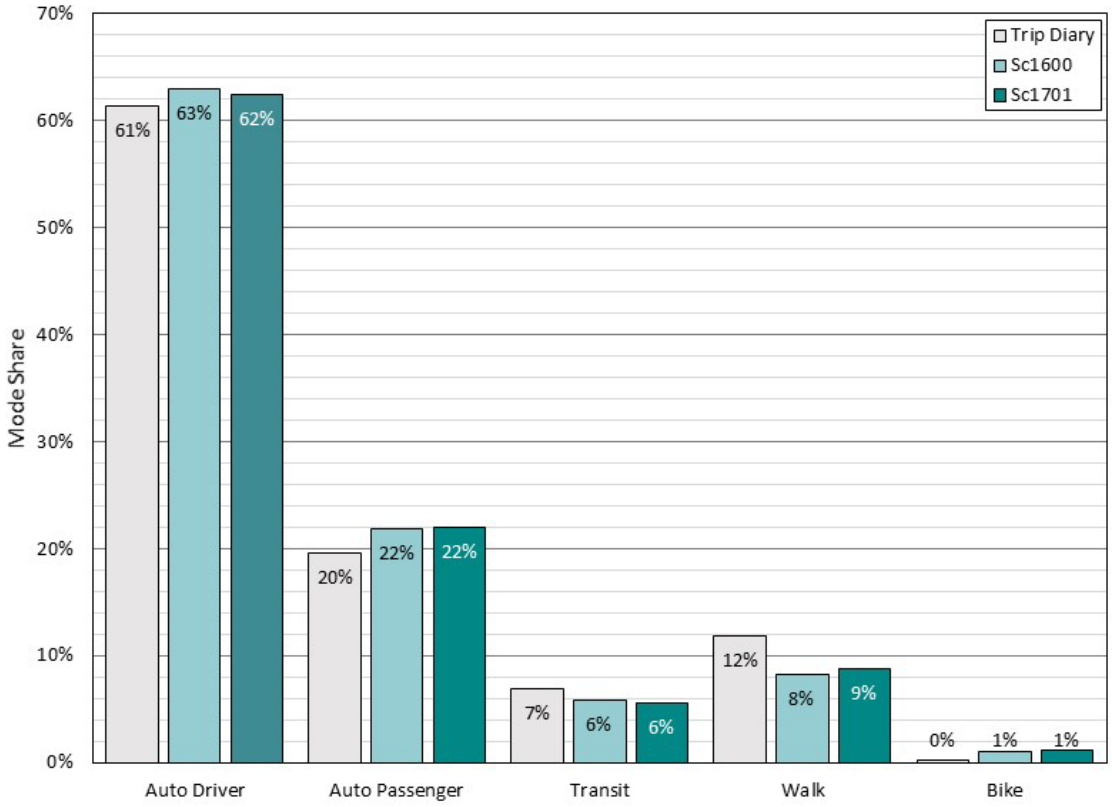


Figure 21: Daily Mode Share: Trips to Guildford



3.4.2. Auto Volume

The model's auto traffic volumes were compared to traffic counts for the AM and PM peak hours. As outlined in **Section 2.3**, the target is for 85% of all locations in each modelled period to have a GEH statistic less than 15 and for R^2 of the best fit lines to be greater than 0.90. Validation targets were met for both the AM and PM peak hours. For the AM peak hour, 94% of the data points had a GEH statistic less than 15, while for the PM peak hour, 87% of the data points were less than 15. The R^2 of the best fit line for the AM was 0.96, while the R^2 for the PM peak hour was 0.91. As illustrated further in the scatter plots (**Figure 22** and **Figure 23**), the model generally validated well for auto volumes. However, specific locations may not validate well, therefore additional localized review, calibration, and/or post model processing may be required depending on the location(s) of interest, required model output(s), and stage of engineering or planning. Network volume validation plots were also produced for the AM and PM peak hours and are included in **Appendix E**.

Figure 22: Volume Validation Scatter Plot (AM)

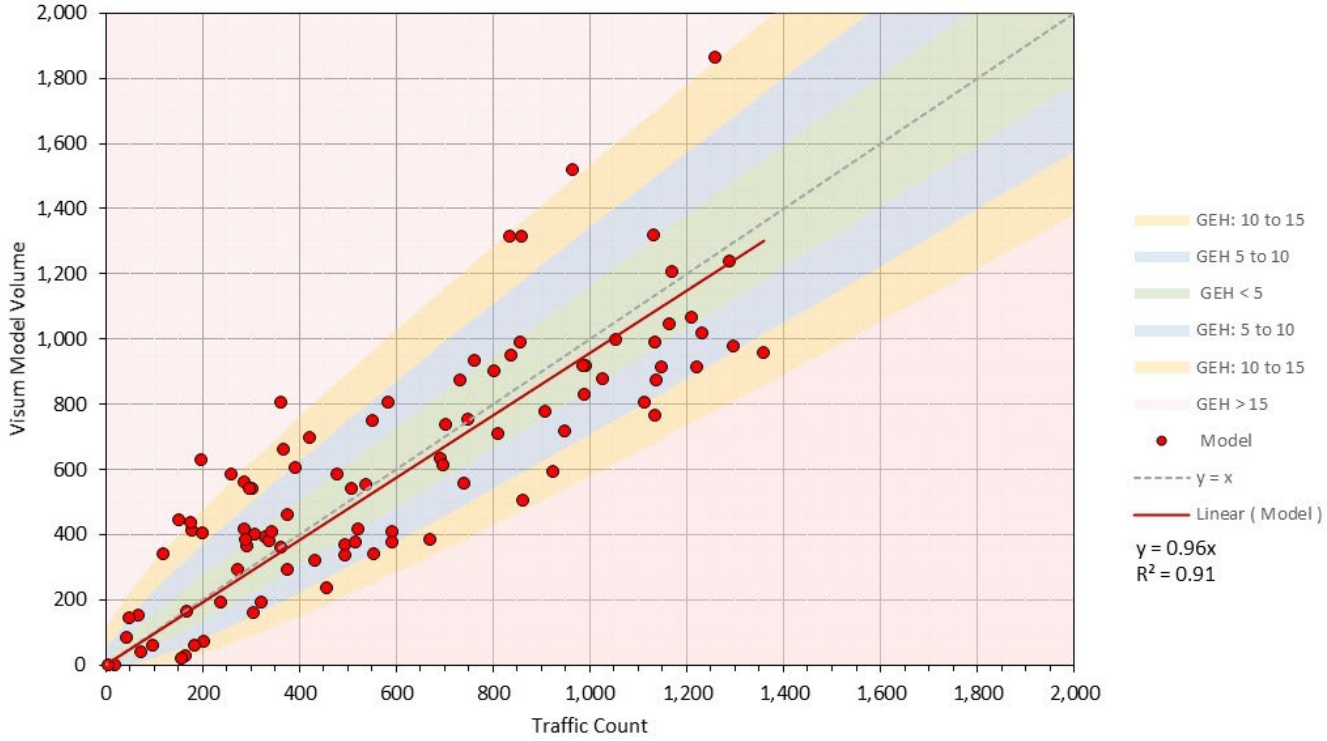
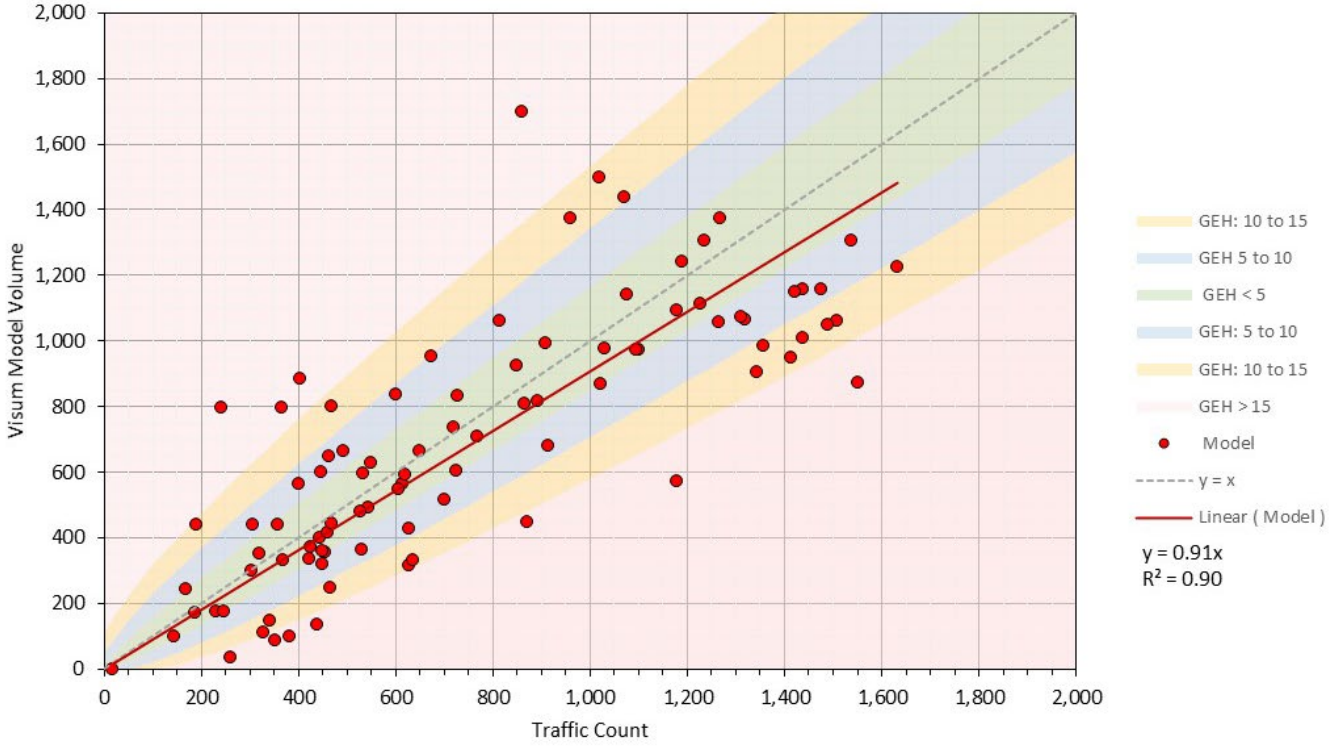


Figure 23: Volume Validation Scatter Plot (PM)



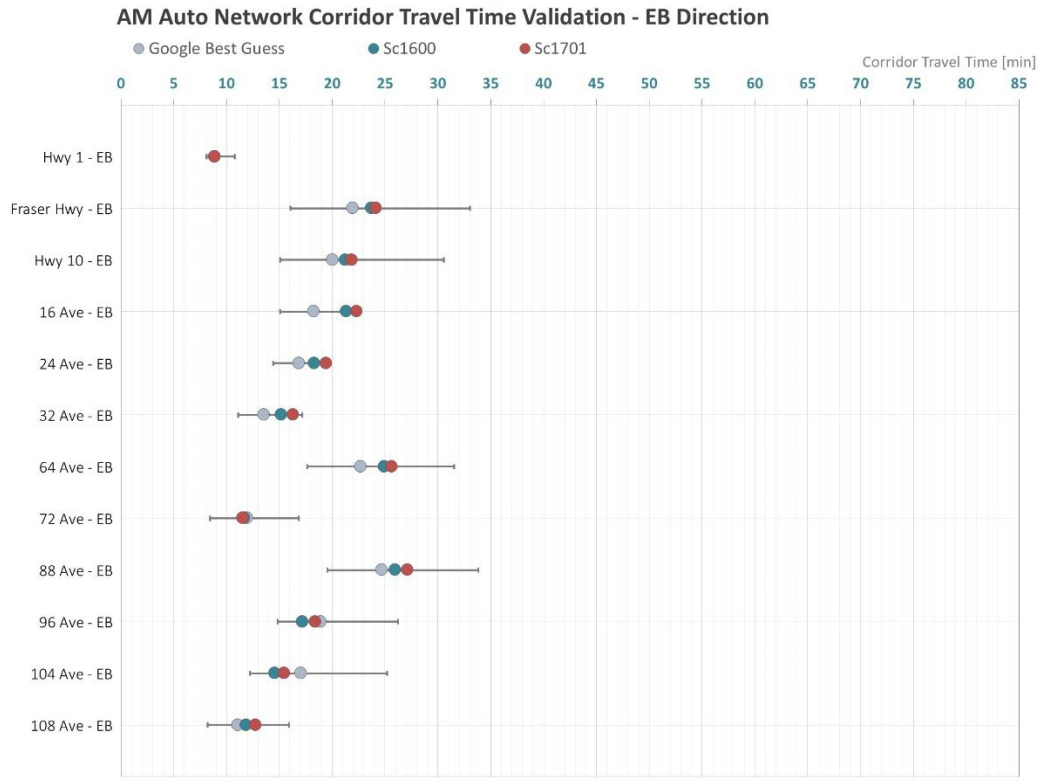
3.4.3. Auto Travel Time

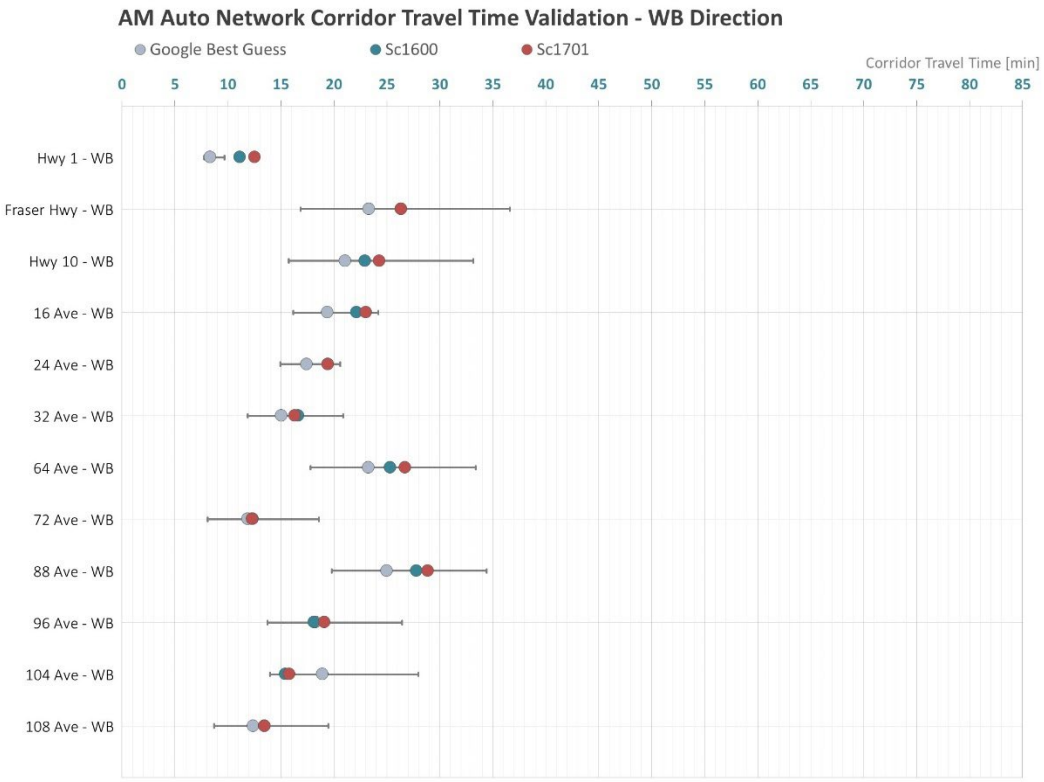
The model's auto travel times were compared to the Google Maps' travel time estimates for all the corridors previously shown in **Figure 14.** Each corridor was broken into several segments. For each segment, Google Maps provided the best guess, pessimistic, and optimistic travel time estimates for the AM and PM peak hours.

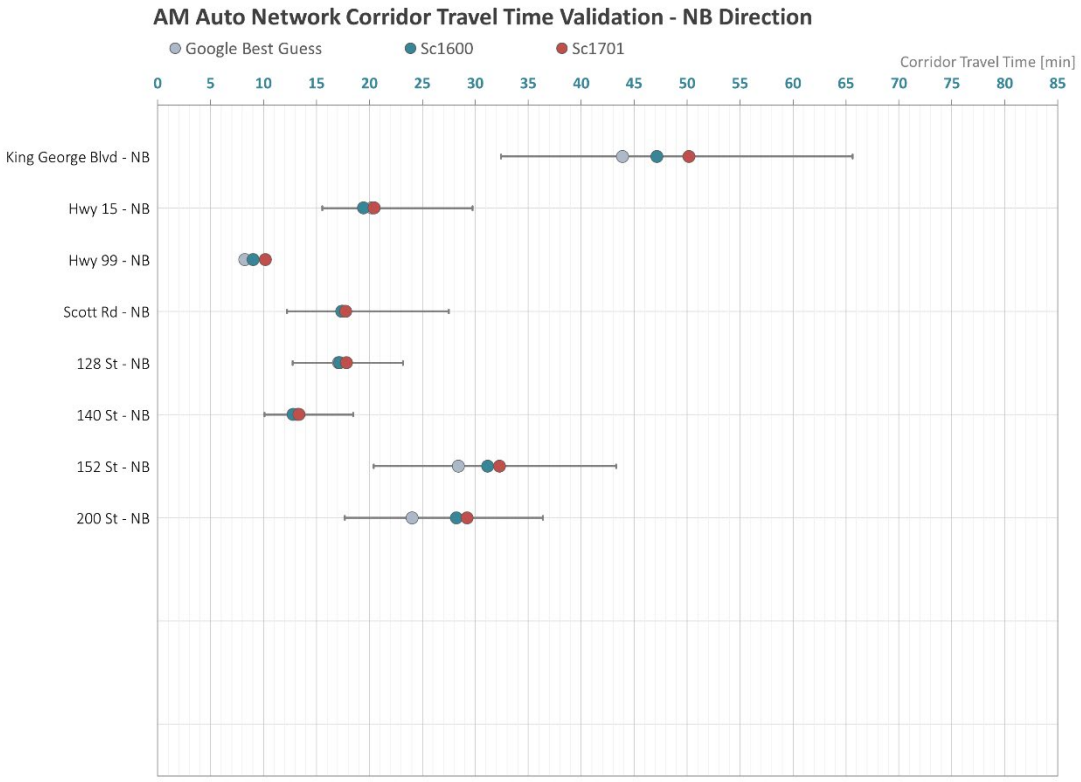
Due to the validation efforts for the Surrey Langley SkyTrain project, the travel times in Scenario 1600 are already within the Google Maps travel time range. However, it is critical to ensure that the travel times remain in the acceptable range after applying the calibration adjustments to increase trip rates and improve the mode share validation. As trip rates increase so does the demand on the network, which subsequently results in an increase in the model travel time. Therefore, the travel time validation for Sc. 1701 ensures that the increases in trip rates are within an acceptable range.

The end-to-end corridor validation for the two peak hours are presented in **Figure 24** and **Figure 25**. The travel time validation for each corridor at the segment level is presented in **Appendix F.** This level of detail assists with the network review process. Segments with significant variances between model and observed travel times are typically an indication of locations with either network coding errors or requiring network calibration or adjustments. Additionally, the City's Bluetooth travel time comparison, both at the corridor and segment level are presented in **Appendix G** as well.

Figure 24: AM Travel Time Validation






AM Auto Network Corridor Travel Time Validation - NB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
King George Blvd - NB
Hwy 15 - NB
Hwy 99 - NB
Scott Rd - NB
128 St - NB
140 St - NB
152 St - NB
200 St - NB

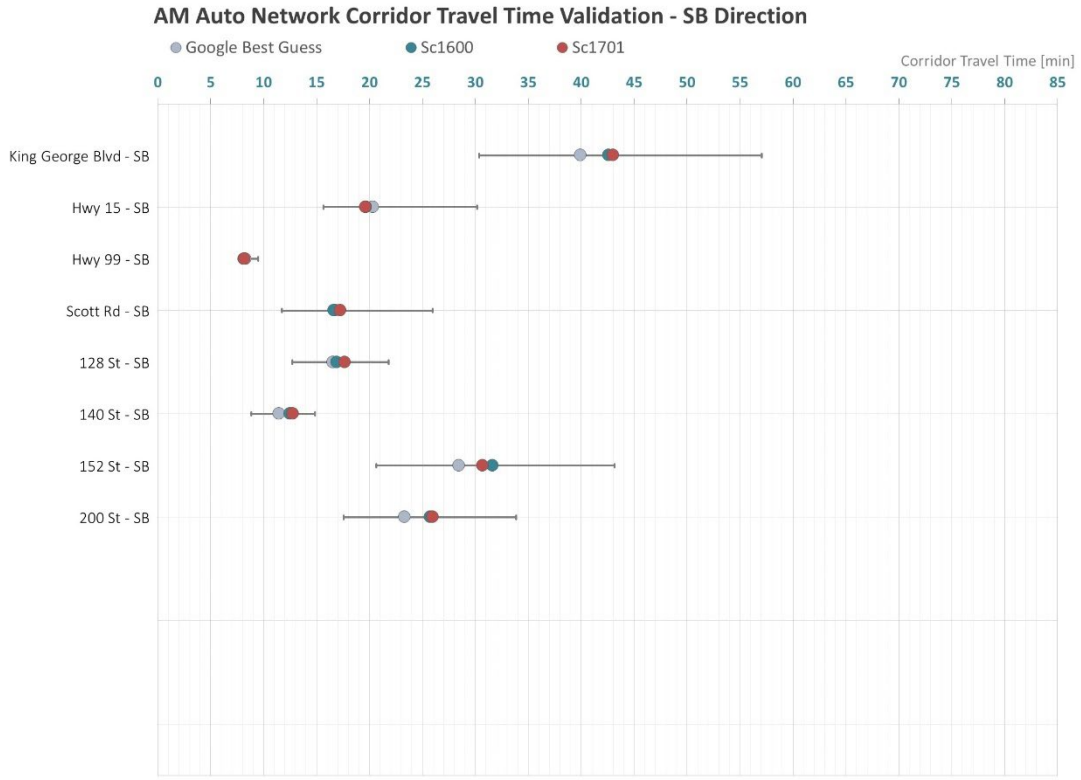
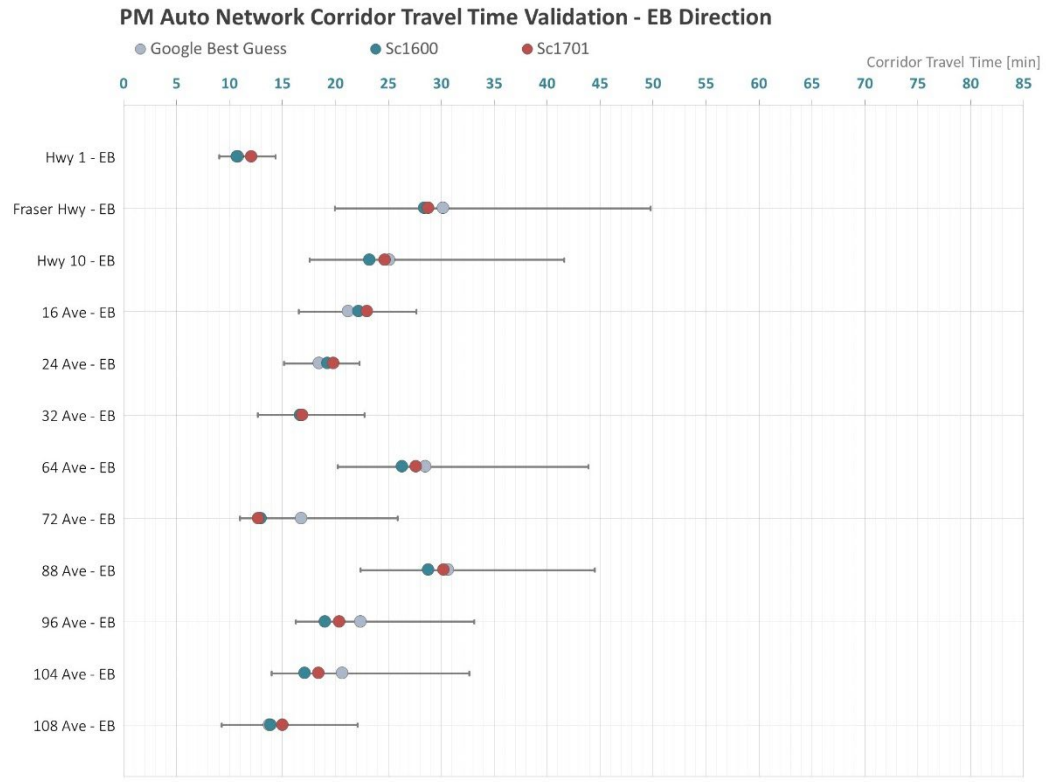
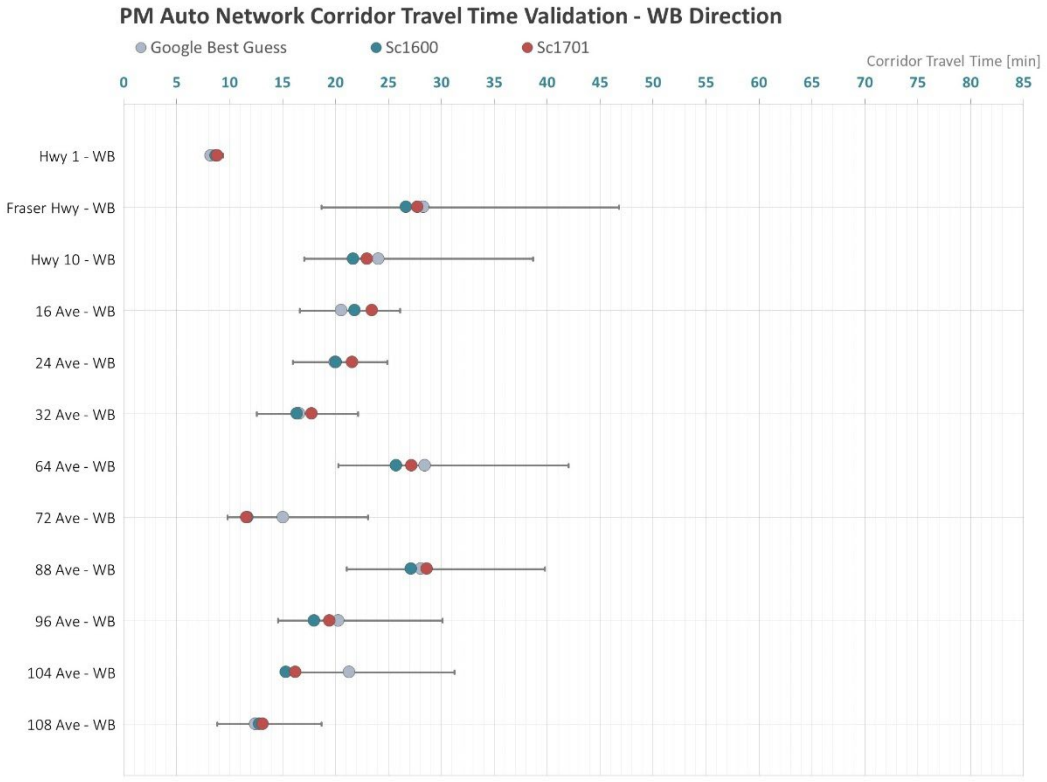
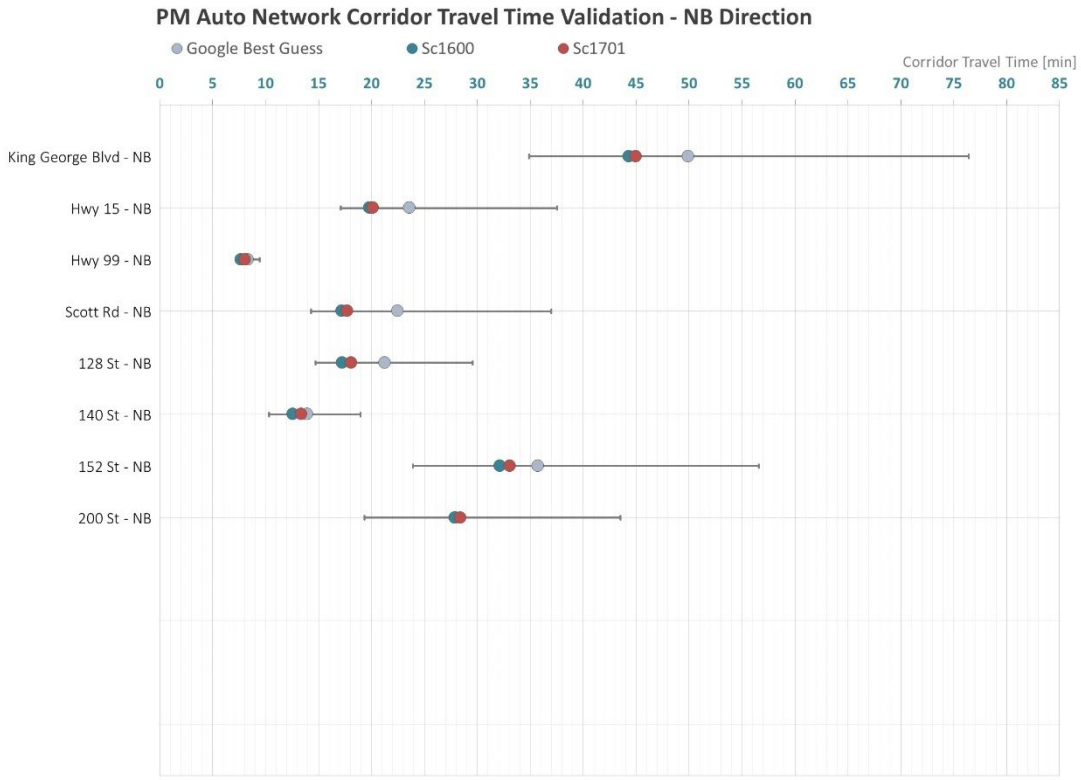
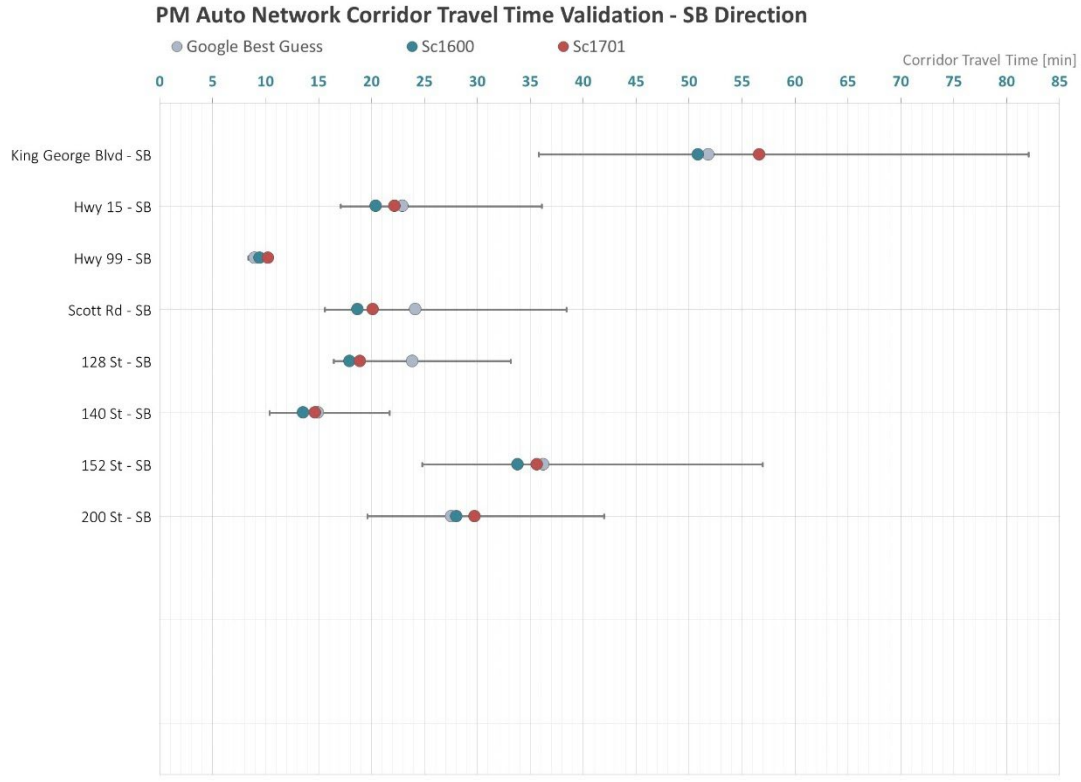

AM Auto Network Corridor Travel Time Validation - SB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
King George Blvd - SB
Hwy 15 - SB
Hwy 99 - SB
Scott Rd - SB
128 St - SB
140 St - SB
152 St - SB
200 St - SB

Figure 25: PM Travel Time Validation






PM Auto Network Corridor Travel Time Validation - NB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
King George Blvd - NB
Hwy 15 - NB
Hwy 99 - NB
Scott Rd - NB
128 St - NB
140 St - NB
152 St - NB
200 St - NB


PM Auto Network Corridor Travel Time Validation - SB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
King George Blvd - SB
Hwy 15 - SB
Hwy 99 - SB
Scott Rd - SB
128 St - SB
140 St - SB
152 St - SB
200 St - SB

3.5. Future Scenario Development

Future scenarios were developed for the 2050 and full buildout horizon years. The demographics for these scenarios were provided by the City, as discussed in **Section 2.1.2** and presented in in **Appendix A**. The road and transit networks for the future scenario were developed based on the RTM 3.4 and SSAM future network assumptions as discussed in the following sections.

3.5.1. RTM 3.4 Future Network

The RTM 3.4 future network includes regional road and transit network improvements that are committed and likely to be implemented by the 2035 and 2050 planning horizon years. Aside from transit frequencies, the 2035 and 2050 networks are the same. These are based on the Mayors' Council Vision Plan and the BC MoTI's network plans. The following outlines the refinements included in the RTM 3.4 to reflect the future road and transit infrastructure upgrades:

- **Pattullo Bridge Replacement Project:** four-lane Pattullo Bridge with a direct southbound ramp to westbound Highway 17 and improved connections on the New Westminster side. The lanes are built to current road standards to provide safety and capacity improvements.
- **72nd Avenue Interchange:** Reflects the recently opened half diamond interchange at 72nd Avenue and Highway 91. The interchange provides free-flow conditions for both directions of Highway 91 and an elevated traffic signal in the southbound direction, providing access to and from 72nd Avenue.
- **Alex Fraser Bridge Counterflow:** Reflects the recently opened counterflow design with four travel lanes in the northbound direction and three southbound travel lanes during the morning peak period. For the rest of the day, including the afternoon peak period, there are four travel lanes in the southbound direction and three travel lanes in the northbound direction. The speed limit has also been updated from 90 km/h to 70 km/h.
- **Highway 91/17 Upgrade Project:** Coded based on publicly available information at the time. This project includes improvements to the Highway 91 & Nordel interchanges, intersection upgrades along Highway 91 Connector and Nordel Way, and the new Sunbury interchange at Highway 17 and Highway 91 Connector.
- **Highway 1 & 216th Street Interchange:** Includes widening of Highway 1 to six lanes between 202nd and 216th streets and extension of the HOV ramps to and from 202nd Street.
- **Highway 1 Lower Lynn Improvements Project:** Includes improvements proposed as part of the four phases of the project, including the Mountain Highway interchange, Keith Road and Mount Seymour Parkway Interchange, Lynn Creek connectivity improvements, and the Main Street / Dollarton Hwy interchange.
- **Vancouver Viaducts Removal:** The replacement of the Georgia and Dunsmuir viaducts with an at-grade complete street network.
- **Existing George Massey Tunnel:** No upgrades, improvements, or changes to the George Massey Tunnel are included and the existing peak period counterflow operation continues. Adjacent interchanges and bus shoulder lanes also remain in their present configuration.

The RTM 3.4 also includes the following transit infrastructure projects and upgrades, fleet expansions, and transit improvements:

- **Surrey-Langley Skytrain Project - Stage 1:** The extension of the Expo Line SkyTrain along Fraser Highway from the King George Station to the Fleetwood community. This stage of the project includes four new stations along Fraser Highway at 140 Street, 152 Street, 160 Street, and 166 Street.
- **Broadway Subway Project:** The extension of the Millennium Line SkyTrain from VCC-Clark Station to Broadway and Arbutus, including six new underground stations. The 99 B-Line bus service will run from Arbutus Street to the University of British Columbia.
- **3rd SeaBus:** Includes increased transit services provided by a third SeaBus vessel.
- **Upgrade to 5-Car Trains:** Reflects the increased capacity associated with the procurement of 5-car trains for the SkyTrain system, as identified in the Mayors' Council Vision Plan.
- **50 Metre Canada Line Trains:** Reflects increased capacity of the Canada Line, as identified in the Mayors' Council Vision Plan.
- **Bus Service Level Increases:** Reflects increased bus route service hours, as identified in the Mayors' Council Vision Plan.
- **TransLink B-Lines (RapidBus):** Addition of future B-Line (RapidBus) routes as envisioned in the Mayors' Council Vision Plan including:
  - Scott Road Station to Newton Exchange via Scott Road and 72 Avenue.
  - Dundarave and Park Royal in West Vancouver to Phibbs Exchange in North Vancouver via Marine Drive and 3rd Street
  - Joyce-Collingwood Station to UBC via 41st Avenue
  - Richmond-Brighouse Station to Metrotown Station via Knight Street, Bridgeport Road and Garden City
  - Coquitlam Centre to Maple Ridge via Lougheed Highway and Dewdney Trunk Road

It is worth noting that the RTM 3.4 does not include the following road and transit policies, infrastructure projects, and smart technologies:

- Distance-Based Transit Fare Structure
- Mobility Pricing (Point Tolls, Distance-Based Pricing, Congestion Pricing)
- Connected Vehicles and Autonomous Vehicles
- Transportation Network Companies (TNC)
- Vehicle Fleet Electrification
- Burnaby Mountain (SFU) Gondola
- Rail to UBC SkyTrain Extension
- Surrey Langley SkyTrain Project Stage 2: Extension to Langley
- South of Fraser Rapid Transit: Rapid Transit along 104 Avenue and King George Boulevard

3.5.2. SSAM Future Network

The SSAM contains future base networks for the 2035 and 2050 horizon years. Both future base networks are built on top of the SSAM existing base network to ensure network fixes, network details such as centroid connector locations, and network calibration adjustments are incorporated into all the future networks. This consistency between the existing and future networks results in fewer network coding errors, more legible and easier to understand network comparisons, and ultimately more accurate and reliable forecasts. Like the RTM 3.4, the networks for the 2035 and 2050 future base are the same, except for the transit headway decreases for 2050.

The SSAM future base networks include the network changes outlined above in **Section 3.5**. The networks also include the following major projects:

- **Highway 1 Widening:** Add a median HOV lane in both directions of travel between the 216th Street and 264th Street interchanges.
- **72 Avenue Roadway Improvements:** Widening of 72 Avenue in Delta from 120 Street (Scott Road) to the BNSF overpass to accommodate two travel lanes per direction and dedicated turning lanes, and intersection improvements and new signals along the corridor.
- **Highway 99 & 32 Avenue Diversion Improvements:** Widening of 32 Avenue Diversion to four travel lanes, two-lane off-ramp from southbound Highway 99, and two-lane on-ramp from westbound 32 Avenue Diversion to northbound Highway 99.
- **Highway 99 & 152 Street Interchange:** 6-lane 152 Street overpass with new on-ramps and off-ramps to allow full movement between Highway 99 and 152 Street.
- **Highway 99 and 24 Avenue Interchange:** Widening of 24 Avenue to four travel lanes and the addition of north-side ramps to provide access to northbound Highway 99 from 24 Avenue and to provide access from southbound Highway 99 to 24 Avenue.
- **20 Avenue Overpass and Widening:** New 4-lane crossing over Highway 99, realignment and widening of Croydon Drive, new roundabouts along 20 Avenue at Croydon Drive and 164 Street, and a new traffic signal at 20 Avenue and 160 Street.
- **Surrey-Langley Skytrain Project - Stage 2:** The extension of the Expo Line SkyTrain along Fraser Highway from Fleetwood to Langley. This stage of the project includes four additional stations along Fraser Highway at 184 Street, 190 Street, 196 Street, and 203 Street.

In addition, the SSAM future base networks include projects identified in the Surrey 10-Year Service Plan. These include the following types of projects:

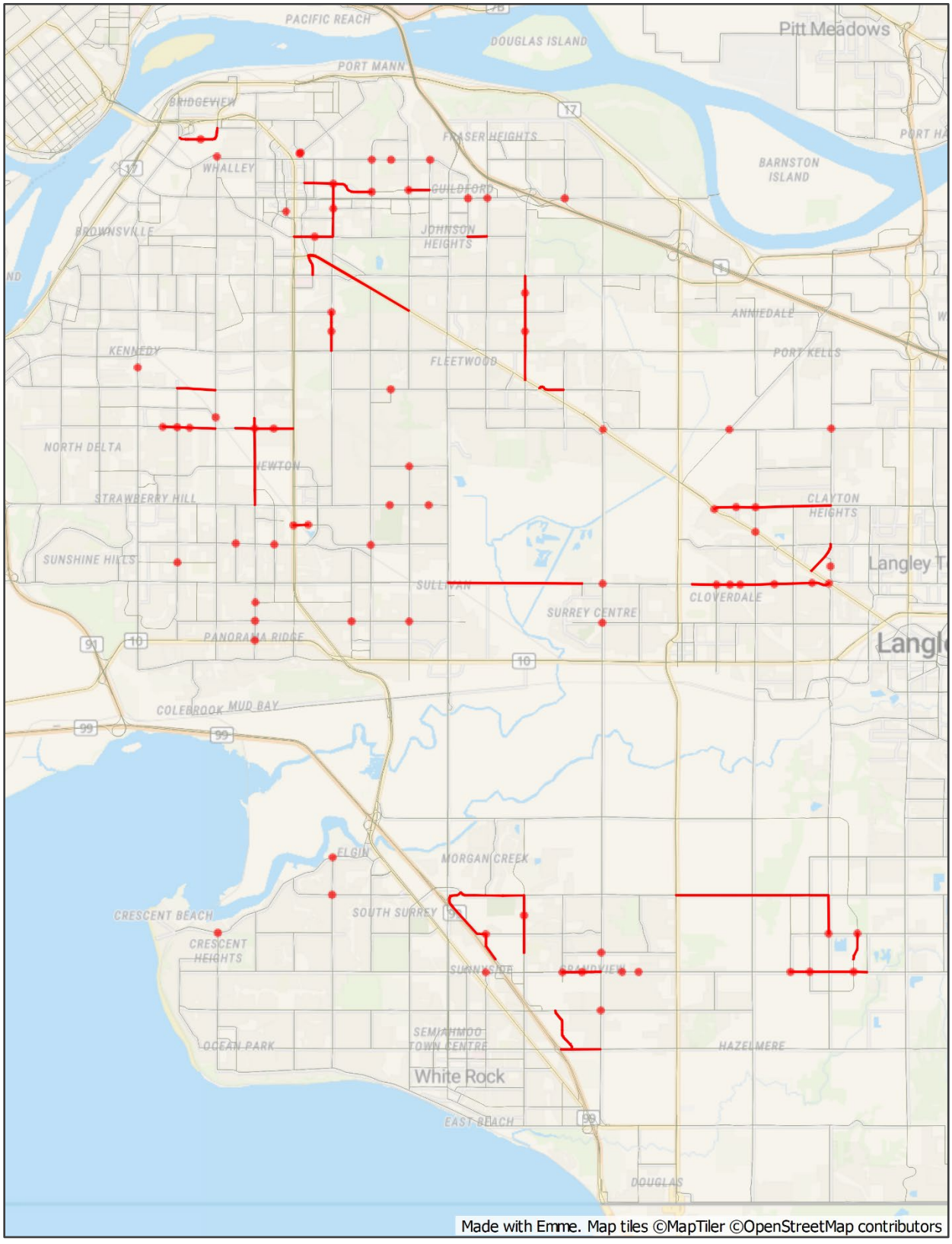
- New Arterials, Collectors and Crossings
- Arterial and Collector Widening
- Intersection Improvements (including Traffic Signals and Roundabouts)

The location of all the projects identified in the Surrey 10-Year Service Plan and included in the SSAM future base networks are highlighted in red in **Figure 26**. The project located within and near Guildford are provided in **Table 5**, while a complete list of these projects is provided in **Appendix H**.

Table 7: Surrey 10- Year Service Plan (Within and Around Guildford)

Project Name	Project Location	Priority
Arterial New Construction	105A Ave: 137 St (Whalley Blvd) - 144 St	Completed
Arterial Widening - 5 Lane	100 Ave: King George Blvd - 140 St	Completed
New Collector	105 Ave: 148 St - 150 St	Short Term (1 - 3 Yrs)
New Collector	105A/104A Ave : 140 St - 144 St	Completed
New Roundabout	104A Ave / 144 St	Completed
New Roundabout	105 Ave / 148 St	Short Term (1 - 3 Yrs)
Traffic Signal: New	105A Ave / 140 St	Completed
Traffic Signals: New	100 Ave / 138 St	Short Term (1 - 3 Yrs)
Arterial New Construction	Whalley Blvd: 96 Ave - Fraser Hwy	Short Term (1 - 5 Yrs)
Arterial Widening - 5 Lane	100 Ave: 154 St - 156 St	Long Term (6 - 10 Yrs)
Arterial Widening - 5 Lane	140 St: 100 Ave - 105A Ave	Short Term (1 - 5 Yrs)
Arterial Widening - 5 Lane	160 St: 092 Ave - 096 Ave	Long Term (6 - 10 Yrs)
Arterial Widening - 5 Lane	160 St: 88 Ave - 92 Ave	Long Term (6 - 10 Yrs)
Arterial Widening - 5 Lane	160 St: Fraser Hwy - 88 Ave	Short Term (1 - 5 Yrs)
Arterial Widening - 5 Lane	Fraser Hwy: 138 St - 140 St	Short Term (1 - 5 Yrs)
Arterial Widening - 5 Lane	Fraser Hwy: 140 St - 148 St	Short Term (1 - 5 Yrs)
Arterial Intersection Improvements	104 Ave & 154 St	Short Term (1 - 5 Yrs)
Arterial Intersection Improvements	104 Ave & 156 St	Short Term (1 - 5 Yrs)
Roundabout	104 Ave / 164 St	Short Term (1 - 5 Yrs)
Arterial Intersection Improvements	108 Ave & 144 Street	Short Term (1 - 5 Yrs)
Arterial Intersection Improvements	108 Ave & 146 St	Short Term (1 - 5 Yrs)
Arterial Intersection Improvements	108 Ave & 150 Street	Short Term (1 - 5 Yrs)
Arterial Intersection Improvements	108 Ave & Oriole Dr	Short Term (1 - 5 Yrs)
Traffic Signals: New	088 Ave / 192 St	Short Term (1 - 5 Yrs)
Traffic Signals: New	088 Ave / Harvie Rd	Short Term (1 - 5 Yrs)
New Traffic Signal	103 Ave & 140 St	Short Term (1 - 5 Yrs)

Figure 26: Surrey 10-Year Service Plan Projects in SSAM Future Networks



3.5.3. Scenario 5001: 2050 Base Scenario

The network edits from the development of the 2017 Base Year Scenario (Scenario 1701) were applied to the 2050 SSAM Base Scenario to develop the 2050 Base Scenario (Scenario 5001). Applying the network corrections and adjustments from the existing conditions ensures consistency between the scenarios.

3.5.4. Scenario 5002: Full Buildout Base Scenario

The Full Buildout Base Scenario (Scenario 5002) replaces the 2050 demographic inputs in Scenario 5001 with the full buildout for the City of Surrey. The road and transit networks are consistent with Scenario 5001.

3.5.5. Scenario 5003: Full Buildout Transit Sensitivity Scenario

A transit sensitivity scenario (Scenario 5003) was developed for the full buildout horizon to test the impact on mode share for Guildford and review high level estimate of the potential impacts to the road and transit networks. The sensitivity scenario was not carried through to the Visum and Vistro analysis.

The demographic inputs and the auto road network are consistent between Scenario 5002 and Scenario 5003. The transit assumptions for Scenario 5003 were provided by the City and include the following:

- **96 Avenue / 200 Street LRT:** Along 96 Avenue from Scott Rd to 200 Street and along 200 Street from 96 Avenue to 56 Avenue.
- **Scott Road / 72 Avenue LRT:** Along Scott Road from the Scott Road Station to 72 Avenue and along 72 Avenue from Scott Road to 152 Street. This replaces the overlapping RapidBus.
- **Highway 10 LRT:** Along Highway 10 from King George Boulevard to Fraser Highway.
- **South Surrey to Langley City LRT:** Along 24 Avenue from 152 Street to 192 Street, up 192 Street to 36 Avenue, east to 200 Street, and then north to Langley City.
- **King George Boulevard LRT:** Along King George Boulevard from 72 Avenue to 152 Street and then along 152 Street to 16 Avenue before turning east towards 156 Street.
- **128 Street RapidBus:** Along 128 Street connecting Gateway Station to Highway 10 and King George Boulevard via 108 Ave, 128 Street, and Highway 10.
- **88 Avenue / 80 Avenue RapidBus:** Connecting 22nd Street Station in New Westminster to Trinity Western University via Alex Fraser, Nordel Way, 88 Avenue, 168 Street, 80 Avenue, 216 Street, and Glover Road.
- **Lougheed to Langley City RapidBus:** Connecting Lougheed Highway to Langley City via Maple Meadows Station, Golden Ears Way, 96 Avenue, and 208 Street.
- **72 Avenue RapidBus:** Connecting Fraser Highway to 208 Street.
- **152 Street RapidBus:** Connecting Coquitlam Central Station to King George Boulevard and Highway 10 via Lougheed Highway, Port Mann Bridge, 152 Street, and Highway 10.
- **South Surrey to Bridgeport Station RapidBus:** Connecting Semiahmoo Town Centre in South Surrey to Bridgeport Station via Highway 99.
- **Highway 1 RapidBus:** Connecting Abbotsford to Lougheed Station via Highway 1. Replaces Route 555.
- **64 Avenue RapidBus:** Connecting 22nd Street Station in New Westminster to Langley City via Alex Fraser, 72 Avenue, Scott Road, 64 Avenue, Highway 15, and Highway 10.

- **Highway 10 / Ladner Trunk Road RapidBus:** Connecting Ladner Park and Ride to Highway 10 and King George Boulevard via Ladner Trunk Road and Highway 10.
- **Newton Guildford SkyTrain:** Connecting Newton Exchange at 72 Avenue and King George Boulevard to 160 Street at 104 Avenue. Replaces RapidBus along King George Boulevard and 104 Avenue. Assume 4.5-minute headways for the AM and PM peaks and 10 -minute headways for midday.

All the LRT routes are assumed to have 4-minute headways during the AM and PM peaks and 8-minute headways during the midday. The new RapidBus routes are assumed to have 8-minute headways during the AM and PM peaks and 15-minute headways in the midday.

3.6. Modelling Outputs

3.6.1. Trips By Mode

The anticipated demographic growth in Guildford, Surrey, and the region results in a corresponding growth in total trips to and from Guildford, as defined by the TransLink Trip Diary sub-regions. In the 2017 base year, there are approximately 183,000 trips to and from Guildford per fall weekday. This daily number of trips is forecasted to increase to 266,000 by 2050, which represents a 45% increase from the base horizon year. For the full buildout horizon, the total daily number of trips to and from Guildford increases to approximately 470,000 per fall weekday. The total daily trips by mode for these scenarios are provided in **Figure 27** while the corresponding mode share is presented in **Figure 28**.

Figure 27: Daily Trips by Mode for Trips from Guildford

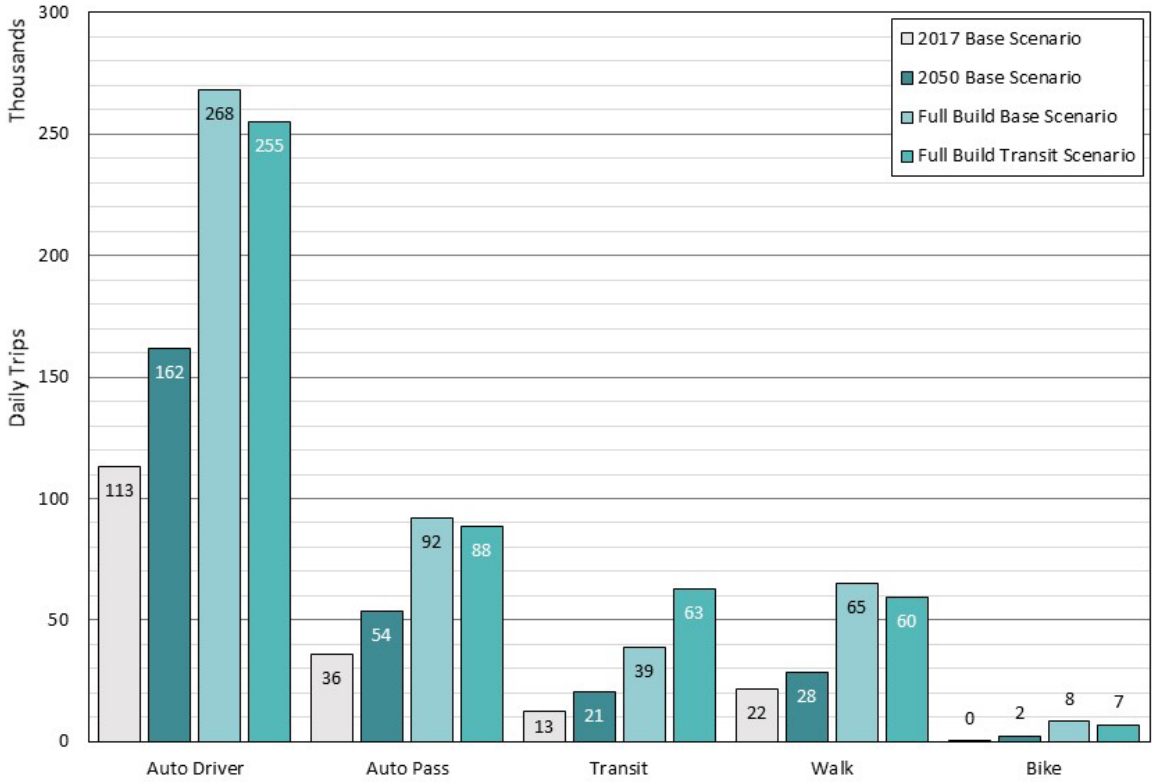
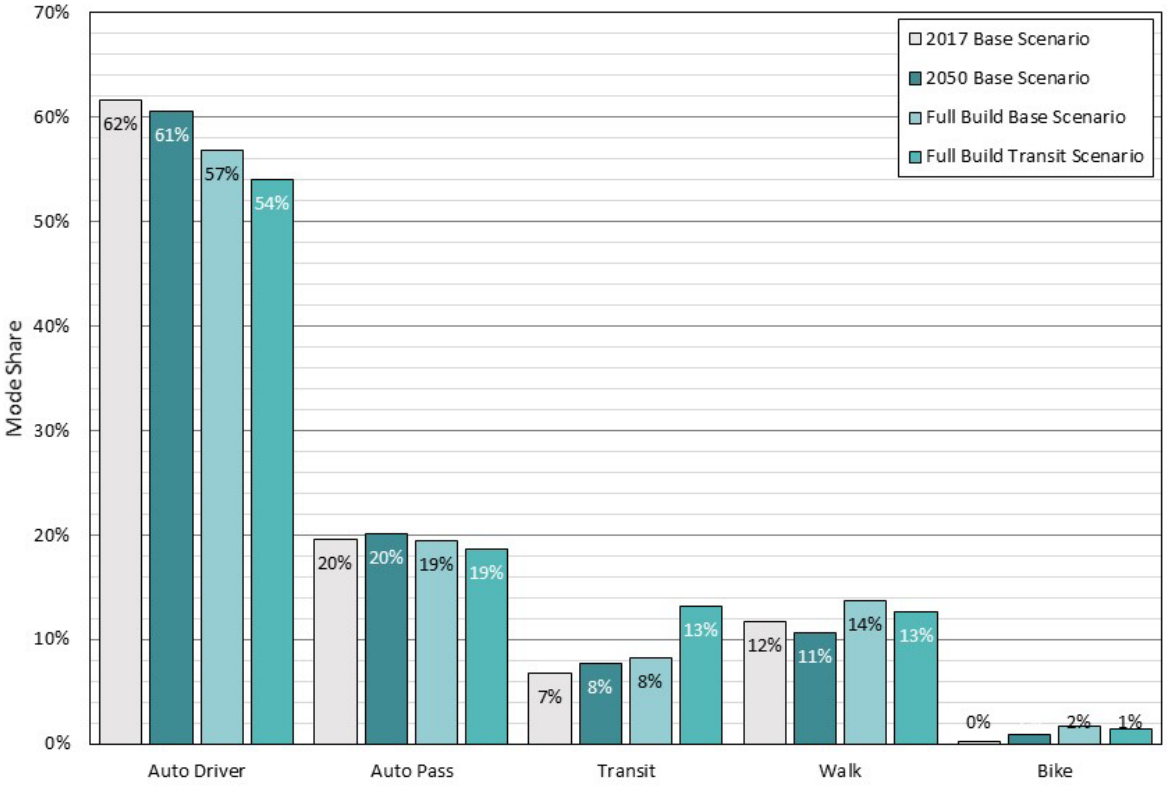


Figure 28: Daily Mode Share for Trips from Guildford



The 2017 Base Scenario (calibrated to the 2017 Trip Diary) illustrates the vehicle dependent mode share of Guildford, with 82% of all trips to and from Surrey being made as either auto driver or passenger. By 2050, there is no significant shift in mode share; the auto driver mode share decreases slightly while the transit mode share increases slightly. For the full buildout horizon there is a larger drop in auto driver mode, which sees a decrease from 62% to 57%, while transit and active modes increase.

The changes in mode share are a result of the anticipated network improvements and demographic growth in Guildford. The existing demographics results in approximately 0.36 jobs per person in Guildford. By 2050, due to the relatively similar percentage growth for all demographic inputs, the number of jobs per person is similar at 0.38. Therefore, in relative terms, the demographic characteristics of Guildford does not change significantly. The 2050 Base Scenario also does not consider any significant transit improvements in the Guildford area except for bus service increases. Conversely, there are regional and local road network improvements that directly increase capacity to, from, and within Guildford. Therefore, while congestion increases, the network and demographic assumptions for the 2050 scenario do not result in a significant shift in the mode share.

The Full Buildout Base Scenario (Scenario 5002) experiences more congestion than today and 2050 due to the population and employment increases while the transit and road network remain consistent. However, looking at the demographic inputs, the increase in population (and households) increase significantly more than the employment in Guildford. As a results, by the full buildout horizon, there are approximately 0.29 jobs per person in Guildford. This equates to a 20% decrease from existing conditions. More trips to outside

Guildford are anticipated without providing additional transit opportunities. The transit sensitivity scenario (Scenario 5003) provides an indication of the potential shifts in transit mode share that can be seen with significant transit investments. Daily transit ridership and mode share increased by more than 60% within the same horizon year as a result of the transit improvements. Compared to 2017 conditions, there is almost a fivefold increase in transit trips. At the same time, auto driver and passenger trips increased 230% only.

As seen in the figure, the active mode shares do not change significantly. Active modes are dependent on the demographic inputs which are assumed fixed in the model for a given horizon year. Additionally, active mode infrastructure such as sidewalk coverage and bike lanes and City policies have a direct impact on the mode share. However, the impact of these factors are limited within the SSAM framework, and their impacts are being researched and tested outside the scope of this model.

The SSAM provides demands for the AM, and PM peak hours. Therefore, outputs of trips and mode share are produced for these periods in the following figures. Overall, the findings are consistent with the results at the daily level.

Figure 29: AM Trips by Mode from Guildford

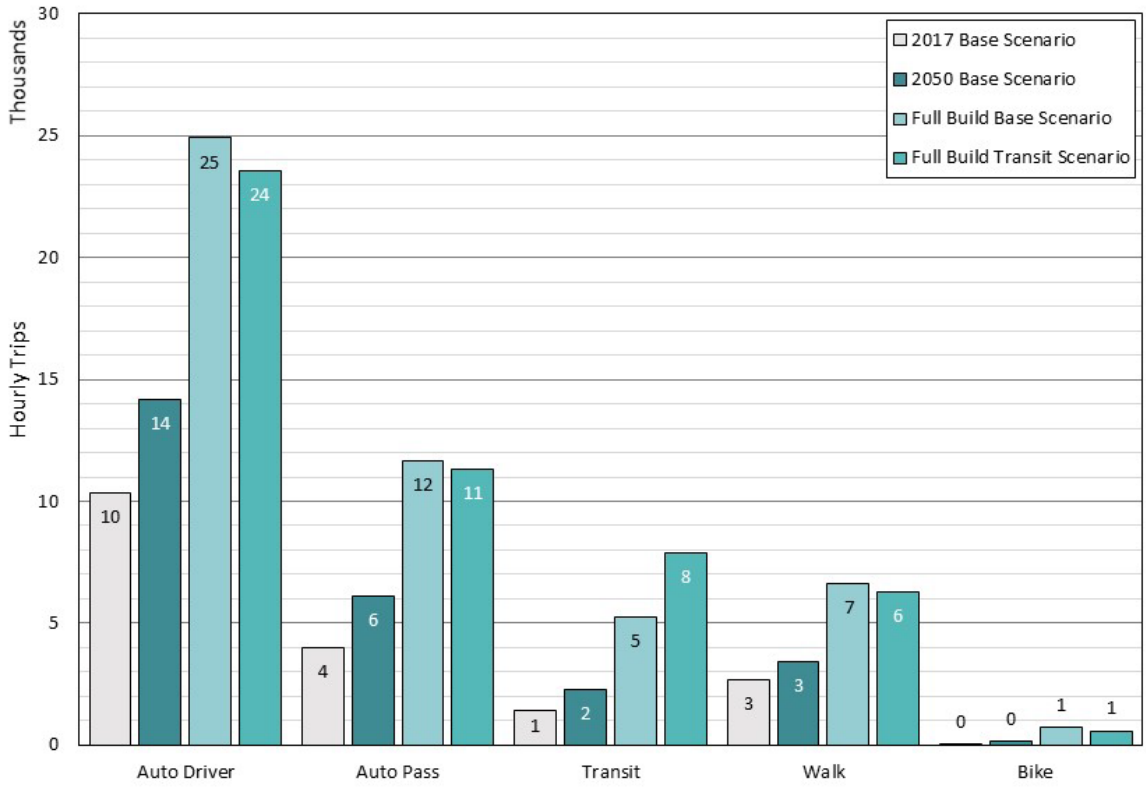


Figure 30: AM Trips by Mode to Guildford

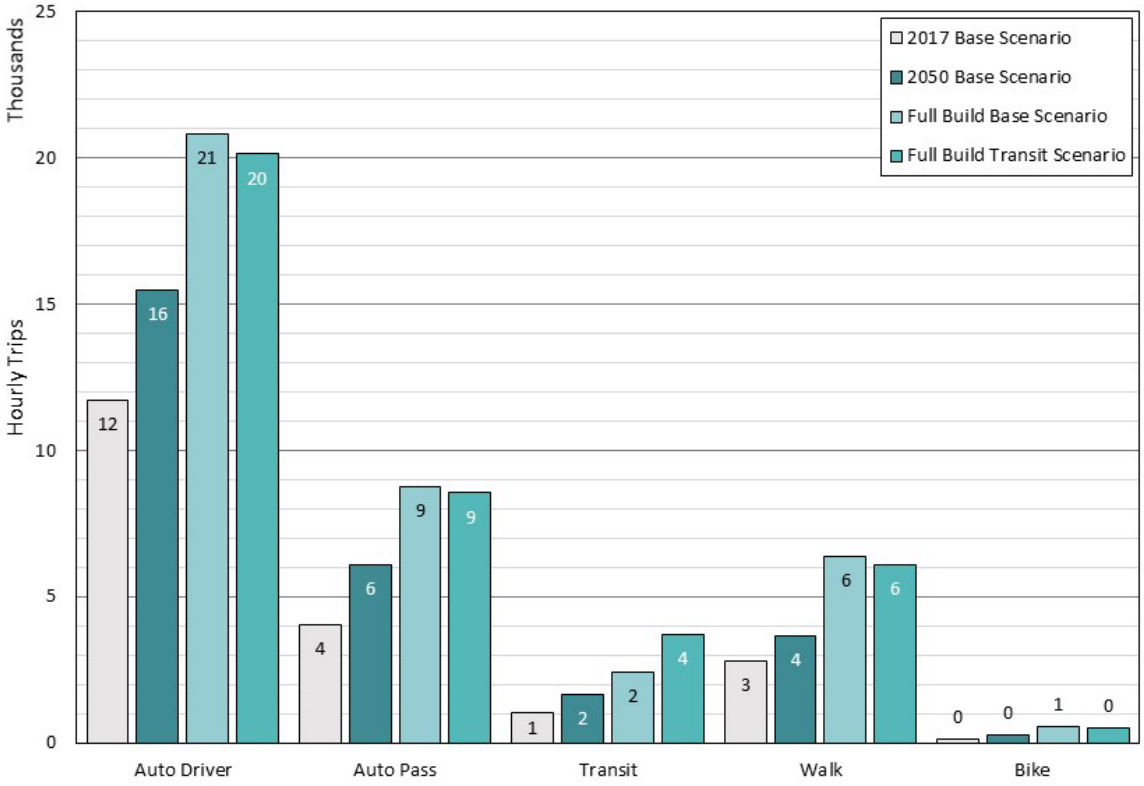


Figure 31: PM Trips by Mode from Guildford

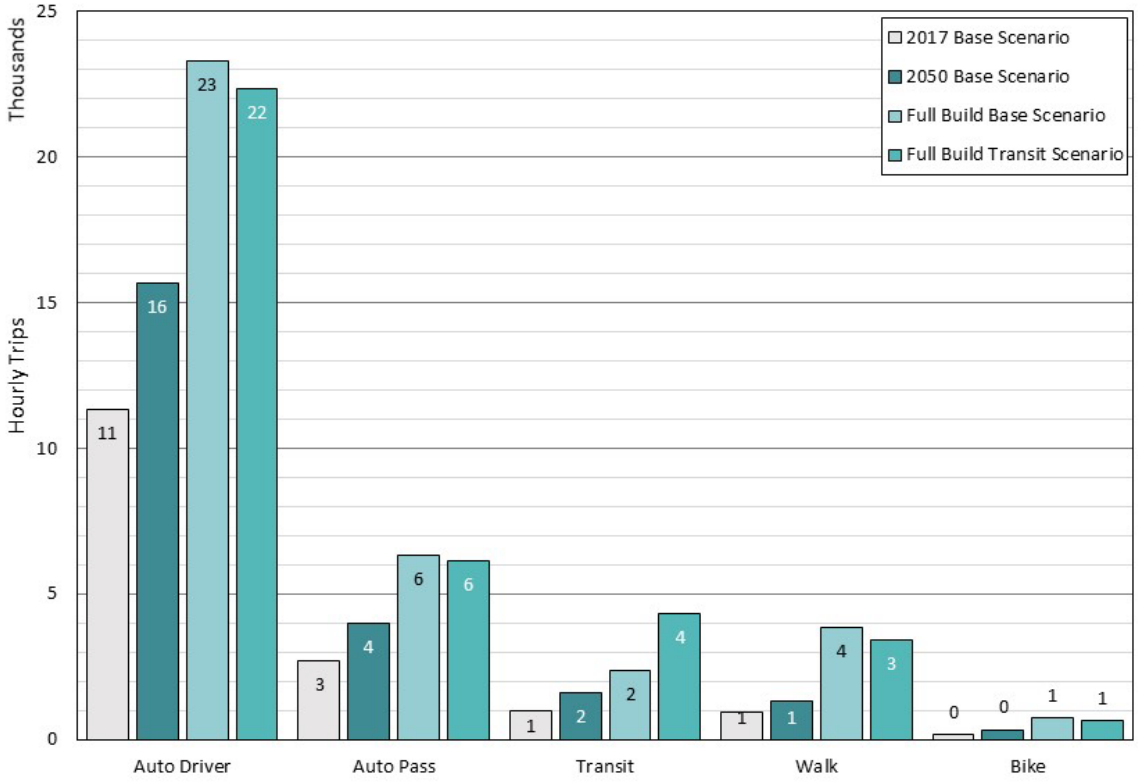
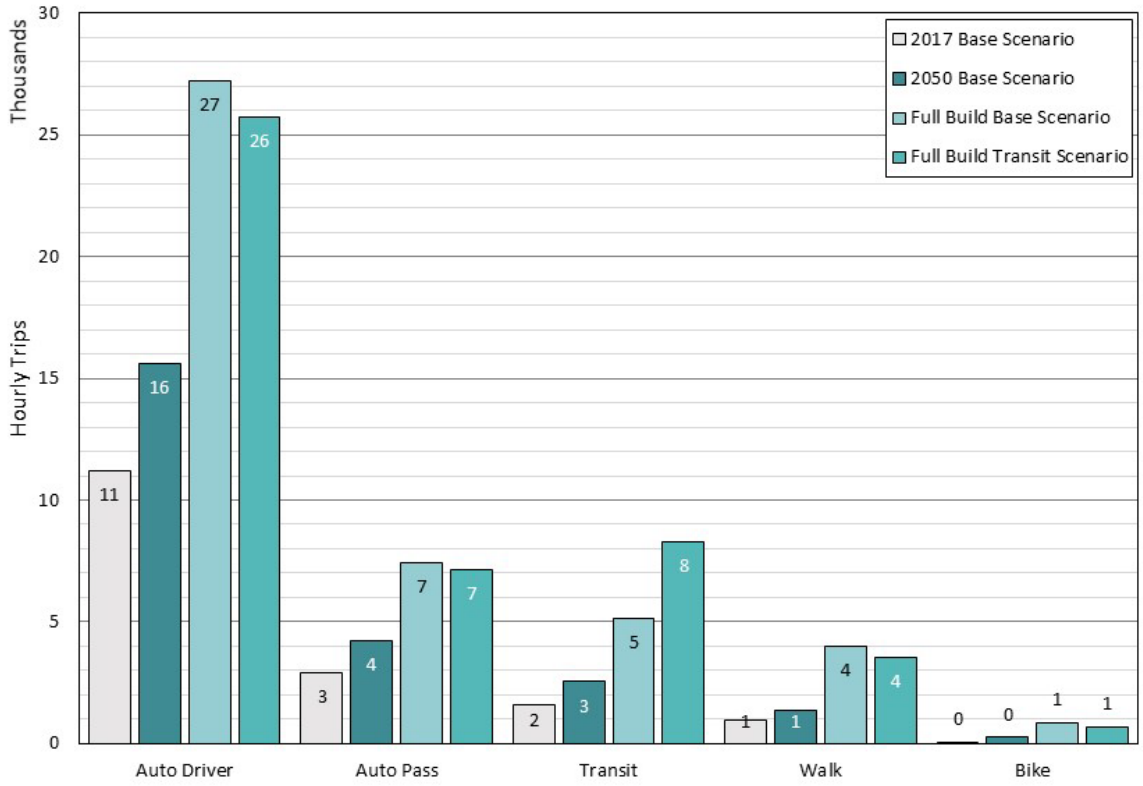


Figure 32: PM Trips by Mode to Guildford



3.6.2. Auto Volume and Volume Difference Plots

Auto volume plots for the 2017 Existing Conditions (Sc 1701) are presented in **Figure 33** and **Figure 34** while the 2050 Base Scenario (Sc 5001) auto volume plots are presented in **Figure 35** and **Figure 36**. Additionally, the plots for the full buildout horizons (base and sensitivity scenarios) are presented from **Figure 37** to **Figure 40**. This is followed by the auto volume difference plots for the AM and PM peak hours to illustrate the growth between different horizon years. The growth to 2050 for the AM and PM peak hours is presented in **Figure 41** and **Figure 42**, respectively. The growth from 2050 to the full buildout for the two peak hours is presented in **Figure 43** and **Figure 44**.

As anticipated, the highest volume in and around the study area is along Highway 1. Strictly within the study area, 152 Street, with its direct access to Highway 1, is busiest north-south corridor. The other north-south corridors pick up volume as you continue south, specifically south of 100 Avenue. The east-west corridors of 108 Avenue and 104 Avenue also provide access to the highway and are both relatively similar in terms of traffic volume.

The volume difference plots provide an indication of where traffic growth is anticipated into the future. The widening of 100 Avenue results in significant increase in volume due to the increase in roadway capacity. Similarly, the new completed 105A/105 Avenue corridor also has significant volume increases. Both provide relief to the busier 104 Avenue and 108 Avenue corridors. Beyond 2050, there is still significant increases in travel demand for the Guildford area as seen by the large increases on most corridors.

Figure 33: Scenario 1701 AM Auto Volume Plot

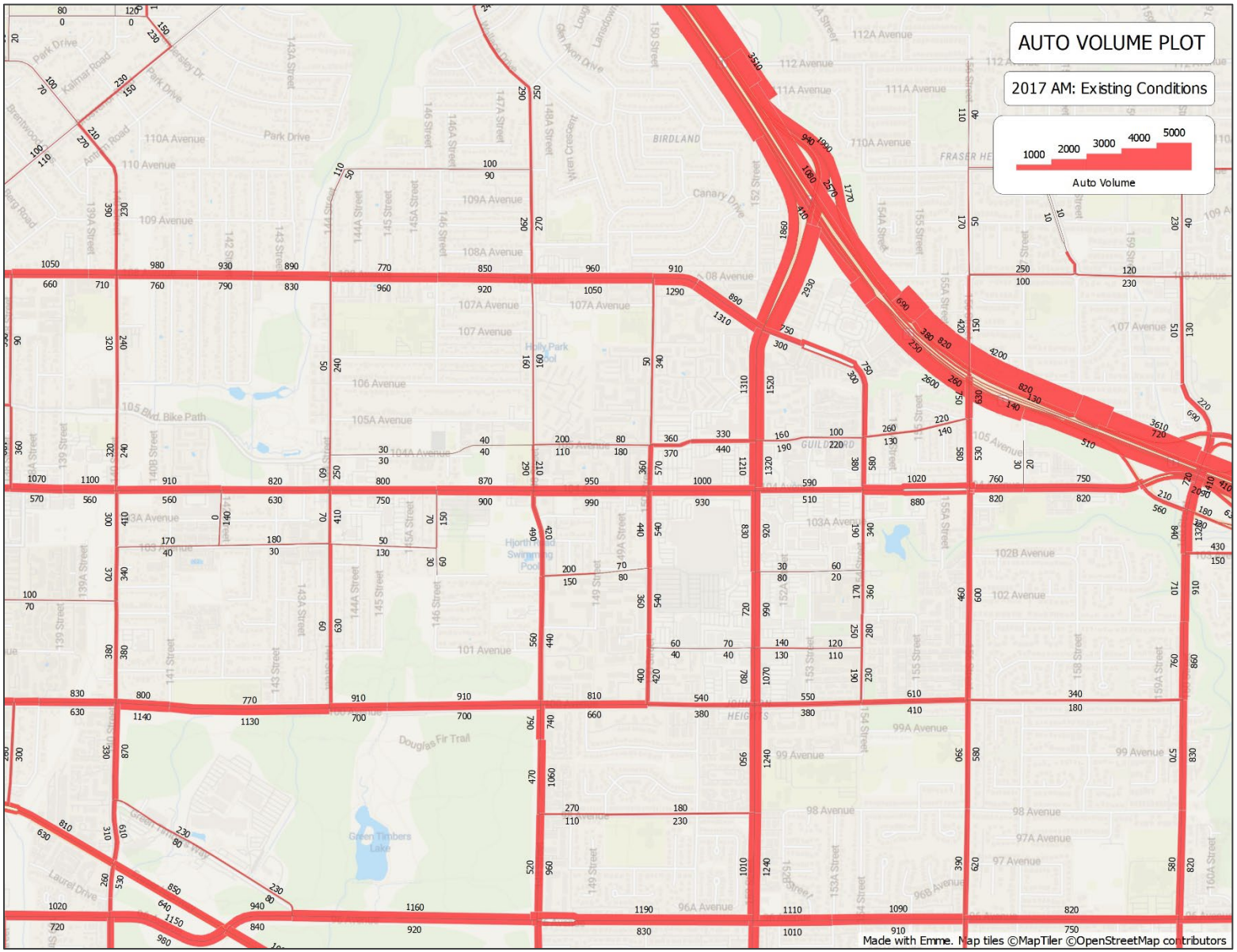


Figure 34: Scenario 1701 PM Auto Volume Plot

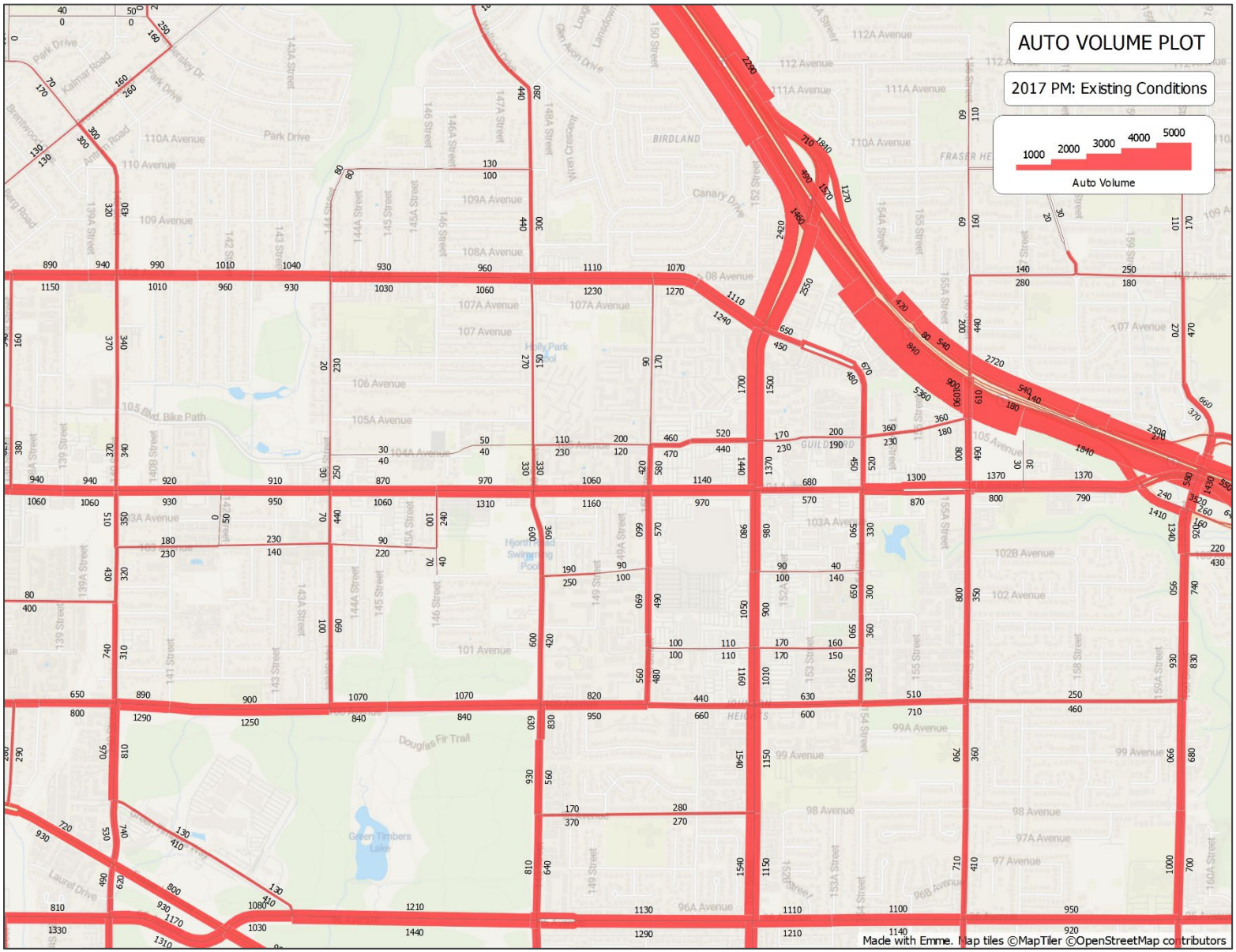


Figure 35: Scenario 5001 AM Auto Volume Plot

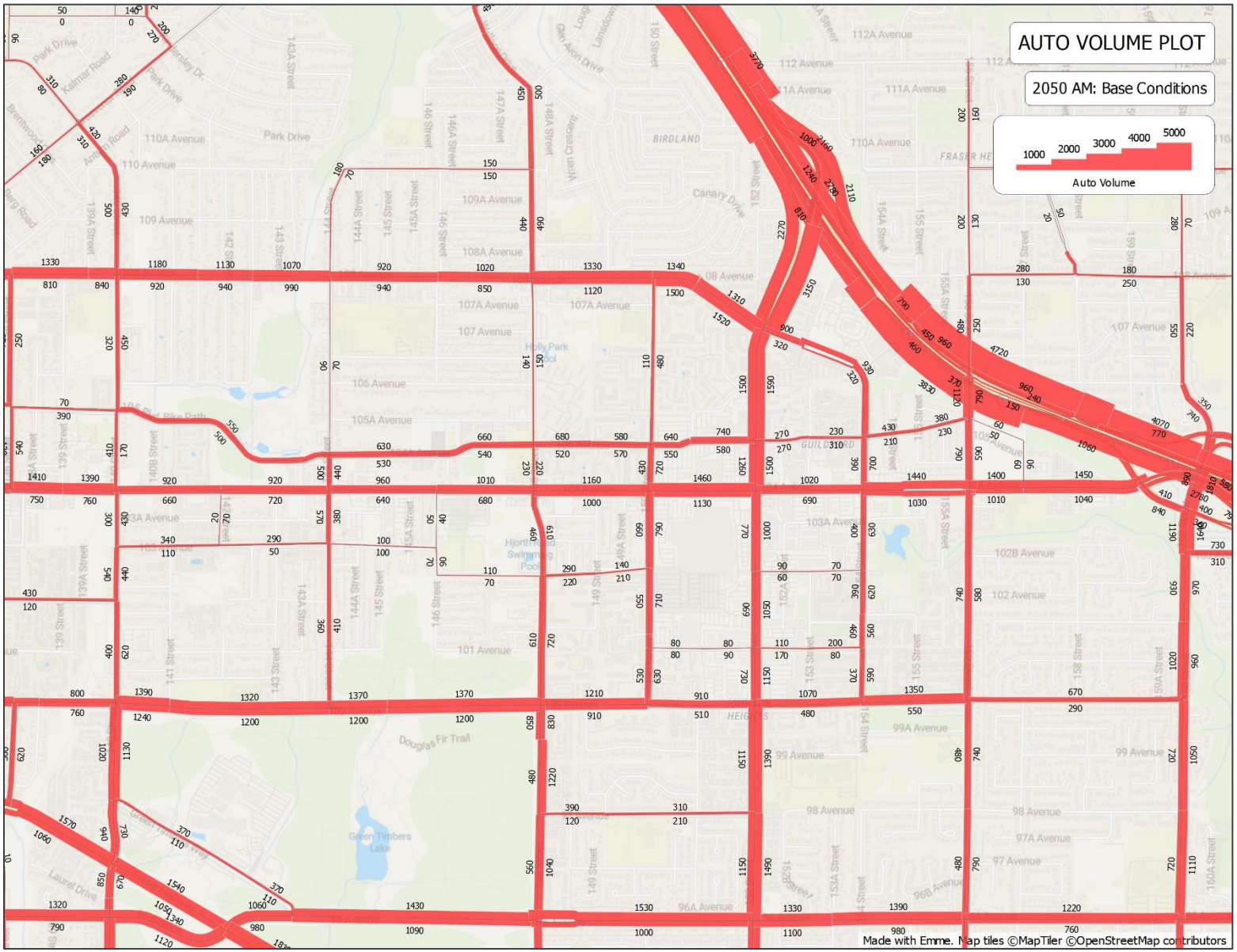


Figure 36: Scenario 5001 PM Auto Volume Plot

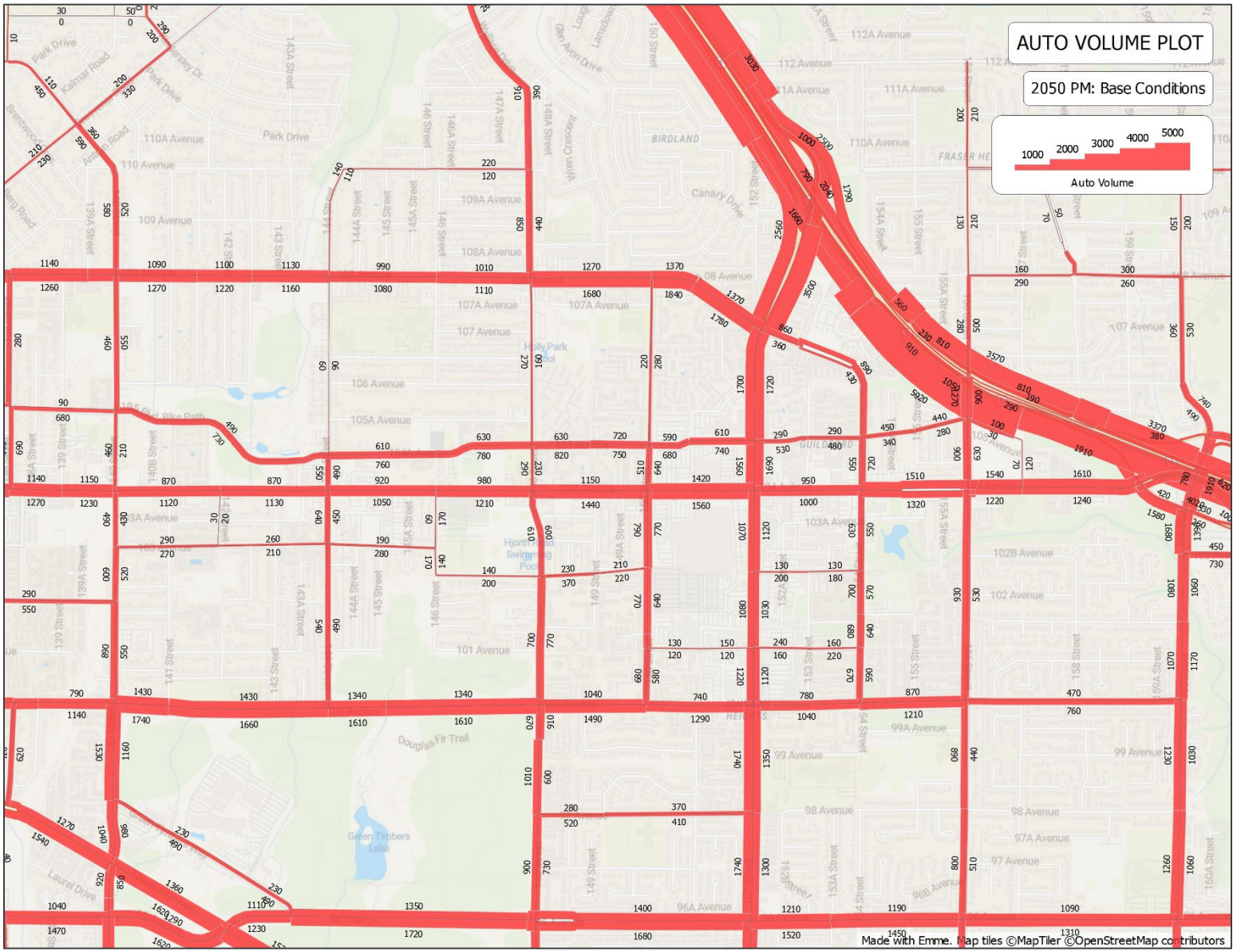


Figure 37: Scenario 5002 AM Auto Volume Plot

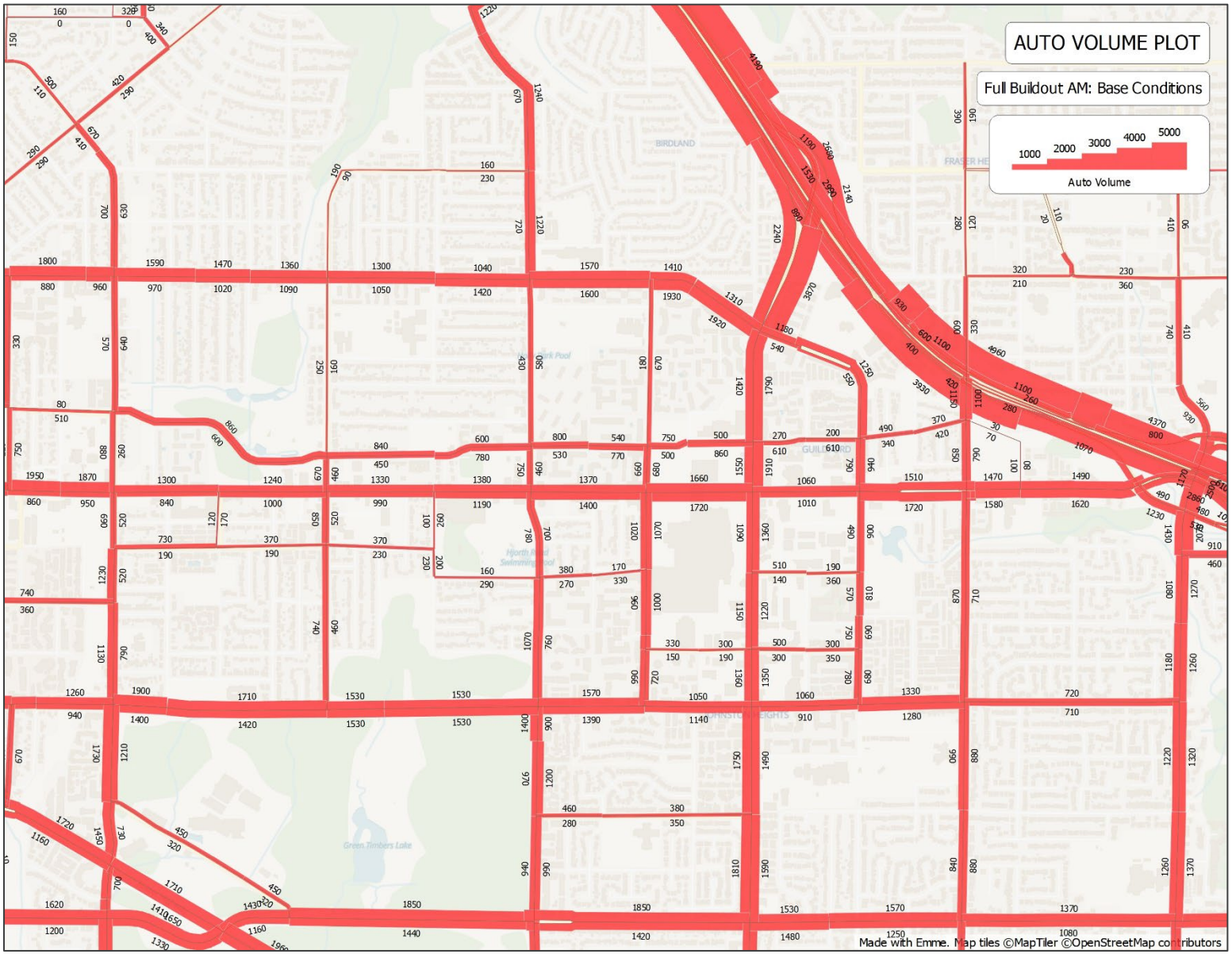


Figure 38: Scenario 5002 PM Auto Volume Plot

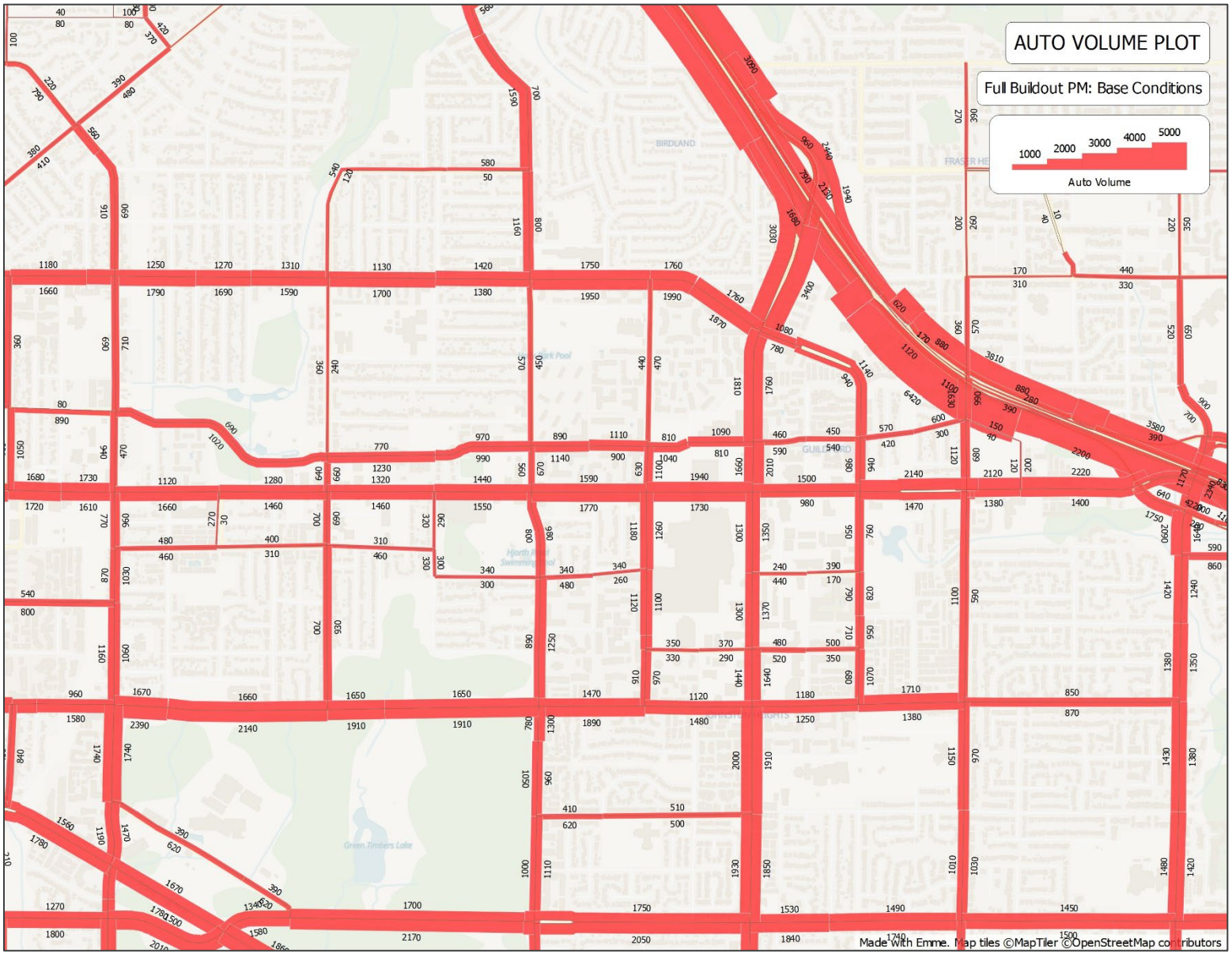


Figure 39: Scenario 5003 AM Auto Volume Plot

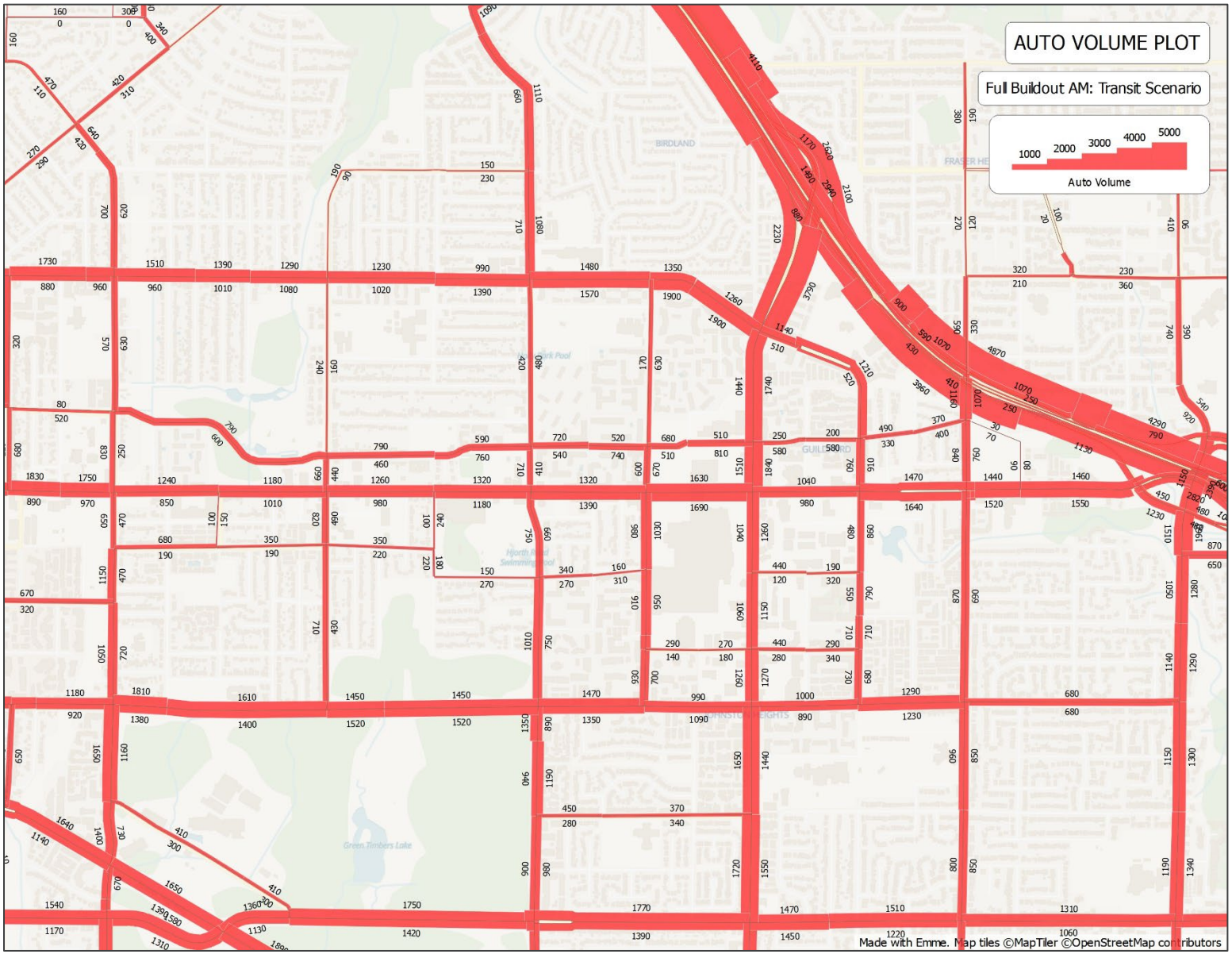


Figure 40: Scenario 5003 PM Auto Volume Plot

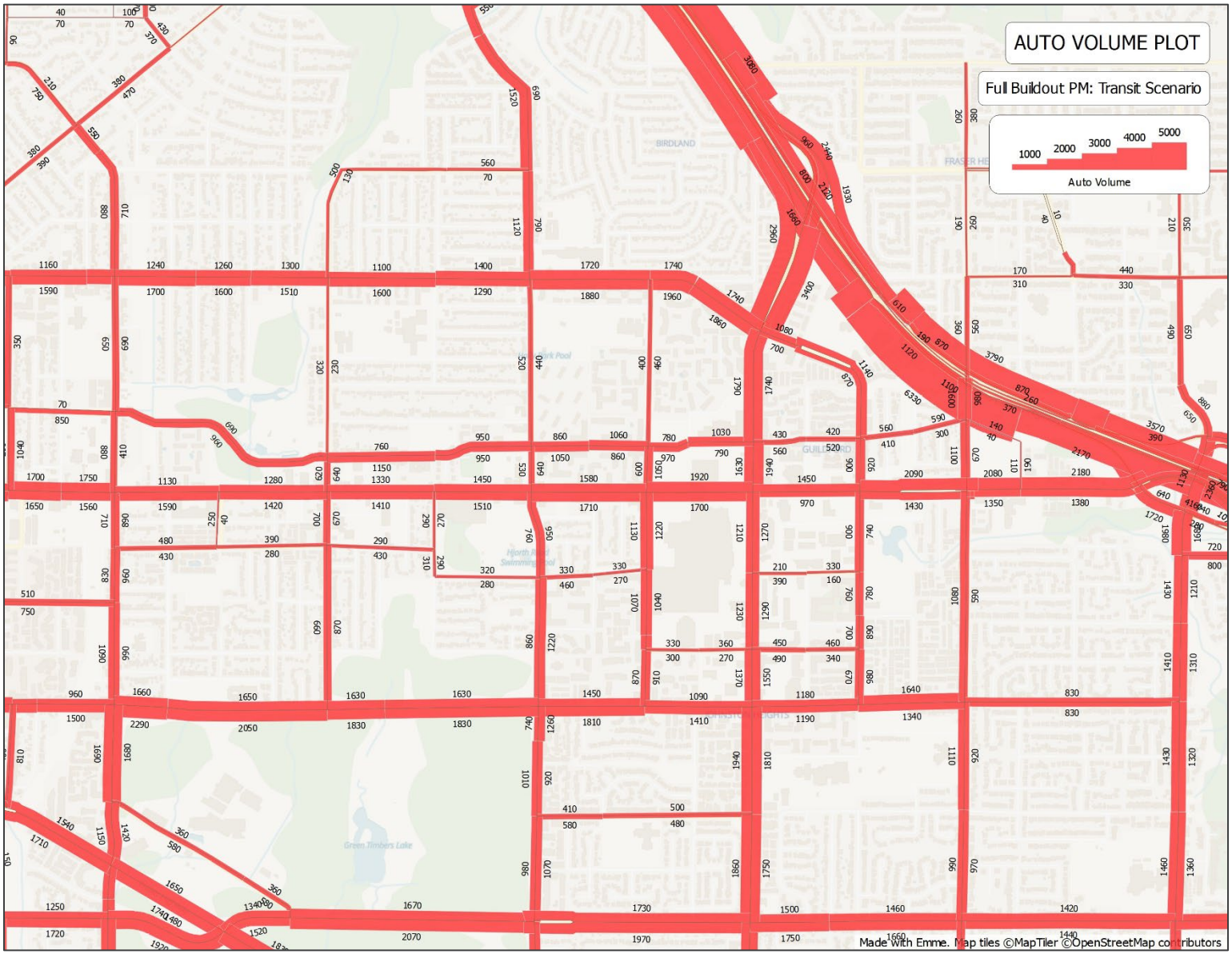


Figure 41: Volume Difference Plot (AM) – Sc 5001 vs Sc 1701

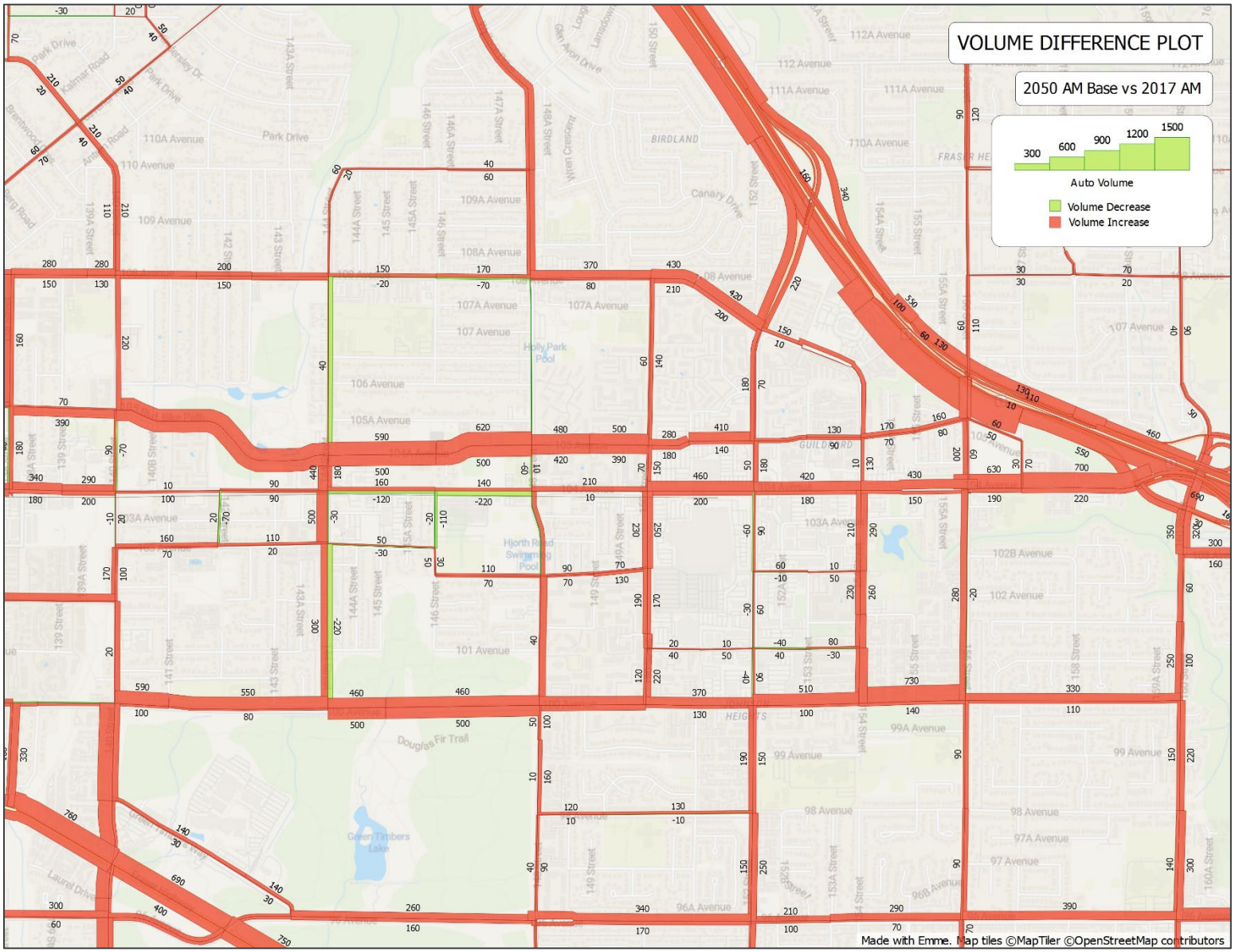


Figure 42: Volume Difference Plot (PM) – Sc 5001 vs Sc 1701

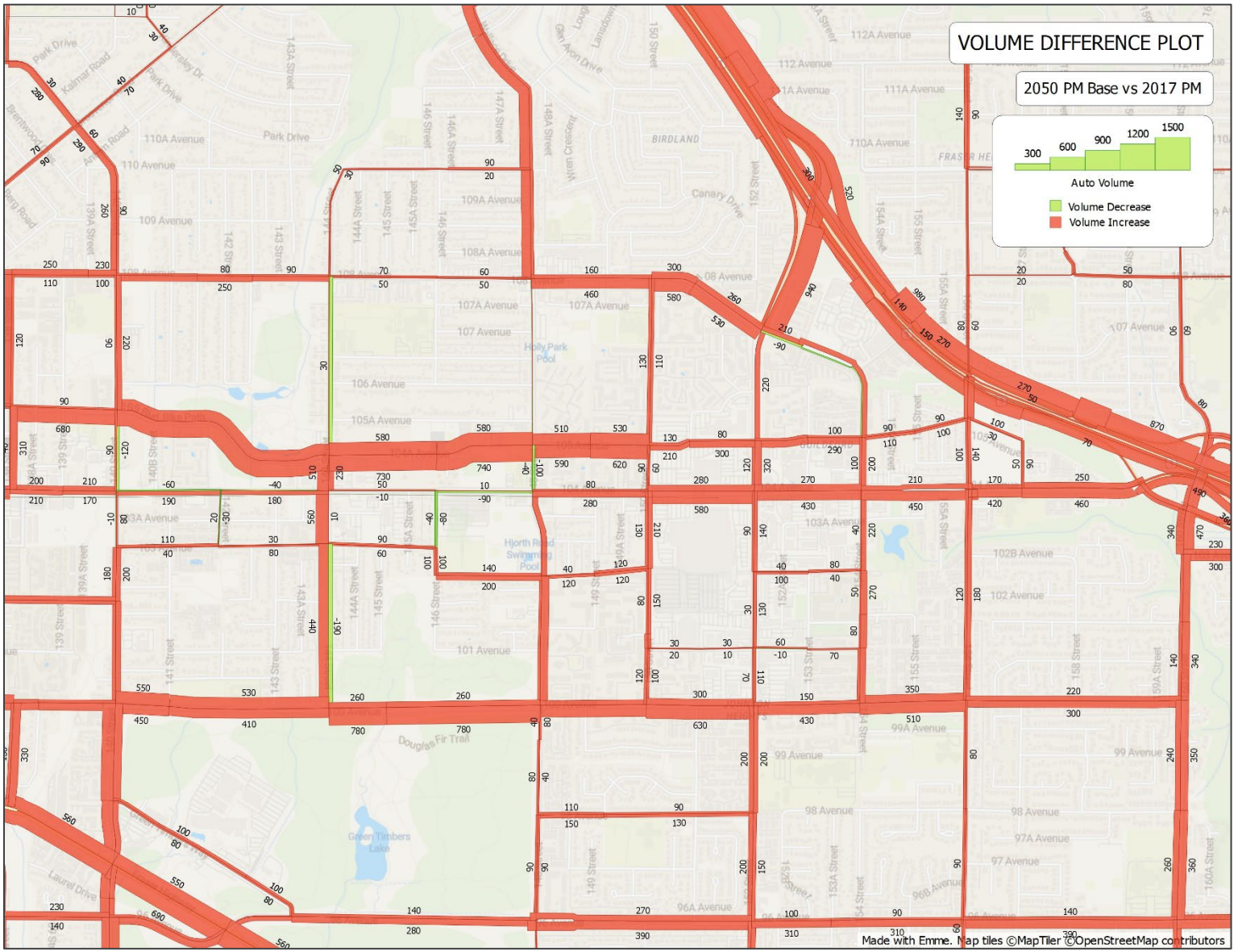


Figure 43: Volume Difference Plot (AM) – Sc 5002 vs Sc 5001

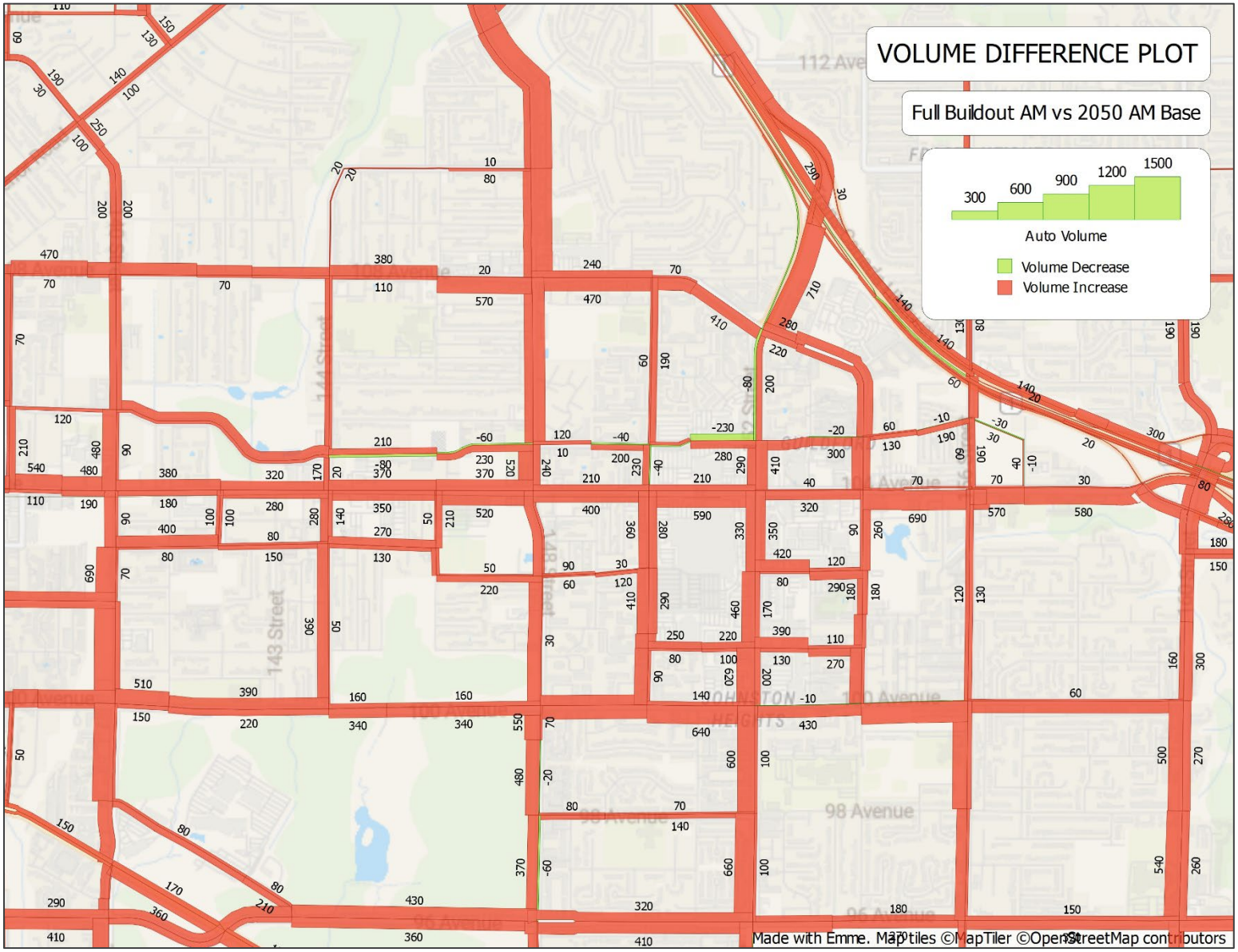
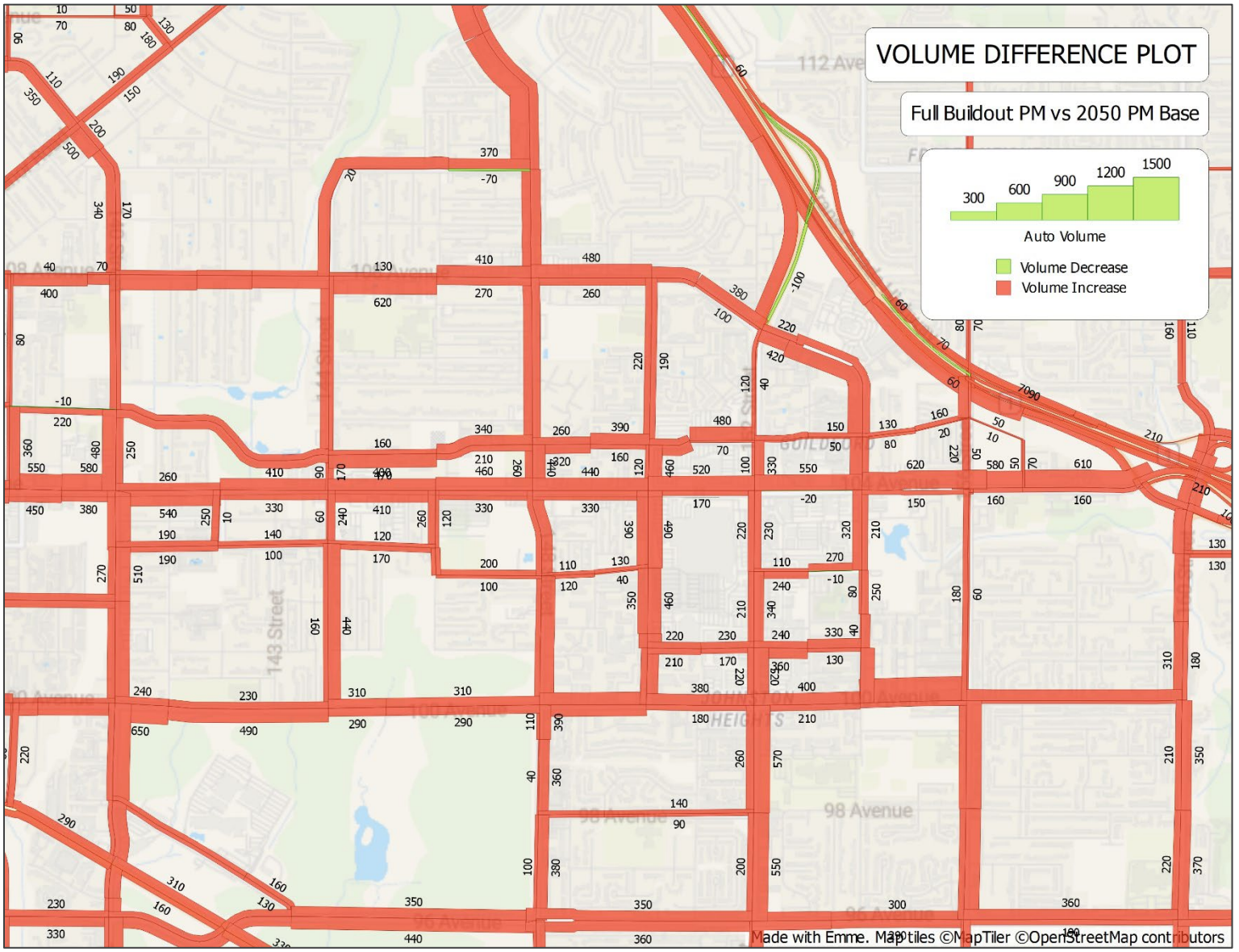


Figure 44: Volume Difference Plot (PM) – Sc 5002 vs Sc 5001



3.6.3. Additional Trips for Study Area

The analysis of trips by mode in earlier sections was focused on the Guildford sub-region as defined by the TransLink Trip Diary. This allowed for consistency with previous SSAM work, the model validation, and any future analysis. For the purpose of this report, the additional trips for the study area were also determined for the AM and PM peak hours. This was done at the SSAM TAZ level for all zones in the study area as shown in **Figure 45**. It should be noted that while most of these TAZ are within the Guildford sub-region, the five TAZs between 140 Street and 144 Street are within the Whalley sub-region. These are TAZ 61190, 61280, 61400, 61480, and 61610.

Additional trips were determined by calculating the difference between subsequent scenarios. This results in additional (or change) in trips from 2017 to 2050, from 2050 to Full Build, and from Full Build Base to Full Build Transit Sensitivity Scenario. The trips were calculated for the AM and PM peak hours, for both inbound (to TAZ) and outbound (from TAZ) direction. The details of the additional trips for the AM peak hour can be seen in **Table 6** while the details of the additional trips for the PM peak hour are presented in **Table 7**. The tables present both the absolute change in trips as well as the percentage change.

In general, there is an upward trend for trips of all modes from 2017 to 2050 and from 2050 to Full Build. A few of the TAZ have less trips and this likely due to changes in land use type in that TAZ. Overall, the study area has more outbound trips than inbound trips in the AM peak hour and more inbound trips than outbound trips in the PM peak hour. This aligns with the typical commuter patterns in areas with a surplus of working population over the available employment. Looking at the peak directions for each peak, total trips increase by about 32% (AM outbound) and 38% (PM inbound) from 2017 to 2050. During this time, the increases in auto driver and auto passenger are between 24% and 28%, while the sustainable modes (i.e., transit, walk, and bike) increase significantly more. From 2050 to full build, the peak directions increase by 177% for AM outbound and 152% for PM inbound. Like above, the auto driver and auto passenger modes grow slower while the sustainable modes grow faster.

When comparing the Full Build Base to the Transit Sensitivity Scenario, the total number of trips change by less than 2%. However, there is a significant shift in modes. The increase in transit trips range from 40% to 85%, with the larger percentages occurring in the off-peak direction. It should be noted, there is no change in demographics or land use when comparing these two scenarios, therefore the impacts are a direct result of the increase in transit service. Several of the largest incremental increases occur along the 104 Avenue corridor, which benefits from the significant transit service increases.

Figure 45: Study Area TAZ

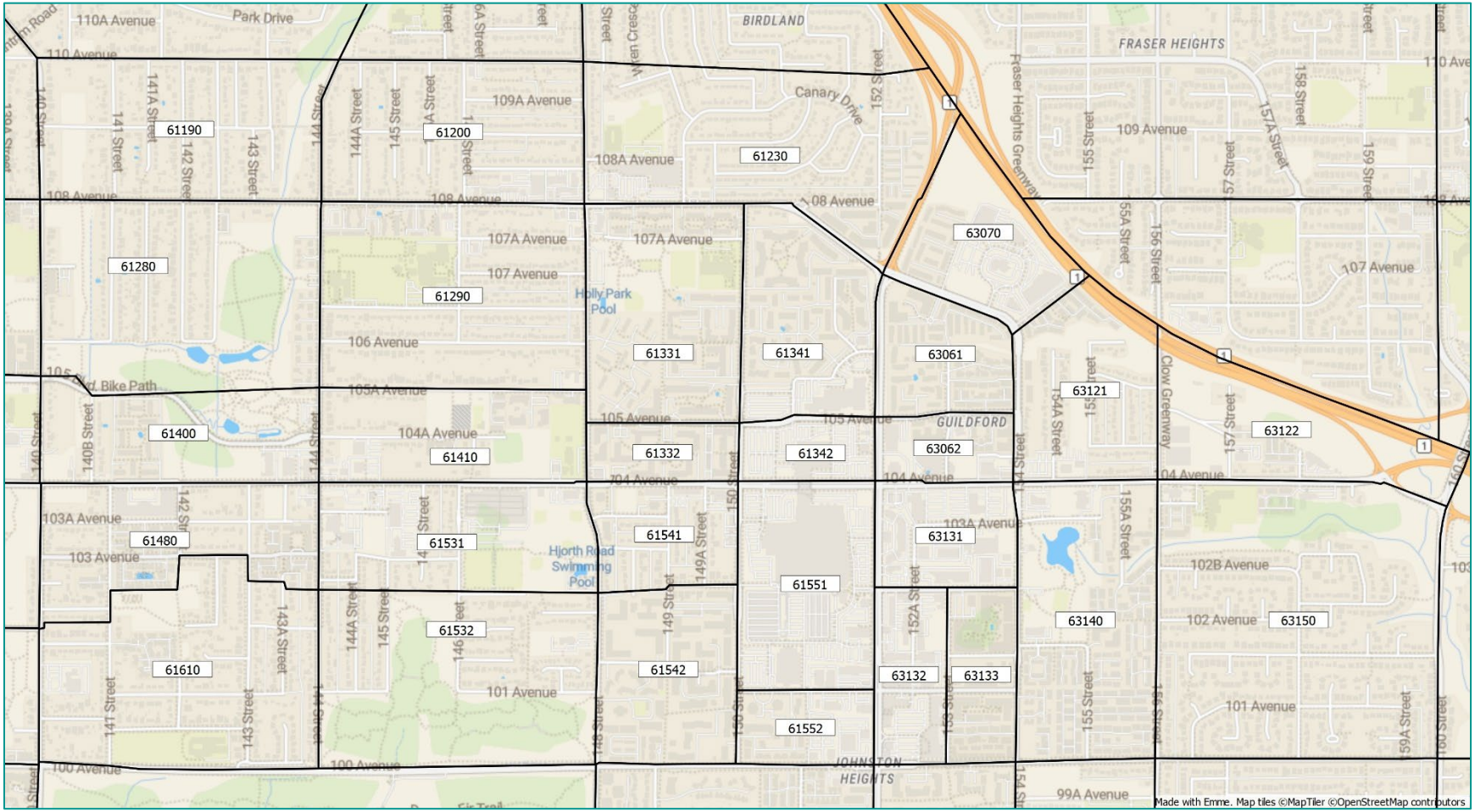


Table 8: Additional Trips by TAZ (AM Peak Hour)

TAZ	Mode	AM TRIP FROM TAZ / STUDY AREA						AM TRIP TO TAZ / STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
61190	Auto Driver	54	48%	102	61%	- 8	-3%	10	25%	30	59%	- 2	-2%
	Auto Pass.	29	51%	57	66%	- 2	-1%	7	39%	10	39%	- 1	-1%
	Transit	22	56%	29	46%	13	14%	2	82%	3	66%	3	37%
	Walk	23	58%	26	42%	- 2	-2%	2	67%	7	152%	- 1	-6%
	Bike	3	98%	6	94%	- 1	-8%	0	75%	1	151%	- 0	-8%
61200	Auto Driver	74	66%	104	56%	- 5	-2%	12	17%	35	44%	- 2	-2%
	Auto Pass.	39	72%	59	63%	- 1	-0%	8	35%	10	32%	- 0	-1%
	Transit	24	86%	25	49%	6	9%	3	74%	3	50%	3	29%
	Walk	23	81%	17	33%	- 1	-1%	2	46%	7	133%	- 1	-6%
	Bike	4	129%	6	85%	- 1	-7%	1	61%	2	111%	- 0	-7%
61230	Auto Driver	98	52%	85	30%	- 14	-4%	95	66%	41	17%	- 7	-2%
	Auto Pass.	56	71%	48	36%	- 3	-2%	50	45%	38	23%	- 2	-1%
	Transit	31	52%	22	24%	23	20%	27	103%	22	41%	14	18%
	Walk	47	90%	15	15%	- 3	-2%	52	53%	109	74%	- 5	-2%
	Bike	5	102%	5	57%	- 2	-10%	4	83%	5	58%	- 1	-4%
61280	Auto Driver	14	11%	132	95%	- 14	-5%	17	39%	36	58%	- 3	-3%
	Auto Pass.	5	7%	65	97%	- 3	-2%	4	21%	12	49%	- 1	-2%
	Transit	22	44%	47	67%	25	21%	5	152%	4	48%	4	36%
	Walk	5	12%	39	82%	- 3	-3%	2	73%	9	160%	- 1	-6%
	Bike	2	63%	9	143%	- 2	-11%	1	143%	2	127%	- 0	-8%
61290	Auto Driver	28	17%	1,021	533%	- 30	-3%	91	32%	191	50%	- 7	-1%
	Auto Pass.	17	23%	546	608%	- 8	-1%	117	38%	142	34%	- 3	-1%
	Transit	16	36%	411	685%	52	11%	80	96%	28	17%	21	11%
	Walk	16	26%	506	682%	- 8	-1%	147	56%	472	115%	- 9	-1%
	Bike	2	62%	55	873%	- 5	-7%	9	65%	17	71%	- 1	-2%
61331	Auto Driver	- 121	-45%	210	144%	- 39	-11%	16	10%	32	18%	- 9	-4%
	Auto Pass.	- 55	-49%	96	166%	- 7	-4%	27	22%	31	21%	- 4	-2%
	Transit	- 36	-41%	77	152%	69	54%	24	87%	16	31%	28	41%
	Walk	- 46	-49%	73	154%	- 9	-7%	51	36%	167	86%	- 11	-3%
	Bike	- 2	-27%	14	237%	- 4	-21%	3	49%	5	55%	- 1	-5%
61332	Auto Driver	189	176%	312	105%	- 88	-14%	98	337%	124	97%	- 20	-8%
	Auto Pass.	78	168%	143	114%	- 17	-6%	29	170%	31	68%	- 3	-4%
	Transit	129	286%	164	95%	172	51%	16	1057%	18	106%	41	116%
	Walk	98	252%	132	97%	- 27	-10%	17	402%	59	281%	- 13	-16%
	Bike	12	380%	25	159%	- 10	-25%	3	950%	6	191%	- 2	-16%
61341	Auto Driver	- 140	-57%	118	114%	- 20	-9%	117	94%	- 120	-50%	- 7	-6%
	Auto Pass.	- 71	-66%	62	169%	- 4	-4%	11	28%	- 12	-23%	- 1	-3%
	Transit	- 61	-68%	59	211%	38	43%	24	228%	- 20	-59%	13	96%
	Walk	- 47	-69%	45	207%	- 5	-8%	8	63%	7	35%	- 4	-15%
	Bike	- 4	-57%	9	283%	- 2	-20%	4	204%	- 3	-39%	- 1	-13%

TAZ	Mode	AM TRIP FROM TAZ / STUDY AREA						AM TRIP TO TAZ / STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
61342	Auto Driver	266	3464%	768	281%	- 153	-15%	183	744%	328	158%	- 42	-8%
	Auto Pass.	116	3922%	348	292%	- 31	-7%	49	483%	95	162%	- 6	-4%
	Transit	152	78221%	480	316%	306	48%	30	1739%	49	152%	88	109%
	Walk	107	21383%	363	339%	- 52	-11%	27	1223%	165	569%	- 31	-16%
	Bike	14	33839%	59	438%	- 18	-25%	5	1674%	17	301%	- 3	-15%
61400	Auto Driver	29	42%	268	274%	- 28	-8%	39	75%	83	92%	- 10	-6%
	Auto Pass.	13	35%	152	310%	- 6	-3%	10	52%	31	107%	- 2	-4%
	Transit	17	86%	130	347%	56	33%	8	218%	10	85%	20	92%
	Walk	13	70%	101	331%	- 11	-8%	5	151%	29	324%	- 5	-12%
	Bike	2	114%	16	430%	- 3	-14%	2	197%	4	166%	- 1	-13%
61410	Auto Driver	76	109%	714	492%	- 83	-10%	94	125%	120	71%	- 15	-5%
	Auto Pass.	38	113%	404	566%	- 21	-4%	31	53%	66	73%	- 4	-3%
	Transit	33	173%	310	594%	167	46%	20	163%	12	38%	32	70%
	Walk	31	165%	291	585%	- 26	-8%	33	73%	116	148%	- 11	-5%
	Bike	4	220%	45	785%	- 9	-18%	4	151%	7	109%	- 1	-10%
61480	Auto Driver	28	16%	464	221%	- 54	-8%	113	196%	82	48%	- 15	-6%
	Auto Pass.	- 1	-1%	235	243%	- 11	-3%	20	78%	41	92%	- 3	-3%
	Transit	23	35%	230	265%	113	36%	20	540%	7	28%	30	95%
	Walk	10	18%	179	261%	- 22	-9%	12	237%	41	243%	- 7	-12%
	Bike	4	74%	34	346%	- 7	-15%	4	506%	5	90%	- 1	-13%
61531	Auto Driver	78	135%	565	415%	- 52	-7%	61	63%	211	133%	- 20	-5%
	Auto Pass.	42	181%	320	494%	- 13	-3%	19	66%	68	145%	- 4	-3%
	Transit	28	236%	212	541%	97	39%	11	152%	24	127%	39	91%
	Walk	25	320%	183	551%	- 16	-8%	8	125%	62	456%	- 10	-13%
	Bike	3	354%	29	682%	- 5	-14%	2	154%	8	227%	- 1	-12%
61532	Auto Driver	- 18	-30%	82	188%	- 8	-6%	39	157%	- 31	-49%	- 1	-3%
	Auto Pass.	- 11	-37%	52	264%	- 2	-2%	8	56%	- 2	-10%	- 1	-3%
	Transit	- 9	-48%	29	300%	14	35%	5	565%	- 4	-69%	2	123%
	Walk	- 4	-37%	23	304%	- 2	-6%	3	184%	1	23%	- 1	-10%
	Bike	- 0	-29%	4	395%	- 1	-13%	1	513%	- 1	-55%	- 0	-10%
61541	Auto Driver	148	171%	176	75%	- 56	-14%	5	3%	108	76%	- 22	-9%
	Auto Pass.	73	217%	82	76%	- 11	-6%	14	48%	24	54%	- 3	-5%
	Transit	91	337%	80	68%	106	54%	7	46%	16	69%	41	107%
	Walk	60	338%	60	77%	- 16	-12%	6	47%	40	231%	- 10	-18%
	Bike	9	441%	13	117%	- 6	-24%	1	37%	6	144%	- 2	-17%
61542	Auto Driver	- 145	-43%	121	63%	- 30	-10%	13	16%	- 27	-29%	- 3	-4%
	Auto Pass.	- 61	-42%	57	67%	- 6	-4%	- 5	-14%	3	9%	- 1	-3%
	Transit	- 41	-37%	45	63%	58	50%	5	102%	- 4	-45%	6	114%
	Walk	- 38	-39%	39	65%	- 8	-8%	- 1	-12%	7	67%	- 2	-11%
	Bike	- 2	-22%	9	105%	- 4	-20%	1	79%	- 0	-20%	- 0	-13%

TAZ	Mode	AM TRIP FROM TAZ / STUDY AREA						AM TRIP TO TAZ / STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
61551	Auto Driver	50	39%	105	59%	-23	-8%	78	22%	188	43%	-40	-6%
	Auto Pass.	17	46%	29	52%	-4	-5%	22	25%	44	39%	-5	-3%
	Transit	21	432%	21	82%	29	62%	25	80%	20	36%	77	101%
	Walk	13	103%	50	190%	-9	-12%	12	36%	104	219%	-22	-15%
	Bike	2	253%	5	133%	-1	-19%	5	81%	9	92%	-3	-13%
61552	Auto Driver	17	28%	88	117%	-14	-8%	-3	-4%	38	60%	-4	-4%
	Auto Pass.	5	22%	33	111%	-3	-4%	1	5%	15	61%	-1	-3%
	Transit	18	127%	42	130%	27	36%	2	68%	4	65%	7	71%
	Walk	6	44%	35	183%	-5	-9%	-0	-5%	19	262%	-3	-11%
	Bike	2	127%	7	213%	-2	-20%	0	33%	2	144%	-0	-11%
61610	Auto Driver	28	18%	276	154%	-8	-2%	17	13%	77	52%	-3	-1%
	Auto Pass.	19	26%	153	166%	-2	-1%	34	27%	73	45%	-2	-1%
	Transit	19	53%	100	180%	15	10%	27	136%	24	52%	8	12%
	Walk	17	37%	99	156%	-4	-2%	45	49%	102	74%	-3	-1%
	Bike	3	65%	15	224%	-1	-6%	3	50%	6	73%	-0	-2%
63061	Auto Driver	-30	-20%	3	3%	-12	-10%	24	77%	-22	-40%	-1	-4%
	Auto Pass.	-12	-18%	2	4%	-3	-5%	3	14%	-2	-9%	-1	-3%
	Transit	-4	-6%	3	5%	23	40%	5	261%	-4	-59%	3	124%
	Walk	-3	-9%	-0	-1%	-3	-8%	2	40%	2	30%	-1	-12%
	Bike	0	9%	1	25%	-1	-21%	1	215%	-0	-37%	-0	-13%
63062	Auto Driver	53	58%	12	8%	-20	-13%	7	6%	52	41%	-16	-9%
	Auto Pass.	28	71%	3	4%	-4	-6%	7	30%	5	14%	-2	-4%
	Transit	46	123%	-2	-3%	37	45%	7	50%	9	40%	30	98%
	Walk	27	114%	2	4%	-6	-10%	4	32%	23	159%	-7	-19%
	Bike	4	154%	2	25%	-2	-23%	1	44%	3	98%	-1	-17%
63070	Auto Driver	6	10%	42	59%	-6	-5%	40	64%	75	74%	-8	-4%
	Auto Pass.	-1	-4%	14	48%	-1	-3%	10	46%	18	56%	-1	-3%
	Transit	1	7%	4	26%	7	41%	5	167%	7	78%	13	83%
	Walk	-1	-6%	8	65%	-1	-7%	3	75%	16	249%	-3	-13%
	Bike	0	30%	1	83%	-0	-14%	1	151%	3	151%	-1	-12%
63121	Auto Driver	42	39%	119	79%	-21	-8%	26	51%	-6	-8%	-3	-5%
	Auto Pass.	24	44%	66	83%	-5	-4%	9	45%	5	18%	-1	-3%
	Transit	29	77%	52	78%	42	35%	5	140%	-2	-25%	7	100%
	Walk	21	75%	44	89%	-5	-6%	3	66%	6	86%	-2	-13%
	Bike	3	97%	7	123%	-2	-16%	1	117%	0	13%	-0	-14%
63122	Auto Driver	5	19%	19	56%	-4	-8%	27	132%	30	64%	-6	-7%
	Auto Pass.	2	11%	8	50%	-1	-4%	5	45%	5	34%	-1	-4%
	Transit	2	24%	5	46%	6	39%	4	544%	4	76%	9	103%
	Walk	2	34%	4	72%	-1	-6%	2	161%	5	200%	-1	-18%
	Bike	0	47%	1	92%	-0	-18%	1	402%	1	158%	-0	-17%

TAZ	Mode	AM TRIP FROM TAZ / STUDY AREA						AM TRIP TO TAZ / STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
63131	Auto Driver	113	354%	612	423%	- 110	-15%	- 9	-7%	88	77%	- 14	-7%
	Auto Pass.	56	605%	288	439%	- 23	-7%	7	27%	48	140%	- 3	-4%
	Transit	76	5197%	391	505%	221	47%	3	26%	12	71%	29	105%
	Walk	42	2085%	261	595%	- 31	-10%	2	24%	46	453%	- 8	-15%
	Bike	6	3045%	47	702%	- 14	-26%	0	20%	4	171%	- 1	-17%
63132	Auto Driver	78	164%	491	392%	- 48	-8%	88	45%	206	73%	- 22	-4%
	Auto Pass.	32	236%	212	459%	- 10	-4%	34	55%	62	65%	- 3	-2%
	Transit	36	2570%	244	652%	97	34%	26	137%	28	63%	43	59%
	Walk	27	678%	239	770%	- 19	-7%	22	43%	133	185%	- 15	-8%
	Bike	4	1055%	38	877%	- 8	-19%	4	89%	11	131%	- 2	-10%
63133	Auto Driver	- 155	-79%	155	367%	- 15	-8%	22	54%	13	21%	- 3	-4%
	Auto Pass.	- 73	-81%	70	401%	- 3	-4%	- 4	-18%	10	56%	- 1	-2%
	Transit	- 50	-77%	75	493%	30	34%	5	283%	1	16%	5	72%
	Walk	- 57	-85%	66	636%	- 5	-6%	- 1	-22%	11	247%	- 2	-11%
	Bike	- 5	-77%	11	748%	- 2	-19%	1	172%	1	64%	- 0	-12%
63140	Auto Driver	- 13	-5%	192	83%	- 55	-13%	20	25%	32	31%	- 9	-7%
	Auto Pass.	- 9	-7%	99	86%	- 12	-6%	5	17%	14	36%	- 2	-4%
	Transit	1	2%	49	68%	97	79%	4	95%	2	30%	18	169%
	Walk	2	3%	67	93%	- 10	-7%	1	13%	14	170%	- 3	-15%
	Bike	2	24%	11	125%	- 4	-23%	1	76%	2	82%	- 1	-17%
63150	Auto Driver	37	15%	73	26%	- 47	-13%	46	32%	54	28%	- 17	-7%
	Auto Pass.	22	20%	36	27%	- 11	-6%	54	42%	69	38%	- 14	-6%
	Transit	16	49%	8	16%	76	132%	14	85%	26	87%	46	83%
	Walk	22	32%	22	25%	- 6	-5%	25	34%	50	50%	- 9	-6%
	Bike	2	39%	4	45%	- 3	-22%	2	45%	5	66%	- 1	-10%
STUDY AREA	Auto Driver	889	24%	7,432	161%	-1,067	-9%	1,387	48%	2,068	49%	- 329	-5%
	Auto Pass.	417	25%	3,737	177%	- 227	-4%	585	39%	953	46%	- 75	-2%
	Transit	652	59%	3,342	191%	2,023	40%	419	123%	314	41%	679	63%
	Walk	439	42%	2,989	201%	- 313	-7%	492	53%	1,830	129%	- 201	-6%
	Bike	80	80%	486	271%	- 120	-18%	67	95%	130	94%	- 26	-10%
	Total	2,476	32%	17,986	177%	297	1%	2,951	52%	5,295	61%	48	0%

Table 9: Additional Trips by TAZ (PM Peak Hour)

TAZ	Mode	PM TRIP FROM TAZ / STUDY AREA						PM TRIP TO TAZ / STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
61190	Auto Driver	19	31%	56	68%	- 4	-3%	53	45%	106	62%	- 9	-3%
	Auto Pass.	9	37%	18	55%	- 1	-2%	15	43%	29	59%	- 2	-2%
	Transit	6	92%	6	53%	8	43%	22	64%	22	40%	15	20%
	Walk	5	94%	16	169%	- 2	-7%	8	91%	18	113%	- 2	-6%
	Bike	1	127%	4	144%	- 0	-8%	3	140%	7	119%	- 1	-9%
61200	Auto Driver	24	26%	63	54%	- 4	-2%	71	58%	108	55%	- 6	-2%
	Auto Pass.	11	38%	19	48%	- 1	-2%	20	55%	30	54%	- 1	-1%
	Transit	5	84%	6	56%	6	31%	19	87%	18	45%	10	16%
	Walk	3	65%	13	171%	- 2	-7%	5	87%	13	109%	- 1	-5%
	Bike	2	104%	4	119%	- 1	-7%	4	158%	6	108%	- 1	-9%
61230	Auto Driver	115	70%	57	20%	- 11	-3%	117	51%	100	29%	- 17	-4%
	Auto Pass.	36	58%	21	21%	- 3	-2%	37	55%	28	27%	- 3	-3%
	Transit	27	149%	9	21%	21	39%	32	56%	17	19%	31	28%
	Walk	17	77%	43	110%	- 6	-8%	16	75%	31	85%	- 5	-8%
	Bike	5	161%	5	62%	- 1	-8%	6	127%	8	72%	- 2	-11%
61280	Auto Driver	22	31%	70	77%	- 6	-4%	20	15%	141	92%	- 14	-5%
	Auto Pass.	4	16%	22	72%	- 1	-3%	4	11%	37	85%	- 2	-3%
	Transit	10	125%	9	51%	10	39%	23	55%	39	60%	27	26%
	Walk	6	90%	22	186%	- 2	-7%	7	65%	26	153%	- 3	-7%
	Bike	2	142%	5	154%	- 1	-9%	3	116%	10	160%	- 2	-11%
61290	Auto Driver	47	23%	370	147%	- 13	-2%	38	18%	1,007	409%	- 31	-2%
	Auto Pass.	25	29%	165	149%	- 4	-1%	14	22%	293	365%	- 6	-2%
	Transit	29	96%	49	83%	24	22%	23	49%	348	492%	54	13%
	Walk	17	52%	138	280%	- 8	-4%	7	39%	163	627%	- 9	-5%
	Bike	5	97%	24	246%	- 2	-6%	5	109%	52	552%	- 5	-8%
61331	Auto Driver	- 24	-13%	65	41%	- 15	-7%	- 120	-39%	217	117%	- 40	-10%
	Auto Pass.	- 13	-19%	30	53%	- 4	-5%	- 33	-38%	56	105%	- 7	-6%
	Transit	8	44%	8	30%	34	96%	- 25	-32%	67	124%	84	69%
	Walk	- 1	-2%	59	164%	- 11	-11%	- 12	-29%	64	219%	- 13	-14%
	Bike	1	32%	5	96%	- 2	-14%	0	5%	15	193%	- 5	-21%
61332	Auto Driver	144	296%	198	103%	- 37	-9%	219	187%	345	103%	- 91	-13%
	Auto Pass.	43	199%	54	83%	- 8	-7%	61	182%	89	94%	- 15	-8%
	Transit	32	688%	37	101%	88	121%	122	308%	140	87%	203	68%
	Walk	43	451%	135	258%	- 31	-16%	61	385%	154	200%	- 39	-17%
	Bike	8	753%	16	185%	- 4	-17%	14	509%	29	172%	- 11	-25%
61341	Auto Driver	95	53%	- 102	-37%	- 11	-6%	- 107	-38%	88	51%	- 22	-8%
	Auto Pass.	1	2%	- 7	-12%	- 2	-5%	- 29	-36%	21	42%	- 4	-5%
	Transit	33	167%	- 25	-48%	25	93%	- 38	-48%	43	106%	47	56%
	Walk	5	19%	24	76%	- 8	-14%	- 11	-32%	37	153%	- 8	-13%
	Bike	5	119%	- 1	-10%	- 1	-14%	- 1	-12%	8	140%	- 3	-20%

TAZ	Mode	PM TRIP FROM TAZ / STUDY AREA						PM TRIP TO TAZ / STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
61342	Auto Driver	245	989%	494	183%	- 69	-9%	320	1917%	866	257%	- 157	-13%
	Auto Pass.	69	854%	146	189%	- 14	-6%	92	1437%	235	240%	- 26	-8%
	Transit	55	1881%	100	172%	174	110%	149	10284%	419	279%	360	63%
	Walk	60	2667%	374	598%	- 67	-15%	77	4988%	434	555%	- 79	-15%
	Bike	11	3089%	44	386%	- 9	-16%	15	7112%	71	459%	- 20	-23%
61400	Auto Driver	59	78%	167	125%	- 19	-6%	49	57%	294	218%	- 32	-7%
	Auto Pass.	14	60%	55	142%	- 5	-5%	14	54%	84	206%	- 6	-5%
	Transit	16	210%	28	118%	48	91%	21	116%	106	277%	75	52%
	Walk	14	203%	79	374%	- 12	-12%	14	189%	91	418%	- 15	-13%
	Bike	3	237%	12	255%	- 2	-13%	3	215%	19	373%	- 4	-15%
61410	Auto Driver	112	158%	274	150%	- 33	-7%	100	117%	719	388%	- 86	-9%
	Auto Pass.	29	104%	114	203%	- 9	-6%	31	113%	212	366%	- 16	-6%
	Transit	22	333%	34	118%	71	112%	33	190%	239	470%	186	64%
	Walk	19	212%	148	519%	- 24	-14%	19	247%	201	744%	- 33	-15%
	Bike	5	356%	23	332%	- 4	-15%	5	297%	48	651%	- 11	-19%
61480	Auto Driver	140	151%	180	77%	- 28	-7%	74	40%	468	181%	- 58	-8%
	Auto Pass.	26	73%	69	114%	- 7	-5%	18	33%	122	170%	- 9	-5%
	Transit	34	408%	23	55%	67	101%	33	65%	183	218%	136	51%
	Walk	26	219%	110	288%	- 19	-12%	25	120%	153	331%	- 27	-13%
	Bike	7	368%	16	171%	- 3	-13%	7	180%	36	310%	- 7	-16%
61531	Auto Driver	108	63%	466	167%	- 39	-5%	111	89%	664	280%	- 60	-7%
	Auto Pass.	32	63%	144	176%	- 9	-4%	34	85%	192	260%	- 12	-4%
	Transit	27	146%	73	159%	98	82%	30	186%	174	371%	134	61%
	Walk	22	144%	191	504%	- 27	-12%	20	185%	183	591%	- 26	-12%
	Bike	6	197%	27	311%	- 4	-11%	6	261%	36	468%	- 6	-14%
61532	Auto Driver	67	177%	- 51	-49%	- 3	-5%	13	18%	42	52%	- 8	-6%
	Auto Pass.	15	93%	- 8	-26%	- 1	-4%	5	23%	11	40%	- 1	-4%
	Transit	12	461%	- 9	-65%	5	108%	- 3	-18%	18	138%	16	50%
	Walk	8	245%	1	10%	- 1	-11%	3	66%	10	120%	- 2	-11%
	Bike	2	401%	- 1	-31%	- 0	-11%	1	89%	3	107%	- 1	-15%
61541	Auto Driver	30	17%	172	83%	- 35	-9%	151	111%	219	76%	- 62	-12%
	Auto Pass.	21	52%	42	68%	- 7	-7%	43	117%	57	71%	- 11	-8%
	Transit	17	71%	32	77%	84	114%	86	286%	75	65%	139	73%
	Walk	22	102%	92	210%	- 23	-17%	40	216%	92	156%	- 25	-17%
	Bike	4	112%	13	149%	- 4	-18%	10	354%	17	136%	- 7	-24%
61542	Auto Driver	- 10	-7%	- 10	-7%	- 8	-6%	- 141	-38%	112	49%	- 31	-9%
	Auto Pass.	- 15	-26%	8	17%	- 3	-5%	- 39	-39%	27	45%	- 5	-6%
	Transit	8	63%	- 4	-21%	17	107%	- 29	-29%	36	52%	64	61%
	Walk	- 9	-25%	25	92%	- 7	-12%	- 21	-34%	42	104%	- 11	-13%
	Bike	1	32%	2	36%	- 1	-14%	- 0	-3%	9	99%	- 4	-20%

TAZ	Mode	PM TRIP FROM TAZ / STUDY AREA						PM TRIP TO TAZ / STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
61551	Auto Driver	127	18%	437	54%	- 66	-5%	102	23%	334	62%	- 47	-5%
	Auto Pass.	35	18%	110	48%	- 13	-4%	30	22%	95	55%	- 11	-4%
	Transit	60	70%	79	55%	181	81%	42	115%	55	71%	121	91%
	Walk	40	40%	315	227%	- 53	-12%	32	47%	224	224%	- 40	-12%
	Bike	12	100%	28	116%	- 6	-12%	9	128%	23	140%	- 5	-13%
61552	Auto Driver	- 9	-7%	85	76%	- 9	-4%	10	9%	131	104%	- 16	-6%
	Auto Pass.	- 2	-4%	29	74%	- 2	-4%	1	3%	37	93%	- 3	-4%
	Transit	6	59%	14	82%	19	59%	20	111%	46	118%	36	42%
	Walk	- 1	-3%	57	271%	- 8	-10%	2	9%	63	256%	- 9	-10%
	Bike	1	52%	7	181%	- 1	-11%	2	95%	11	211%	- 2	-16%
61610	Auto Driver	5	4%	109	90%	- 5	-2%	24	14%	270	137%	- 10	-2%
	Auto Pass.	8	15%	49	85%	- 2	-2%	8	15%	76	126%	- 2	-1%
	Transit	10	130%	15	80%	8	25%	22	69%	85	160%	18	13%
	Walk	8	45%	39	153%	- 3	-4%	8	45%	51	205%	- 4	-5%
	Bike	2	64%	7	152%	- 1	-5%	3	88%	15	205%	- 1	-6%
63061	Auto Driver	20	34%	- 22	-27%	- 4	-7%	- 24	-16%	1	1%	- 12	-10%
	Auto Pass.	0	2%	- 2	-9%	- 1	-6%	- 6	-14%	- 0	-1%	- 2	-6%
	Transit	8	138%	- 5	-38%	9	105%	1	2%	- 0	-1%	26	51%
	Walk	3	21%	6	43%	- 3	-14%	1	5%	8	37%	- 4	-14%
	Bike	1	106%	- 0	-2%	- 0	-15%	1	37%	1	30%	- 1	-22%
63062	Auto Driver	18	13%	59	37%	- 21	-10%	55	50%	22	14%	- 22	-12%
	Auto Pass.	10	32%	6	15%	- 3	-7%	17	56%	4	8%	- 4	-7%
	Transit	15	62%	15	38%	52	98%	46	119%	1	2%	55	64%
	Walk	11	61%	37	126%	- 12	-18%	17	101%	24	69%	- 10	-17%
	Bike	3	83%	5	83%	- 2	-18%	4	168%	4	50%	- 2	-23%
63070	Auto Driver	76	67%	176	93%	- 14	-4%	38	37%	118	83%	- 11	-4%
	Auto Pass.	21	56%	47	82%	- 3	-3%	12	37%	35	78%	- 2	-3%
	Transit	14	154%	23	101%	30	66%	6	45%	11	58%	20	68%
	Walk	9	92%	54	289%	- 8	-11%	5	68%	33	253%	- 5	-11%
	Bike	3	172%	8	182%	- 1	-10%	2	127%	6	172%	- 1	-12%
63121	Auto Driver	38	50%	13	11%	- 9	-7%	48	39%	109	65%	- 22	-8%
	Auto Pass.	12	45%	11	29%	- 3	-6%	15	42%	30	59%	- 5	-6%
	Transit	11	134%	- 1	-6%	18	102%	27	82%	41	67%	45	45%
	Walk	7	79%	17	115%	- 5	-14%	9	80%	25	128%	- 6	-13%
	Bike	2	142%	2	57%	- 1	-15%	3	129%	6	122%	- 2	-20%
63122	Auto Driver	34	142%	45	76%	- 8	-7%	14	41%	32	67%	- 6	-7%
	Auto Pass.	7	67%	10	57%	- 1	-5%	4	37%	9	59%	- 1	-5%
	Transit	7	407%	8	86%	17	101%	4	51%	6	54%	12	67%
	Walk	3	213%	10	254%	- 2	-17%	2	109%	6	189%	- 1	-15%
	Bike	1	367%	2	172%	- 1	-17%	1	137%	2	145%	- 1	-20%

TAZ	Mode	PM TRIP FROM TAZ / STUDY AREA						PM TRIP TO TAZ / STUDY AREA					
		2017 to 2050		2050 to Full Build		Full Build Base to Transit		2017 to 2050		2050 to Full Build		Full Build Base to Transit	
		Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
63131	Auto Driver	1	0%	219	134%	- 35	-9%	101	121%	625	338%	- 110	-14%
	Auto Pass.	10	27%	89	187%	- 10	-7%	28	110%	169	310%	- 19	-8%
	Transit	9	39%	39	119%	73	102%	69	787%	339	438%	236	57%
	Walk	9	66%	142	600%	- 25	-15%	20	240%	203	709%	- 36	-15%
	Bike	2	74%	18	350%	- 4	-18%	6	464%	46	648%	- 14	-27%
63132	Auto Driver	105	44%	362	105%	- 34	-5%	102	82%	575	255%	- 52	-6%
	Auto Pass.	28	49%	106	125%	- 6	-3%	29	75%	155	229%	- 9	-4%
	Transit	35	147%	57	97%	74	65%	42	471%	224	442%	116	42%
	Walk	17	58%	211	465%	- 27	-11%	18	108%	225	639%	- 27	-10%
	Bike	6	126%	27	241%	- 4	-11%	5	253%	43	565%	- 9	-17%
63133	Auto Driver	3	4%	45	58%	- 6	-5%	- 138	-68%	157	241%	- 15	-7%
	Auto Pass.	- 12	-35%	21	94%	- 2	-4%	- 37	-65%	41	207%	- 3	-4%
	Transit	7	131%	6	49%	11	64%	- 36	-68%	66	387%	32	39%
	Walk	- 8	-49%	32	378%	- 4	-10%	- 21	-73%	45	569%	- 5	-10%
	Bike	0	23%	4	176%	- 1	-12%	- 3	-59%	11	527%	- 2	-19%
63140	Auto Driver	26	18%	81	47%	- 21	-8%	- 0	-0%	194	73%	- 56	-12%
	Auto Pass.	6	10%	29	49%	- 6	-6%	- 0	-1%	52	69%	- 10	-8%
	Transit	8	81%	8	42%	42	158%	6	10%	38	62%	106	107%
	Walk	2	11%	39	186%	- 9	-15%	1	4%	43	157%	- 10	-14%
	Bike	2	77%	5	108%	- 2	-17%	3	53%	10	135%	- 5	-25%
63150	Auto Driver	32	22%	43	24%	- 22	-10%	37	14%	79	26%	- 48	-13%
	Auto Pass.	15	24%	21	27%	- 7	-7%	12	16%	23	26%	- 9	-8%
	Transit	7	103%	6	39%	38	188%	16	55%	8	18%	84	161%
	Walk	3	22%	8	59%	- 3	-14%	2	19%	6	44%	- 3	-13%
	Bike	1	56%	2	61%	- 1	-22%	2	50%	4	59%	- 3	-28%
STUDY AREA	Auto Driver	1,671	43%	4,122	74%	- 587	-6%	1,335	28%	8,141	133%	-1,151	-8%
	Auto Pass.	444	34%	1,416	81%	- 140	-4%	400	28%	2,247	124%	- 205	-5%
	Transit	538	129%	641	67%	1,354	85%	761	74%	2,864	160%	2,490	53%
	Walk	359	68%	2,438	275%	- 410	-12%	356	65%	2,669	296%	- 456	-13%
	Bike	107	137%	312	169%	- 64	-13%	121	124%	552	252%	- 139	-18%
	Total	3,119	50%	8,930	95%	153	1%	2,974	38%	16,473	152%	539	2%

4. GUILDFORD MESOSCOPIC MODELLING (VISUM)

As the SSAM is designed as a broad tool for estimating existing and future traffic conditions at a regional and city-wide scale, the mesoscopic Visum model, developed as part of this study, provides a tool that combines the capabilities of both macroscopic and microscopic models to best understand traffic conditions within a scale that falls between the city-wide scale and intersection level of detail. Compared to the SSAM, the Visum model incorporates more detailed operational elements (e.g., turning lane storage lengths, signal timings, signal coordination etc.) and does a better job at capturing travel behaviour and operations at the corridor and intersection level. As such, the Visum model traffic assignment serves as a reasonable tool to estimate link and turn volume growth, identify potential hot spots, and incorporate future forecast volumes to evaluate future traffic operations.

The approach undertaken for the development of the Visum model, including calibration and validation, as well as the results of the traffic operations analysis performed with the Visum model are presented in the subsequent sections.

4.1. VISUM MODEL DEVELOPMENT

Developing the Visum model included the following components: coding the road network including signals for the study area, inputting observed traffic volumes for model calibration and validation, and developing the procedure to assign the traversal SSAM demands to the Visum network. These are described in greater detail in the subsections below.

4.1.1. Network

The 2017 Base Year Scenario from the SSAM was used as a starting point for developing the mesoscopic 2017 Base Year Visum model. The initial framework of the Visum network was built from the traffic analysis zone shapefile retrieved from the SSAM, as shown in **Figure 46**. The SSAM link shapefile includes road characteristics (e.g., link length and shape, road classification, roadway capacities, number of lanes, and posted speed limits) and was used to develop the initial road network for the Visum model. A thorough review of the initial network was performed to ensure that each roadway's facility type, posted speed limit, and number of directional lanes aligned with existing conditions, as shown in **Figure 47** to **Figure 49**.

The following tasks were also undertaken to complete the network development:

- Code traffic zone connectors and attributes
- Develop volume delay functions (VDF)
- Assign VDF to network links based on road classification
- Identify truck routes
- Code detailed intersection characteristics (e.g., major flow direction, orientation, lane configuration and geometry, and turn restrictions)
- Code traffic signal timing specifications provided by the City.

Figure 46: Traffic Analysis Zones for 2017 Base Scenario

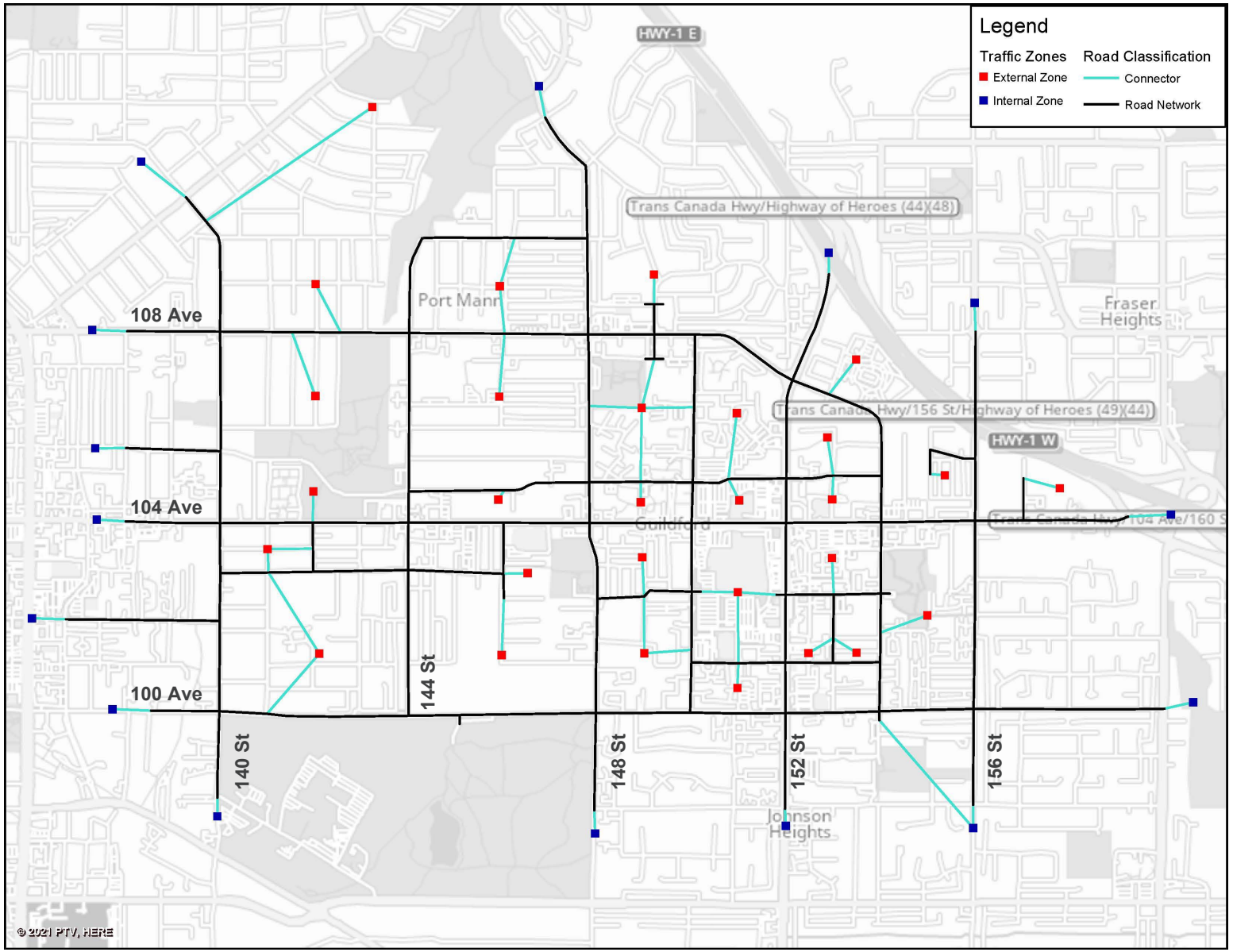


Figure 47: Road Classification and Control Type for 2017 Base Scenario

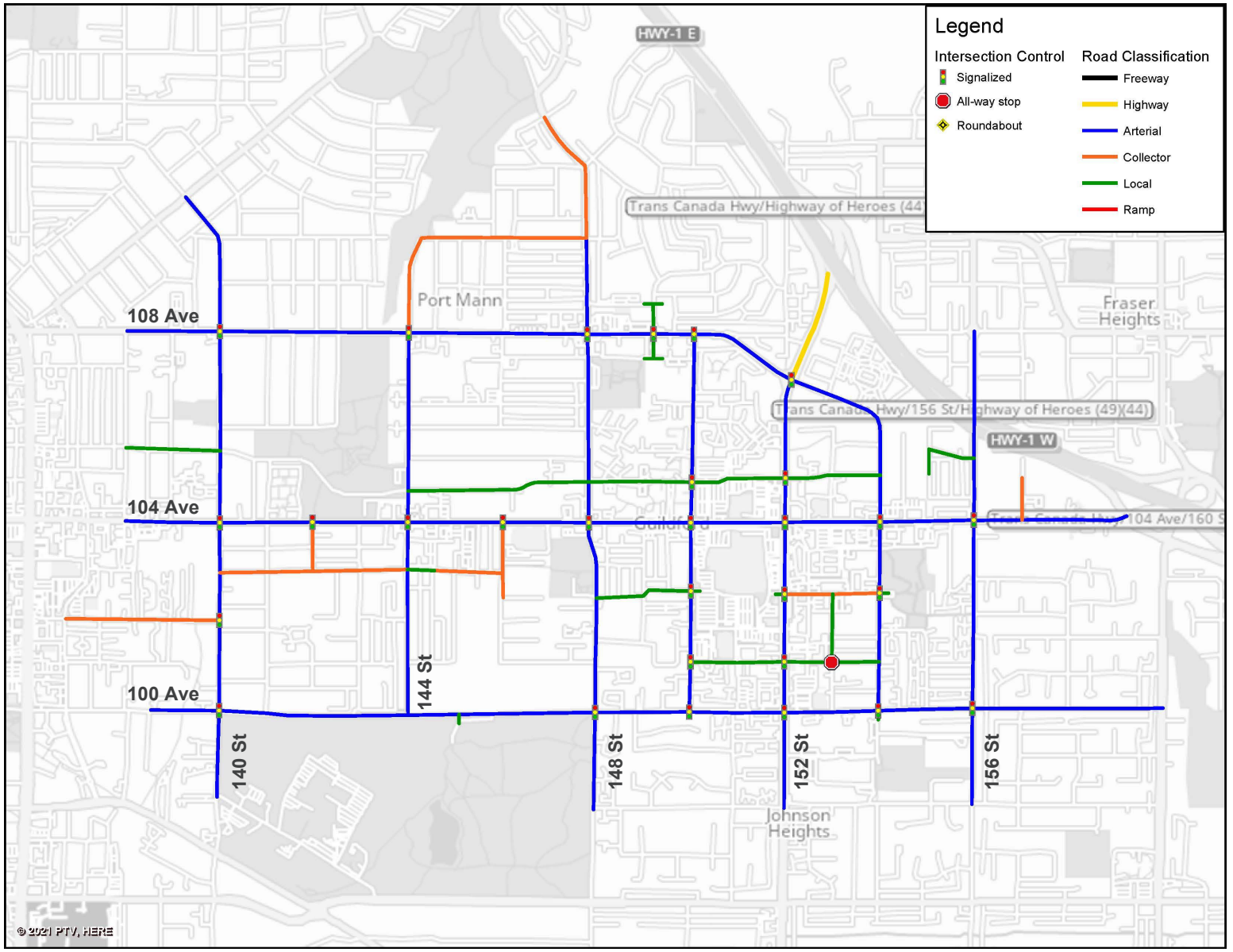


Figure 48: Number of Directional Lanes for 2017 Base Scenario

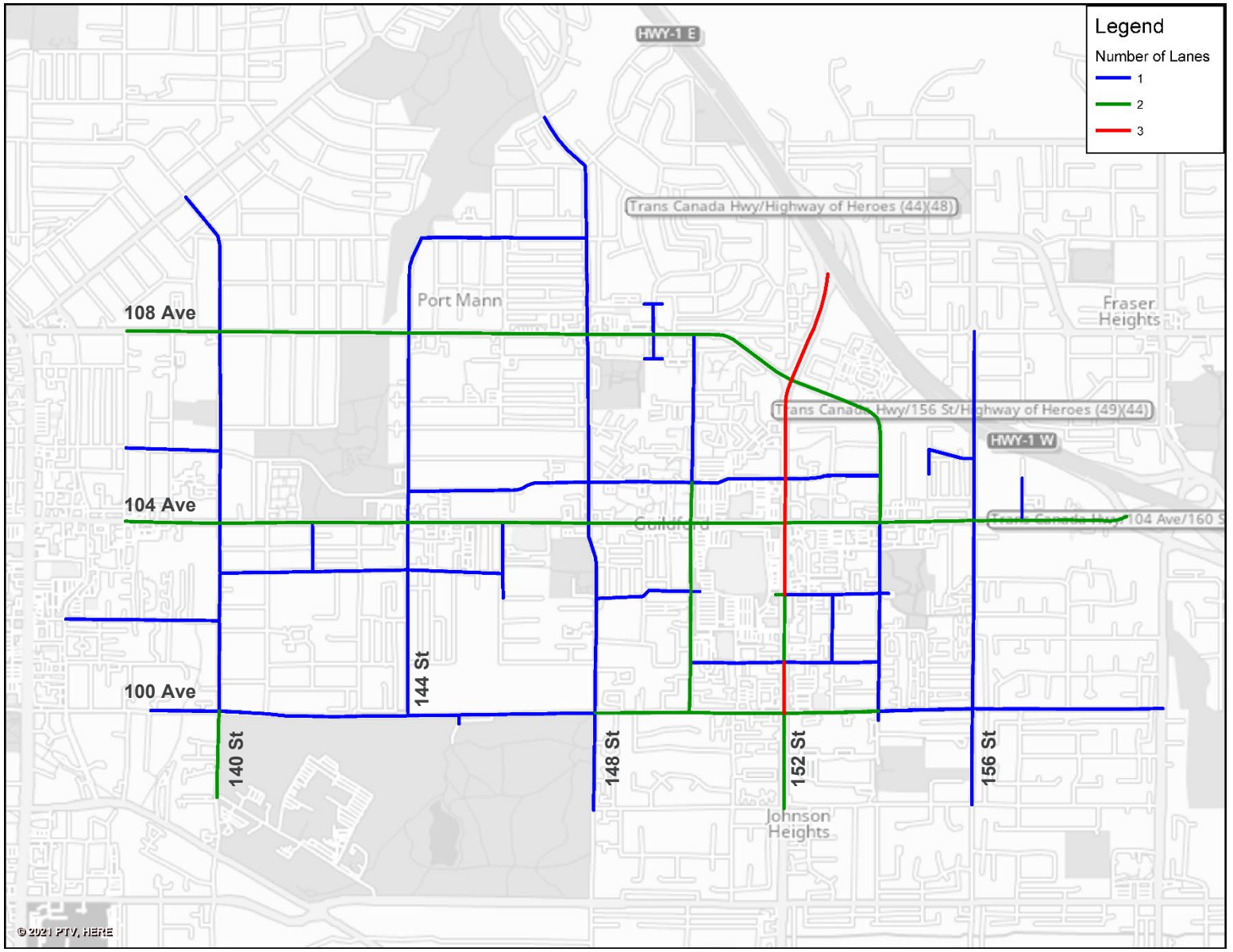
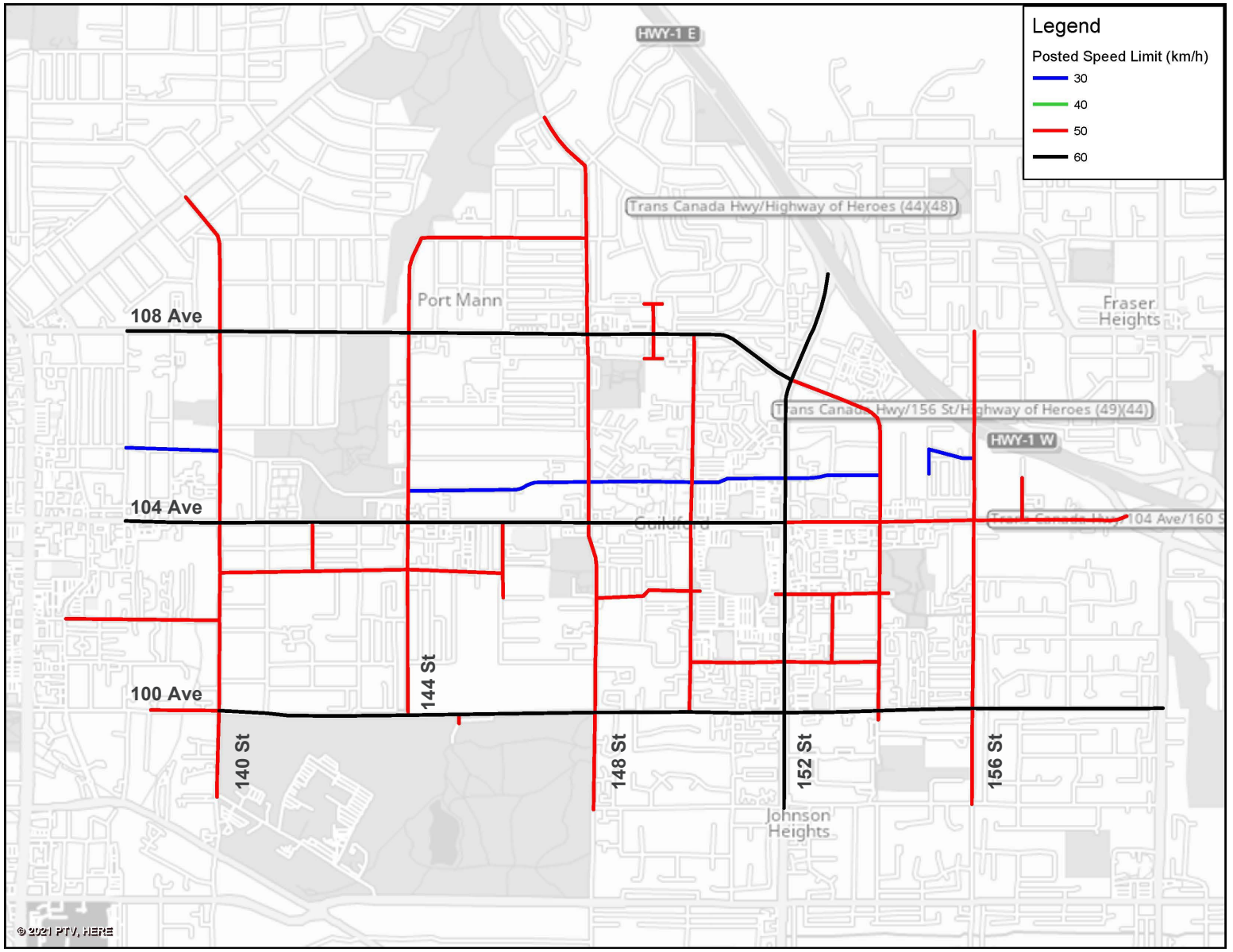


Figure 49: Posted Speed Limits for 2017 Base Scenario



4.1.2. Traffic Volume Input

As discussed in **Section 2.3**, link level traffic counts were summarized for 25 locations within Guildford. These were used to calibrate and validate the mesoscopic model to ensure that the model provides an accurate representation of the traffic conditions observed in 2017.

4.1.3. Assignment Procedure

The development of the assignment procedure is a major component of the Visum model. Through a collection of procedures and steps, origin-destination trip tables by auto transport mode (single occupancy vehicles (SOV), high occupancy vehicles (HOV), light truck vehicles (LGV), and heavy truck vehicles (HGV)) were extracted from the SSAM and subsequently, assigned in the Visum model. As part of the traffic assignment, the following tasks were completed:

- Select volume delay functions (vdf) and impedances for the network links. The functions are used to estimate the delay on network links and the impedance calculations are used to determine congested assignment routing.
- Calculate heavy truck penalties for heavy truck vehicles travelling off the truck route(s). This is specifically included in the impedance calculation for heavy trucks. Heavy trucks are not banned on these links, rather they are discouraged (or penalized) from travelling on these links unless required. This corresponds to bylaws which require heavy vehicles to stay on the truck route(s) except where required for deliveries, pickup, access etc.
- Calculate intersection impedance in Visum based on HCM 2010.
- Select and establish Intersection Capacity Analysis (ICA) assignment procedures.
- Apply limited demand adjust using Visum's "TFlowFuzzy" matrix adjustment tool which iteratively adjusts the origin-destination trip tables to match observed traffic volumes by utilizing the relation of link or turning movement traffic volumes and the macro-level traffic patterns from the SSAM.
- Calculate and incorporate the incremental demand adjust matrices into the assignment procedure.

4.2. Model Calibration and Validation

To ensure that the Visum model provides accurate results and would be appropriate to support the forecasting needs of this project, validation was performed on modelled auto travel times and modelled traffic volumes. This section therefore describes the validation of the Visum model's auto travel times and traffic volumes for 2017 base conditions.

4.2.1. Demand Adjust

Validating and calibrating the model is an iterative process that requires adjusting the demand matrices to improve the model's ability to replicate observed travel patterns. **Table 8** presents the level of demand adjustment applied from the initial model run to the final model run by vehicle class for the AM and PM peak periods. Since the trips made to, from, and within Guildford are predominantly made by automobile, adjustments were not required for trucks (i.e., LGV and HGV). As shown in the table, the AM peak period has a net demand adjustment of -1.8% while the PM peak period has a net demand adjustment of 0.4%.

This level of adjustment also limited the distortion of the input origin-destination matrices preserving the integrity of the RTM's demand forecasts.

Table 10: Demand Adjustment by Vehicle Type and Occupancy

Vehicle Class	AM	PM
High Occupancy Vehicles (HOV) & Single Occupancy Vehicles (SOV)	-1.8%	0.4%
Light Grade Vehicles (LGV)	0%	0%
Heavy Grade Vehicles (HGV)	0%	0%

4.2.2. Traffic Volume

Similar to the validation of the SSAM, modelled traffic volumes were compared to traffic counts to determine how well the model validates traffic volumes within the study area. **Figure 50** provides a comparison of the modelled traffic volumes to the count volumes at the link-level during the AM peak period for the initial and final model runs. As shown, there is a bit of variation between the model and the count volume prior to making any adjustments to the model. As the slope of the goodness of fit line[1] and the R^2 are both less than one, this implies that the model is underestimating the demand. Having both the R^2 and the slope of the goodness of fit line equal to 1.0 would indicate a perfect fit. For this project, the target for both the R^2 and the slope of the goodness of fit line is 0.9.

Comparing the scatter plot of the initial run to the final run shows that the adjustments applied to the model improved the model fit. As illustrated, the final model run illustrates a closer match between the model volumes and traffic count volumes. With both the slope of the goodness of fit and the R^2 being closer to one, the results of the final model run indicate that at the link-level, the model replicates observed traffic volumes during the AM peak period reasonably well.

The validation of link volumes for the PM peak period is shown in **Figure 51**. As shown, the slope of the goodness of fit line remains the same after applying adjustments, however there is improvement in the value of the R^2 which changes from 0.93 to 0.96. Since both validation metrics either meet or exceed the target value of 0.9, this indicates that the model is capturing observed travel behaviour and patterns reasonably well.

[1] R^2 is a statistical measure of how close the data is to the fitted regression line. An R^2 of 1.0 and a regression line of y = x (i.e., slope equals to one) indicates a perfect fit.

Figure 50: Link-Level Volume Validation (AM Peak Period)

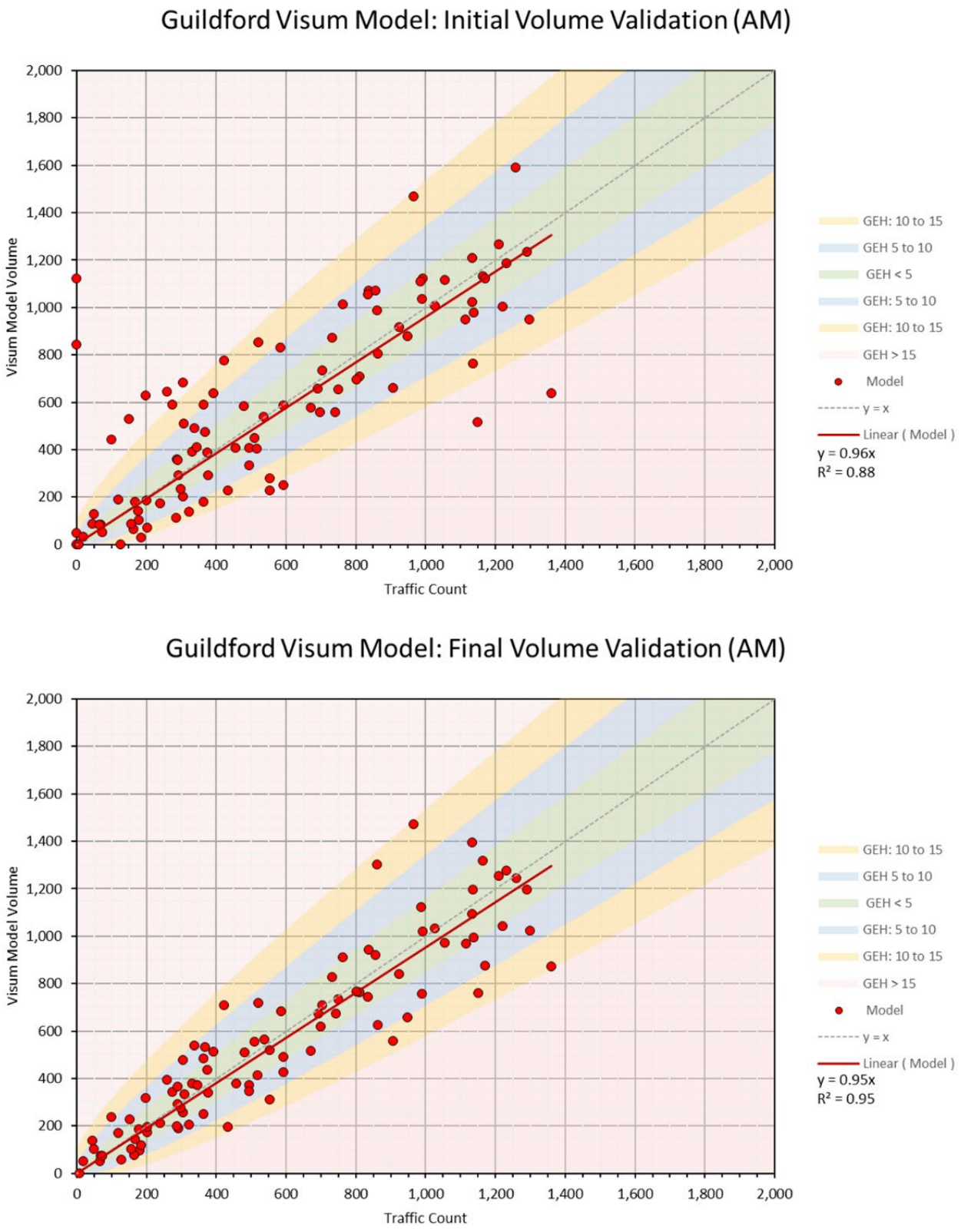
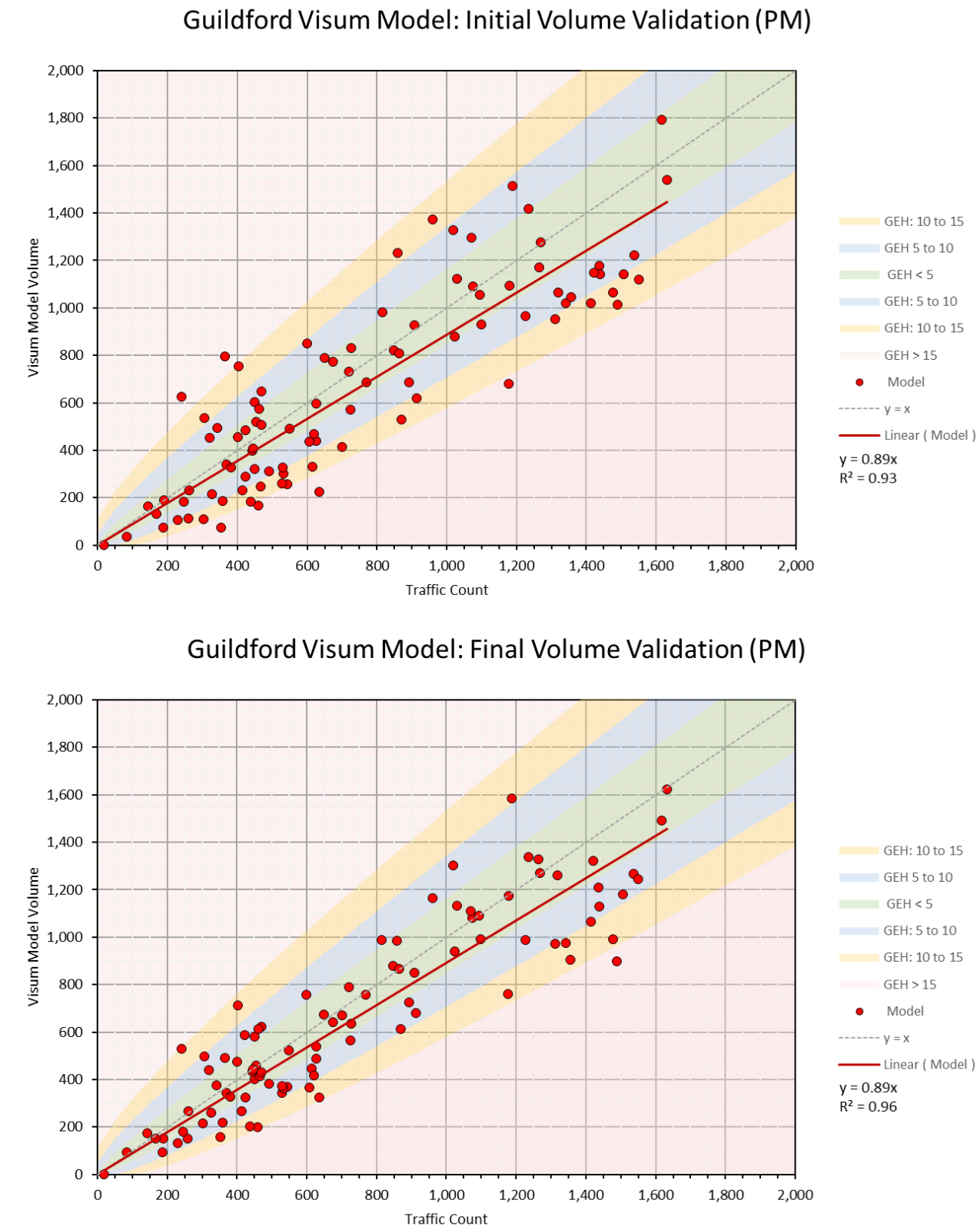


Figure 51: Link-Level Volume Validation (PM Peak Period)



In addition to the R^2 and the slope of the goodness of fit line, the GEH statistic was used as a supplementary validation metric to confirm the accuracy and fit of the model. For mesoscopic modelling, a GEH ≤ 10 is considered acceptable and is targeted for 85% of the locations in the study area. As shown in **Table 9** and **Table 10**, the results of the final run indicate that both the AM and PM peak periods achieve the 85% target for GEH ≤ 10. The mesoscopic model is shown to perform well in replicating observed volumes with 89% of the link volumes achieving a GEH value less than 10 during the AM peak period and 85% during the PM peak period.

Table 11: GEH Summary for AM Volume Validation

GEH Summary	Target	Initial Model Run	Final Model Run
GEH < 5	-	47%	57%
GEH < 10	85%	72%	89%
GEH < 15	-	87%	100%
GEH > 15	-	13%	0%

Table 12: GEH Summary for PM Volume Validation

GEH Summary	Target	Initial Model Run	Final Model Run
GEH < 5	-	34%	45%
GEH < 10	85%	69%	85%
GEH < 15	-	94%	99%
GEH > 15	-	6%	1%

4.2.3. Corridor Travel Time

Modelled travel times from the Visum model were compared with the travel time data supplied by the City's Bluetooth sensors for each key corridor within the study area. Comparison of the travel times are presented in **Figure 52** and **Figure 53** for the AM and PM peak hours for the following nine key corridors:

- 100 Avenue (EB/WB): 140 Street to 154 Street
- 104 Avenue (EB/WB): 140 Street to 154 Street
- 108 Avenue (EB/WB): 140 Street to 150 Street
- 140 Street (NB/SB): 100 Avenue to 108 Avenue
- 144 Street (NB/SB): 100 Avenue to 108 Avenue
- 148 Street (NB/SB): 100 Avenue to 108 Avenue
- 150 Street (NB/SB): 100 Avenue to 108 Avenue
- 152 Street (NB/SB): 100 Avenue to 108 Avenue
- 154 Street (NB/SB): 100 Avenue to 104 Avenue

As shown in the scatterplot for the AM peak period, the adjustments made in the final run improved the R^2 from 0.90 to 0.95, showing a much closer match to observed travel times. While the adjustments for the PM peak period did not significantly impact the slope of the goodness of fit line nor the R^2, both validation metrics either achieve or exceed the target of 0.9.

Figure 52: Auto Travel Time Validation (AM Peak Period)

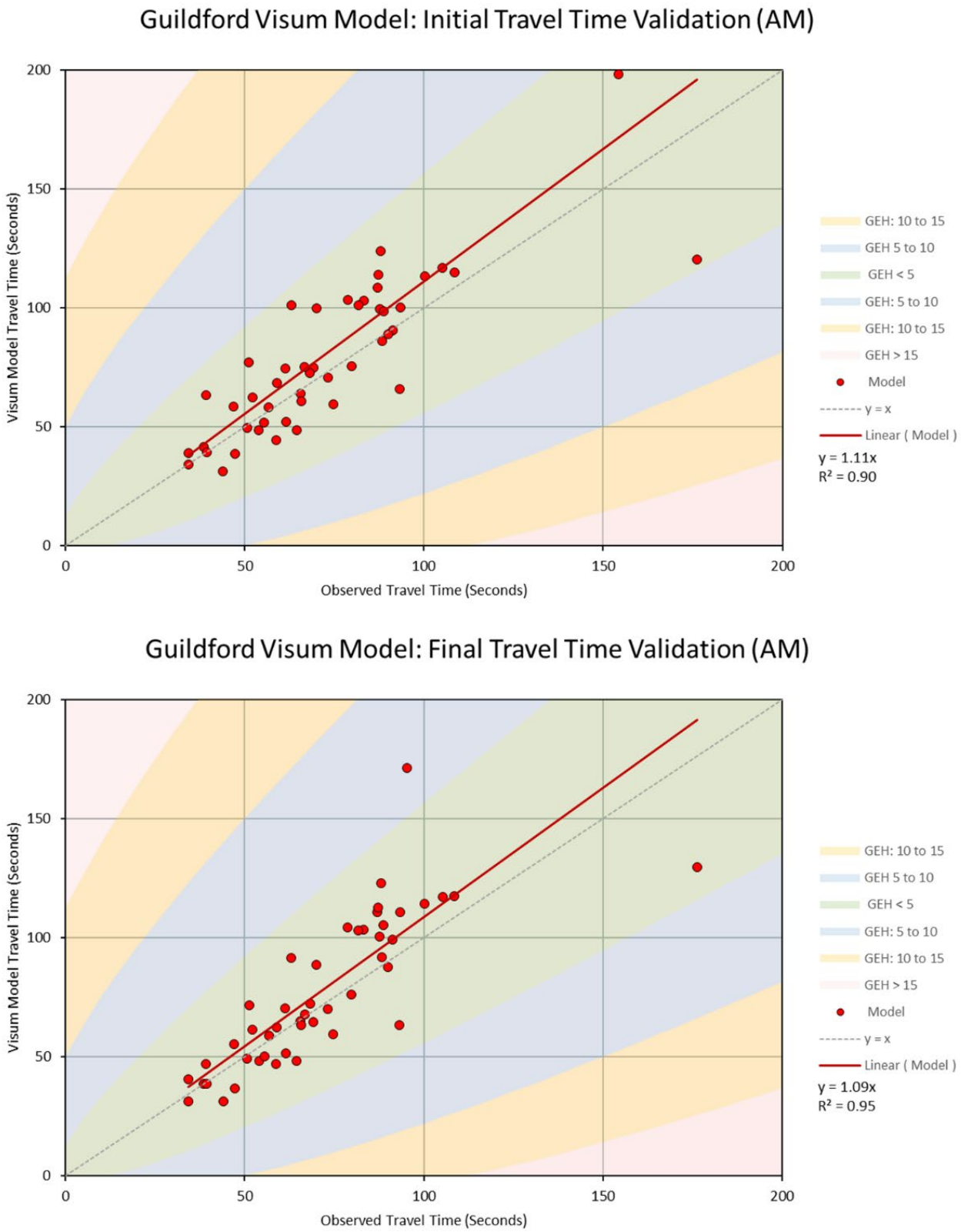
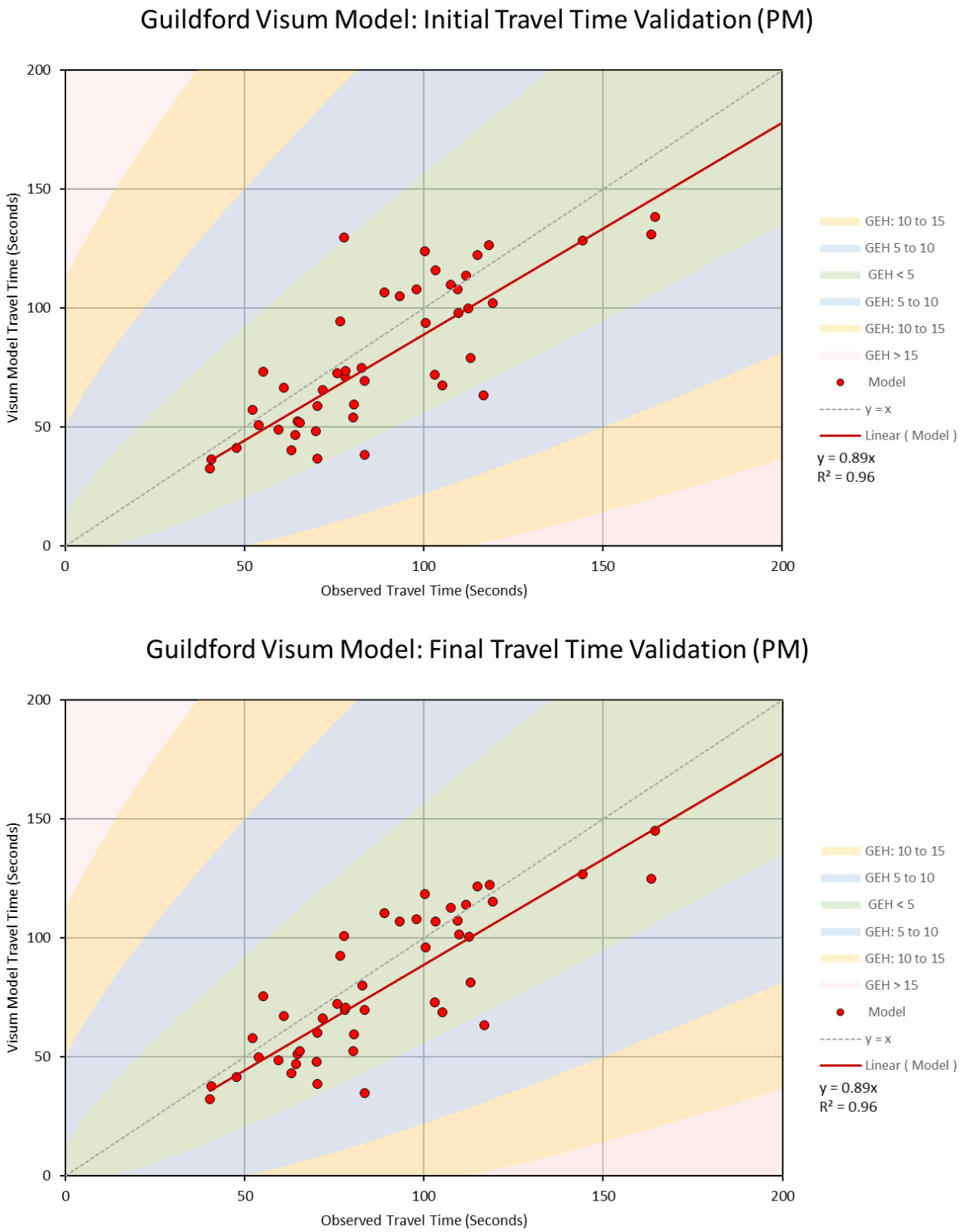


Figure 53: Auto Travel Time Validation (PM Peak Period)



4.3. FUTURE SCENARIO DEVELOPMENT

Modelling of the 2050 and Full Buildout Base Scenarios was undertaken using Visum to assess the potential traffic impacts associated with growth and road improvements planned for the Guildford Town Centre area.

The future roadway network used the same calibrated capacities and roadway characteristics from the base year Visum model. However, the base year roadway network was modified to include all the transportation improvements listed in **Section 3.5**. In addition, the 2050 Base Scenario also includes road improvements that were implemented past 2017, such as new traffic signals and storage bays.

The 2050 Base Scenario also includes intersection improvements at Guildford Drive/Ferguson Diversion and 152 Street and 104 Avenue and 157 Street. These improvements address queueing at these locations which limit the total volume entering the network. Without addressing these locations, it is not possible to evaluate the ability of the entire network to address the true demand for the study area. The traffic signal at 104 Avenue and 157 Street was optimized to improve performance. The improvements at Guildford Drive and 152 Street include intersection configuration and laning changes including dual EB left and dual SB left turn lanes, as well as signal timing changes including protected left turns, overlap phases, and removal of the split phases.

In addition to the above noted changes, the Full Buildout Base Scenario includes all improvements identified for the 2050 Base Scenario (**Section 6.3**). This ensures all deficiencies that were identified and addressed in the 2050 horizon are included for the full buildout horizon and only new deficiencies or issues need to be addressed.

The TAZ, road classification, traffic control, number of lanes, and posted speed limits coded for the 2050 Base Scenario and Full Buildout Base Scenario are shown in **Figure 54** to **Figure 58**.

The future (2050 and full buildout) travel demands for the Visum model were imported from the SSAM. The future demand matrices from the SSAM account for trip generation, trip distribution, and mode choice. The traffic assignment was performed in the Visum model, which provides better representation of intersection characteristics (e.g., traffic signal timings, lane configurations, storage lengths, delay, etc.). The assignment procedure developed for the base model was used to assign the future traffic volumes and incorporated the incremental demand adjust matrices from the base year validation.

Figure 54: Traffic Analysis Zones for 2050 and Full Buildout Base Scenarios

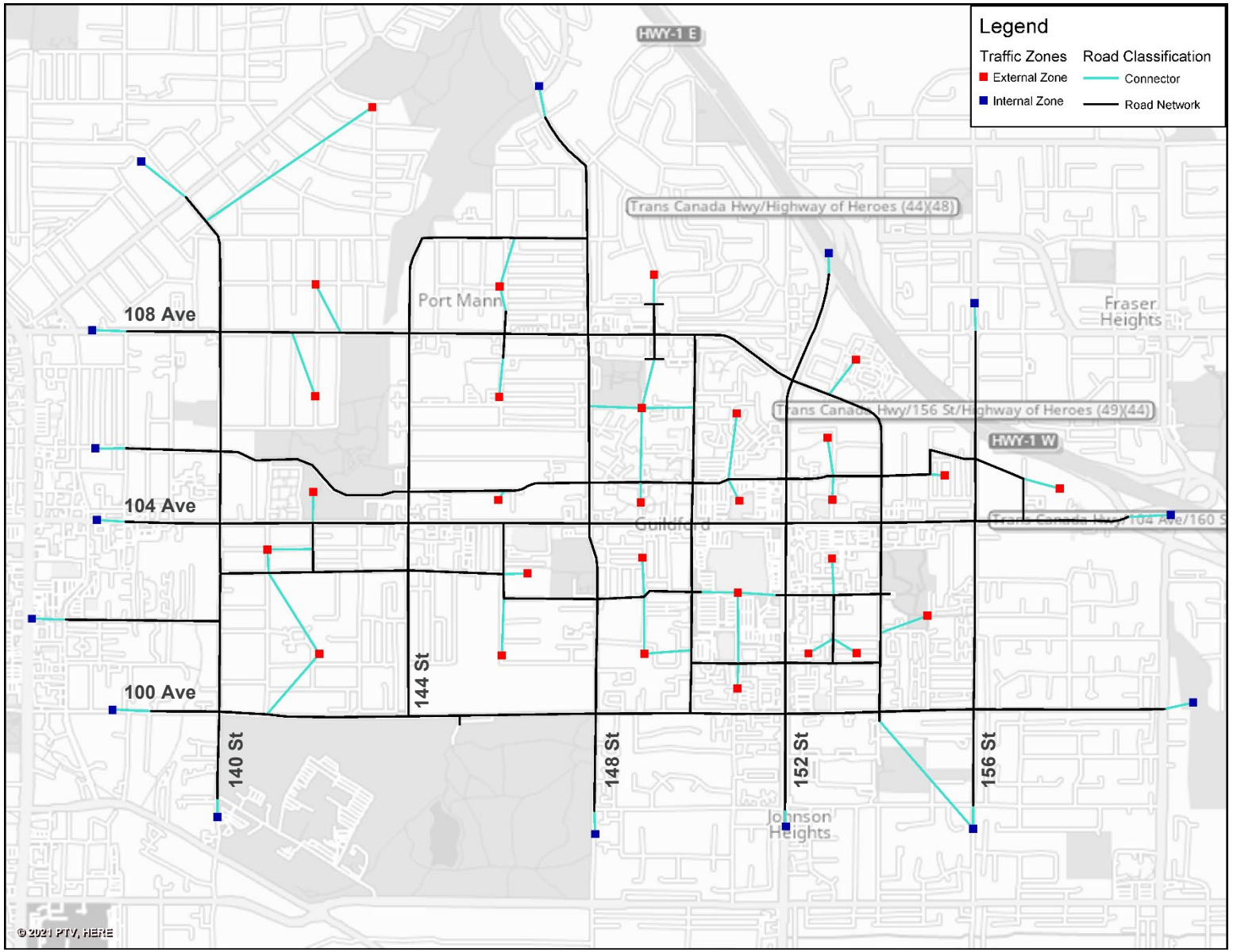


Figure 55: Road Classification and Control Type for 2050 Base Scenario

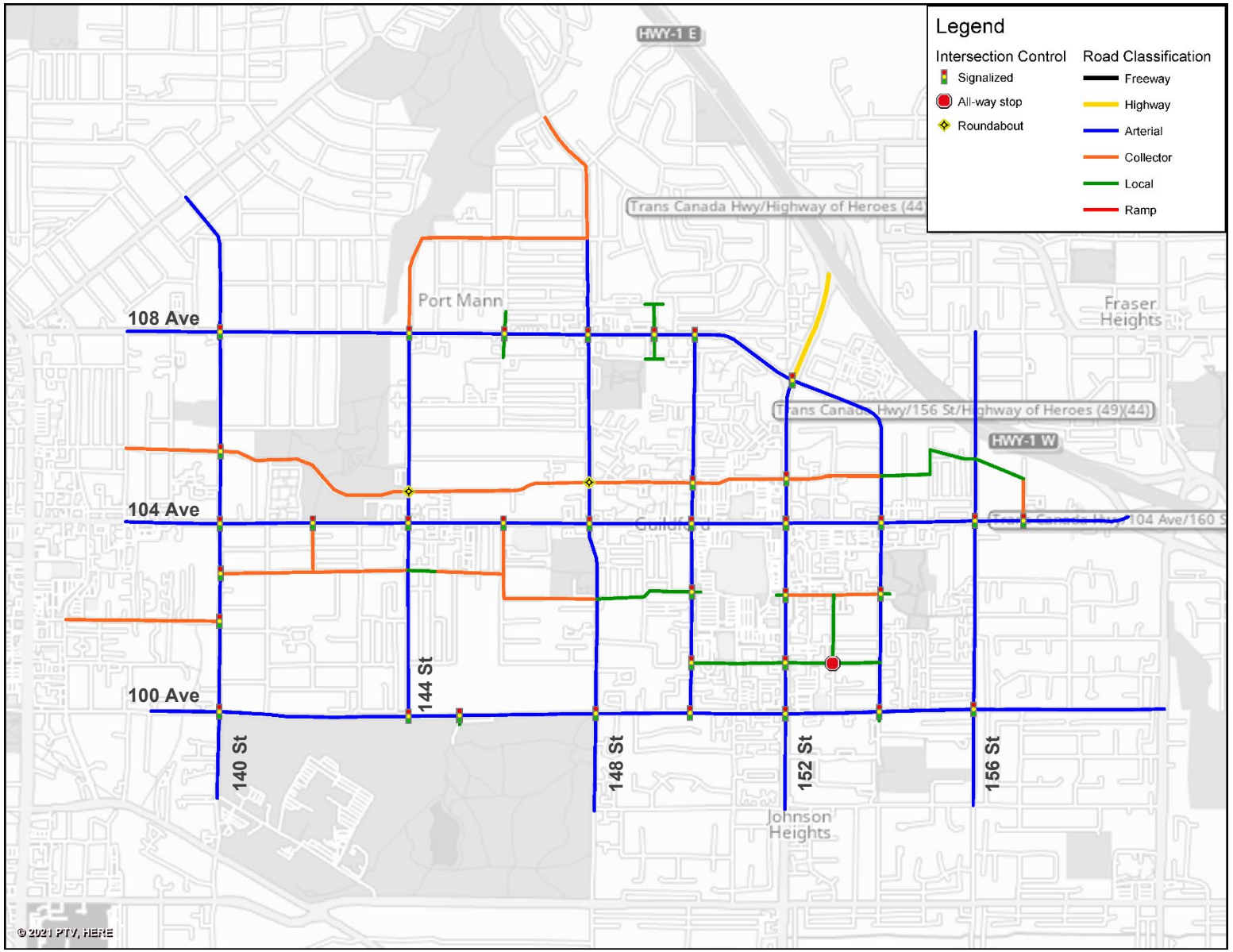


Figure 56: Road Classification and Control Type for Full Buildout Base Scenario

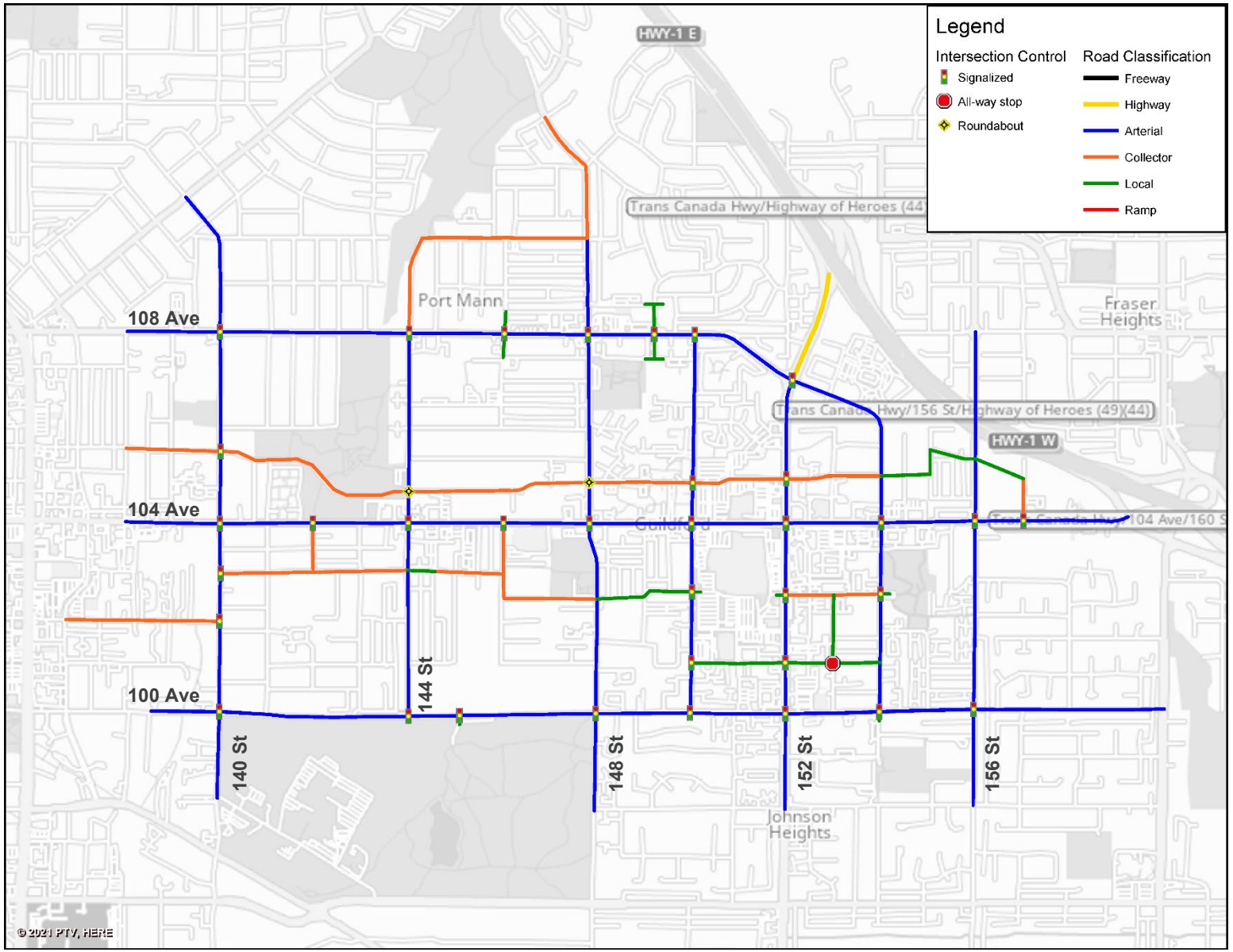


Figure 57: Number of Directional Lanes for 2050 and Full Buildout Base Scenarios

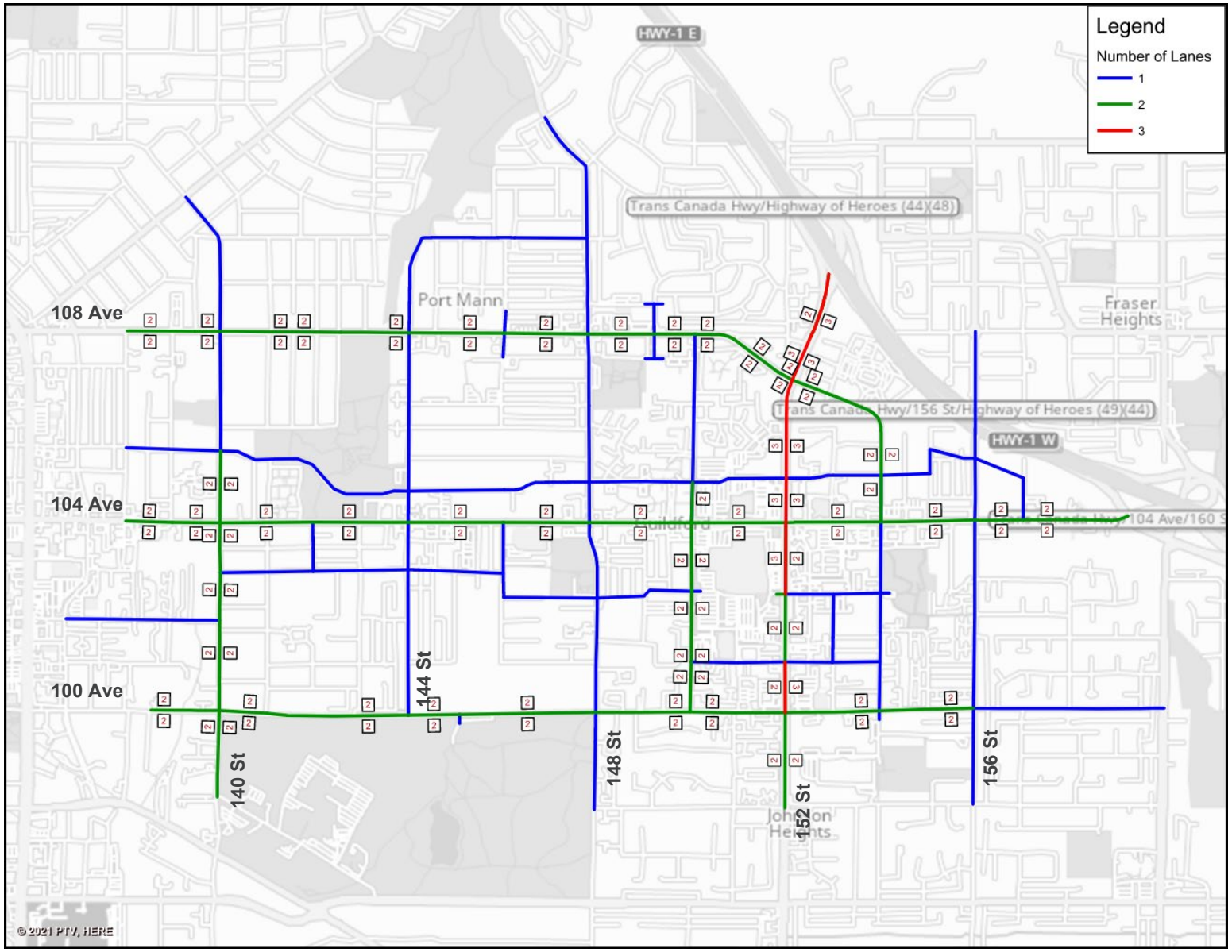
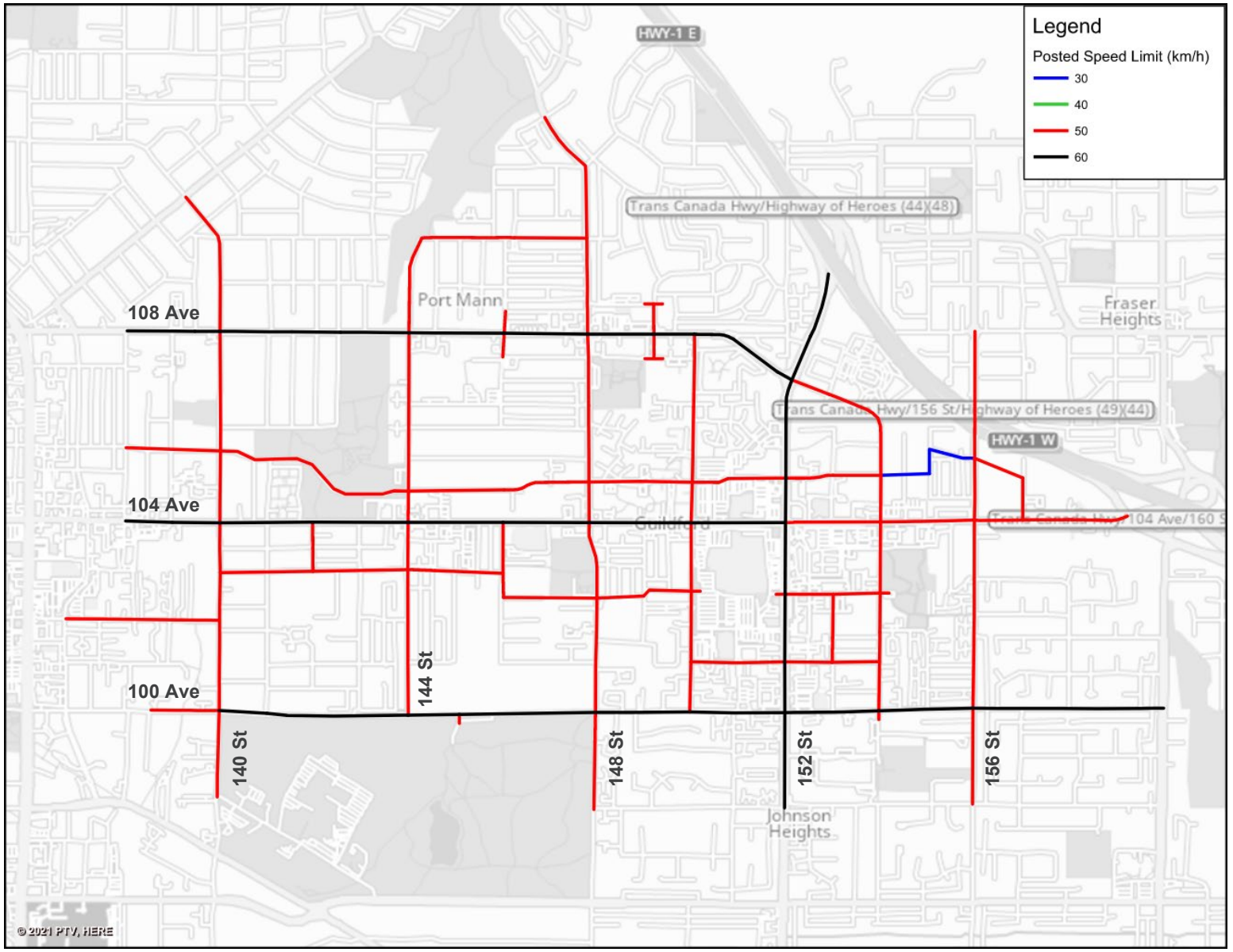


Figure 58: Posted Speed Limits for 2050 Base and Full Buildout Base Scenarios



4.4. Traffic Operations Mesoscopic Analysis

As mentioned previously, analysis of the 2017 base conditions was conducted with the mesoscopic Visum model to understand traffic operations observed in 2017, as well as identify potential hotspot locations.

4.4.1. Intersection Level of Service Criteria

Intersection operations are evaluated in terms of level of service (LOS), which is a quantitative stratification of the average delay and the volume-to-capacity (v/c) ratio. The LOS evaluation ranges from LOS A to F. LOS A indicates operating conditions with little or no delays and ample capacity (or operating at free-flow conditions), while LOS F denotes over-saturated conditions with significant delays and extensive queues. When demand exceeds capacity (i.e., v/c > 1), operations are designated LOS F regardless of average delay. **Table 11** summarizes the delay ranges, v/c ratio, and operational characteristics associated with each LOS. Acceptable operations are typically considered to be LOS D or better and therefore, any movement or intersection operating at LOS E or worse may require further improvements.

Table 13: Intersection Level of Service Definition

Level of Service	Delay Criteria (sec/veh)		V/C Ratio	Description
	Signalized Intersections	Unsignalized Intersections		
A	≤ 10	≤ 10	≤ 1	Represents free flow conditions. Individual users are virtually unaffected by others in the traffic stream. Usually no conflicting traffic.
B	> 10 to 20	> 10 to 15	≤ 1	Stable flow, but the presence of other users in the traffic stream beings to be noticeable. Occasionally some delay due to conflicting traffic.
C	> 20 to 35	> 15 to 25	≤ 1	Stable flow, but the operations of individual users become affected by interactions with others in the traffic stream. Delay is noticeable.
D	> 35 to 55	> 25 to 35	≤ 1	Represents high-density, but stable flow. Delay is noticeable and further affected by interactions with others in the traffic stream.
E	> 55 to 80	> 35 to 50	≤ 1	Represents operating conditions at or near capacity level. Delay approaching tolerance levels.
F	> 80	> 50	> 1	Represents forced or breakdown flow. Delay exceeds tolerance level and/or volume exceeds capacity.

4.4.2. 2017 Base Scenario

Figure 59 and **Figure 60** display the traffic assignment in Visum or the AM and PM peak periods. As expected, the arterial streets and roads connected to Highway 1 are the most utilized roads within the study area during the peak periods. Of the north-south corridors, 152 Street experiences the highest level of volumes as it provides a direct connection to Highway 1. Of the east-west corridors, 108 Avenue and 104 Avenue are the most utilized with approximately two-way volumes of 2,000 vehicles per hour.

As shown in **Figure 61** and **Figure 62**, the results of the traffic operations analysis indicate that the vast majority of intersections within the study area operate at a satisfactory level of service for both AM and PM peak periods. Intersections that feed into Highway 1 generally operate with higher levels of delay when compared to intersections further away due to higher levels of traffic. This is illustrated at the Guildford Drive and 152 Street intersection which operates at LOS E during the AM peak period.

Figure 59: Traffic Assignment for 2017 Base Scenario (AM Peak Period)

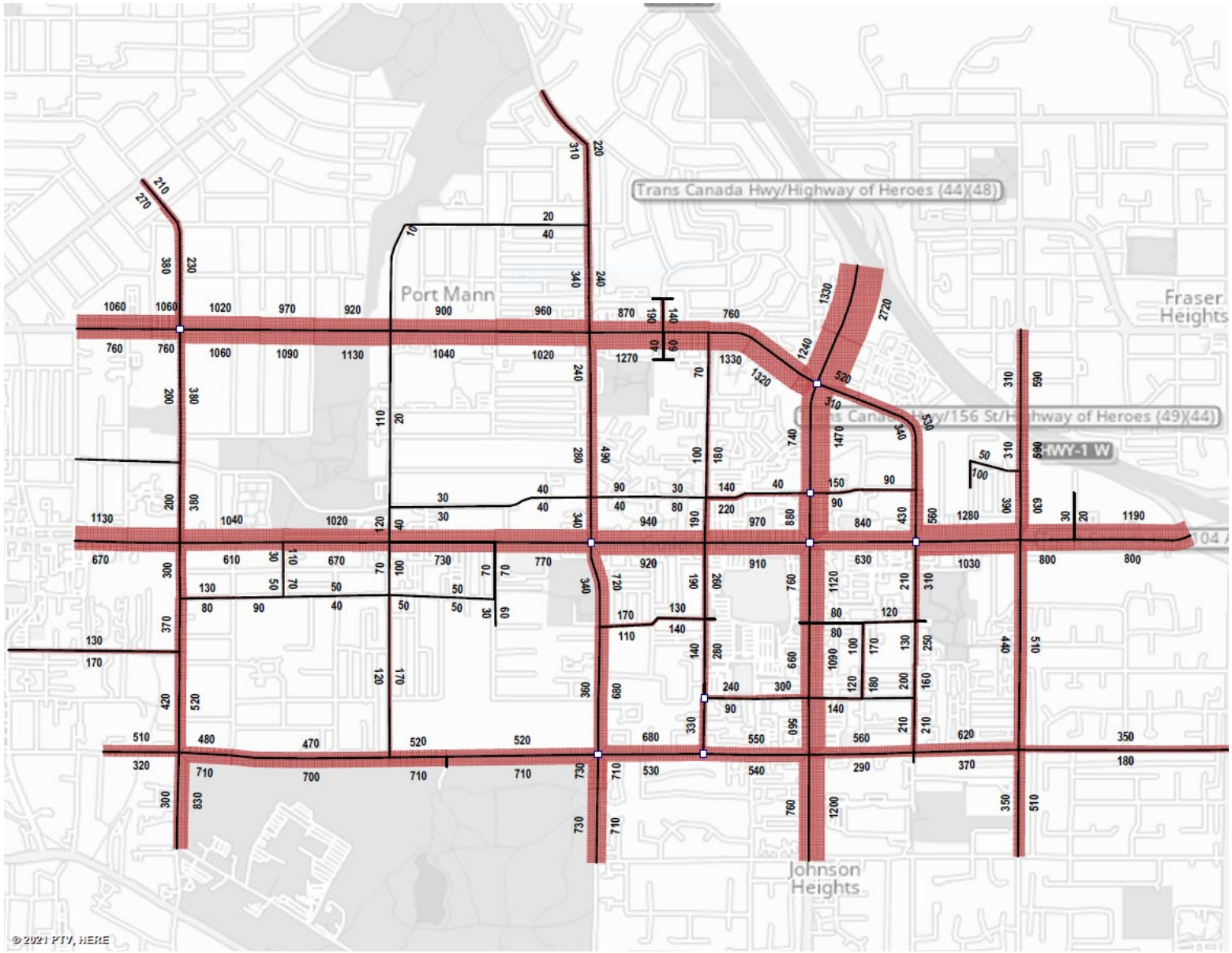


Figure 60: Traffic Assignment for 2017 Base Scenario (PM Peak Period)

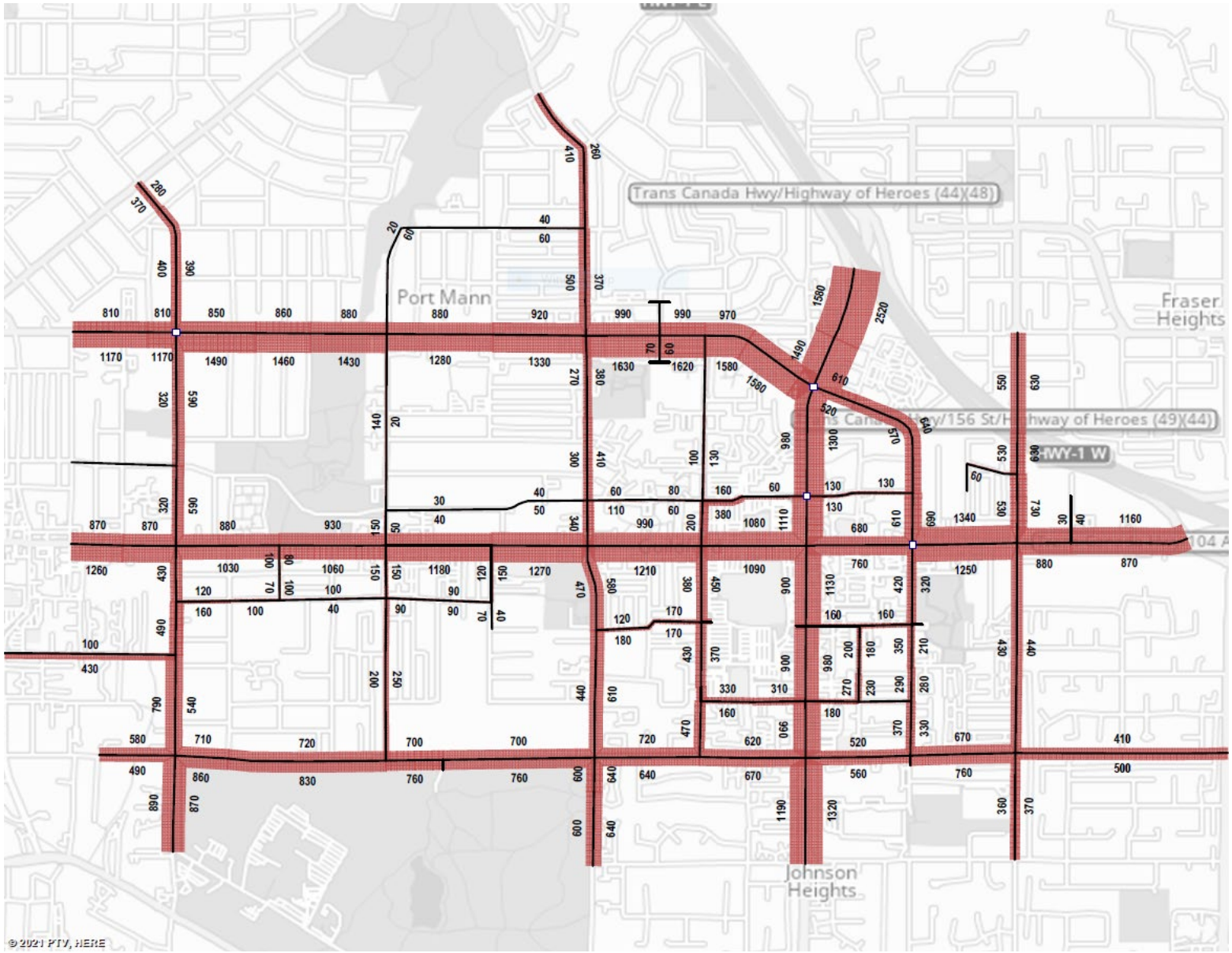


Figure 61: Intersection Level of Service Results for 2017 Base Scenario (AM Peak Period)

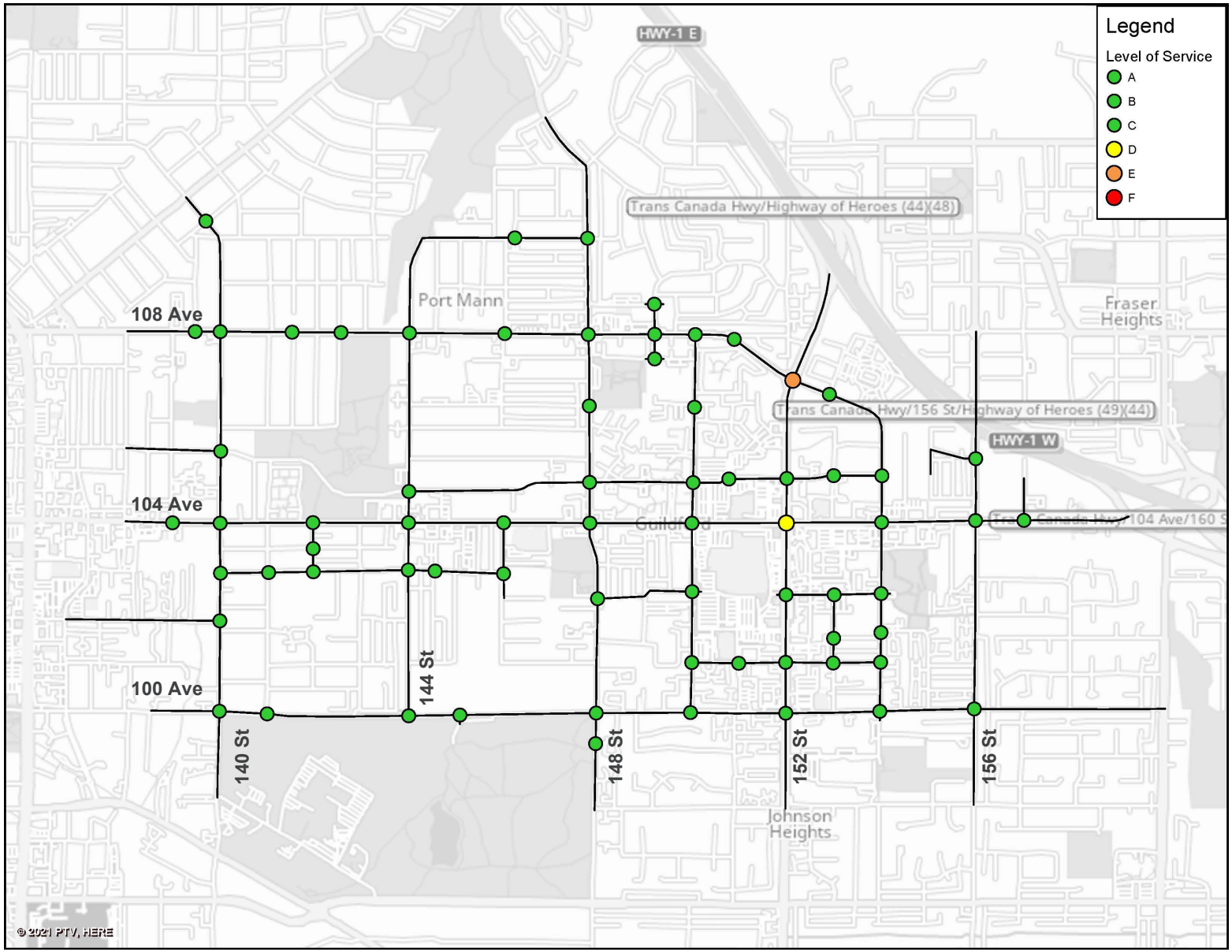
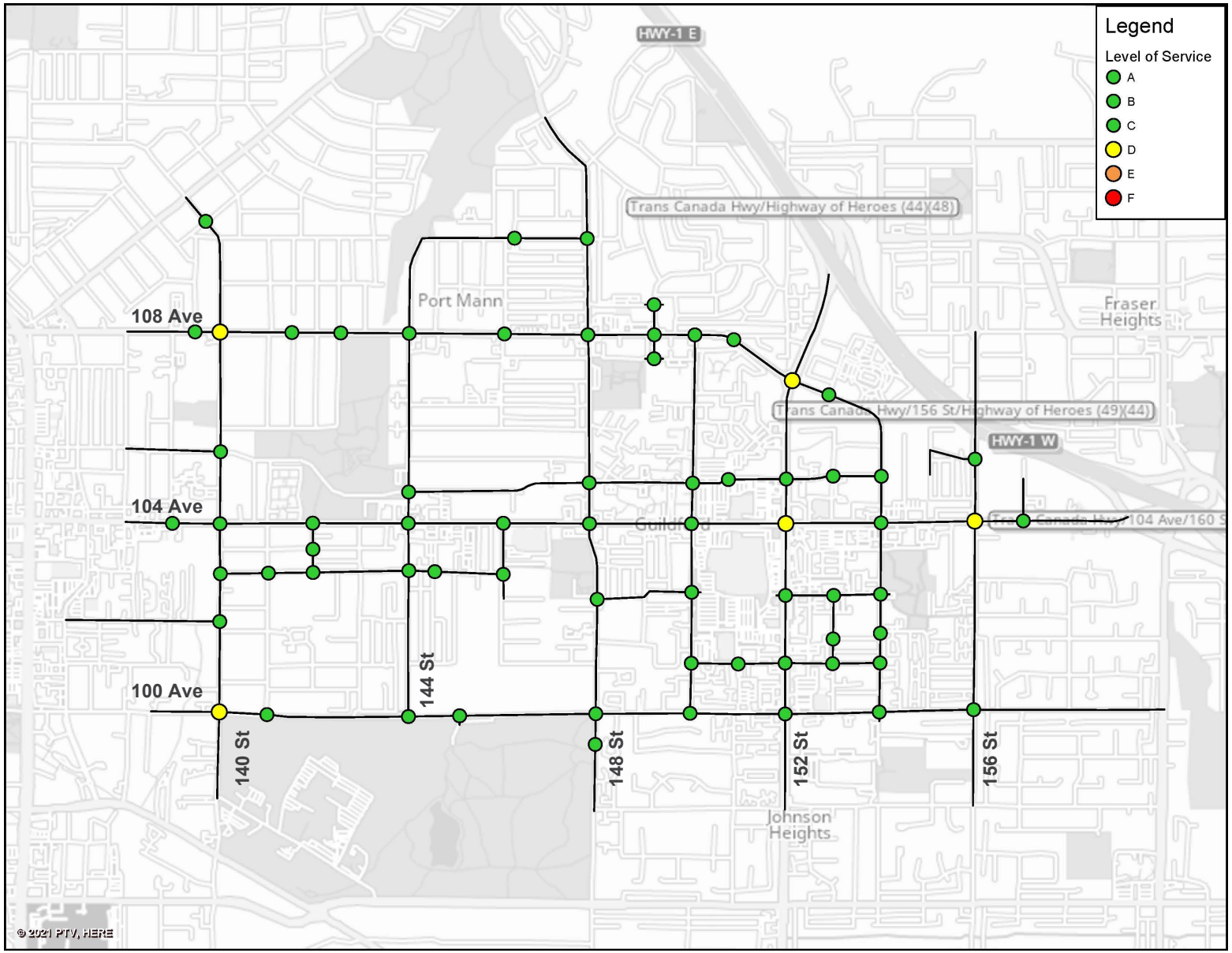


Figure 62: Intersection Level of Service Results for 2017 Base Scenario (PM Peak Period)



4.4.3. 2050 Base Scenario

A high-level assessment of 2050 traffic operations were performed based on the traffic forecasts developed with the Visum model to identify potential network hotspot locations. This section summarizes the results of the 2050 Base Scenario traffic assignment, along with the operational performance of intersections within the study area.

Figure 63 and **Figure 64** show the results of the traffic assignment conducted for the 2050 horizon year. As illustrated, both the AM and PM peak periods show significant vehicular growth throughout the Guildford Town Centre study area. With direct access to Highway 1, 152 Street continues to experience high levels of traffic. Additionally, alternative access roads to Highway 1, specifically 154 Street and 104 Avenue are expected to see higher utilization in 2050. The increased capacity on 100 Avenue from the road widening also attracts significant growth for that corridor.

As shown in **Figure 65**, all intersections except for the 104 Avenue and 152 Street and 104 Avenue and154 Street intersections continue to operate at LOS D or better during the AM peak period. As 104 Avenue is expected to experience significant traffic growth, these two intersections along 104 Avenue are shown to downgrade to a LOS E and F, respectively. Results of the traffic analysis also illustrate several intersections along 100 Avenue and 152 Street will operate with a LOS D.

With regards to the PM peak period, operations around 152 Street and 104 Avenue have declined to either LOS D or LOS E, as shown in **Figure 66**. Furthermore, similar to the AM peak period, several intersections along 100 Avenue operate at a LOS D. As shown in the figure, it is expected that a few intersections along 140 Street will also operate with at a LOS D or worse. In particular, two intersections operate at a LOS F. These are 140 Street and 108 Avenue and 144 Street and 103 Avenue.

Although only three of the intersections within the study area are shown to be operating with a LOS F, the network operations in general do worsen compared to the 2017 Base Scenario and therefore the entire network was considered for a more detailed analysis in the traffic impact analysis modelling assignment. Note that although there is an increase in travel demand in this area in the future, traffic is very fluid and can optimize network conditions based on route choice, mode choice, destination choice (including staying home), as well as time of day travel. With this in mind, there is not a one-to-one correlation between demographic growth and traffic volume growth.

Figure 63: Traffic Assignment for 2050 Base Scenario (AM)

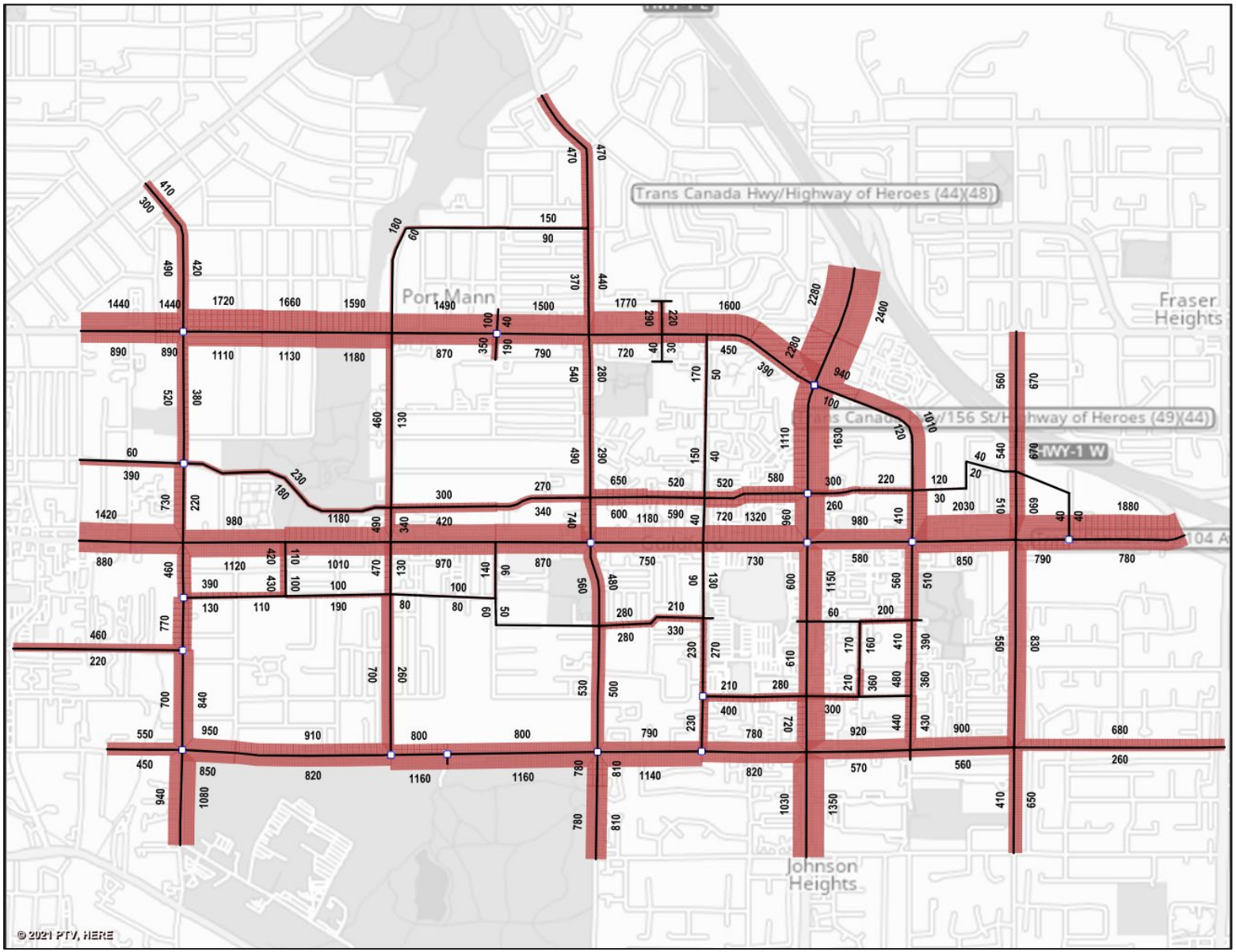


Figure 64: Traffic Assignment for 2050 Base Scenario (PM)

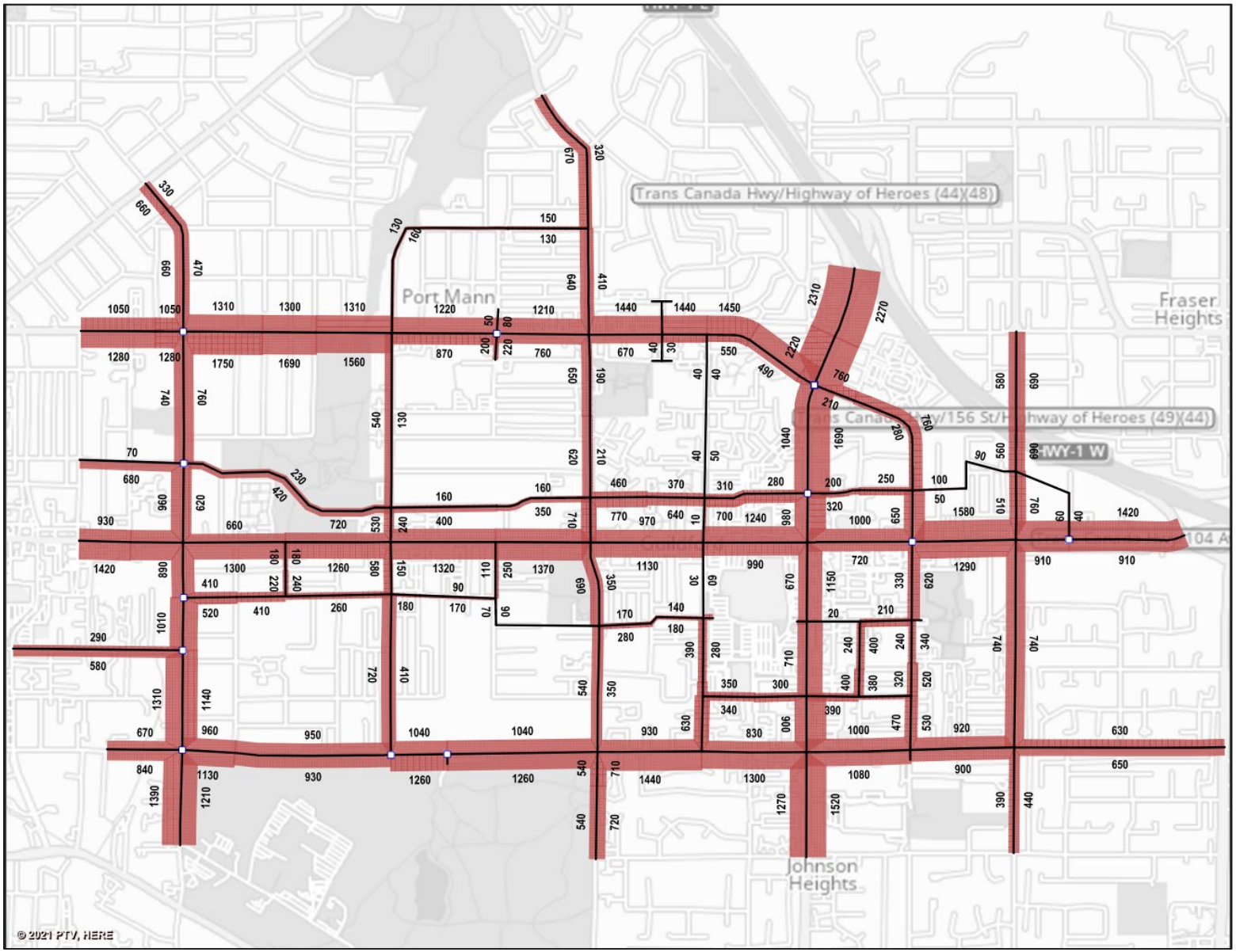


Figure 65: Level of Service Results for 2050 Base Scenario (AM)

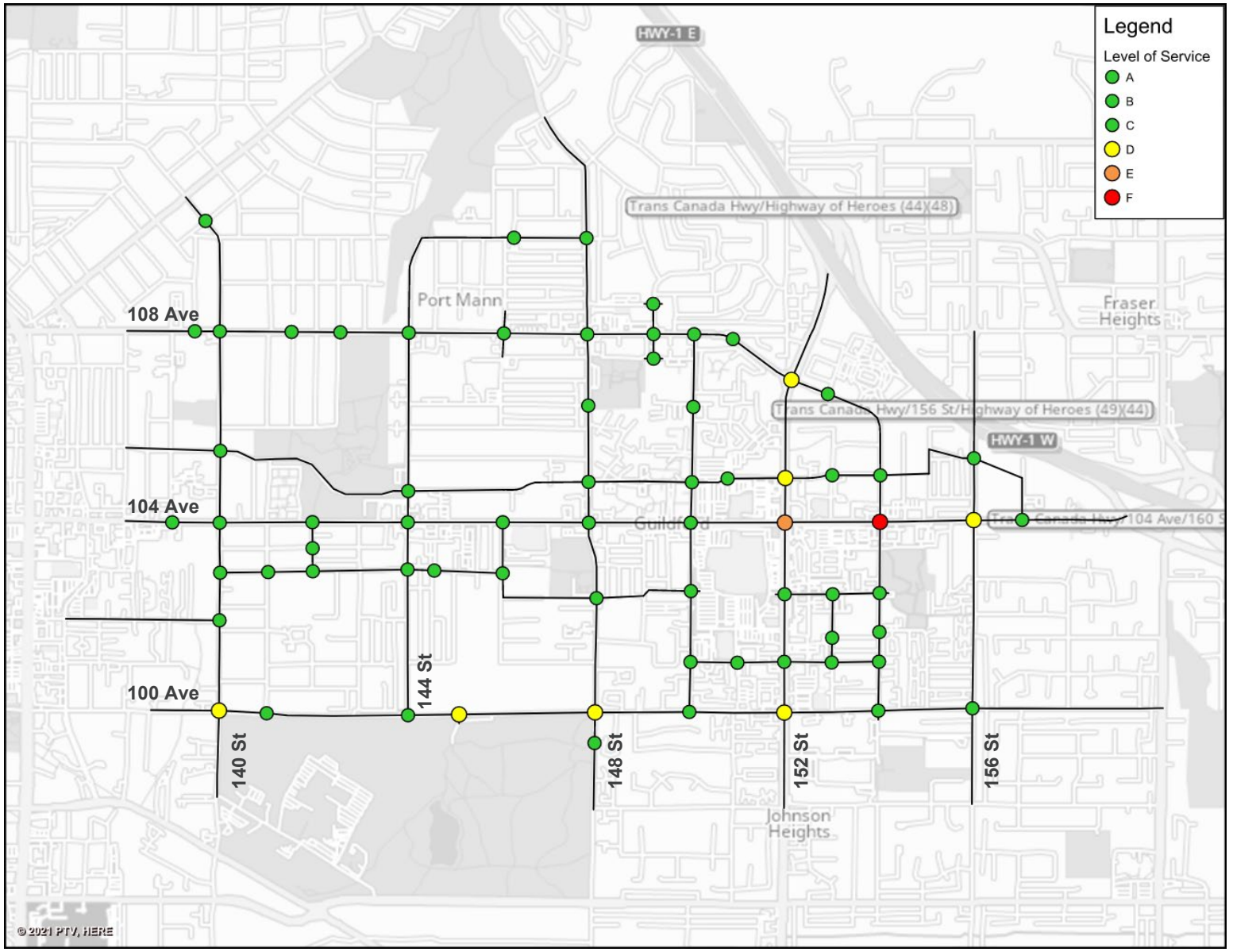
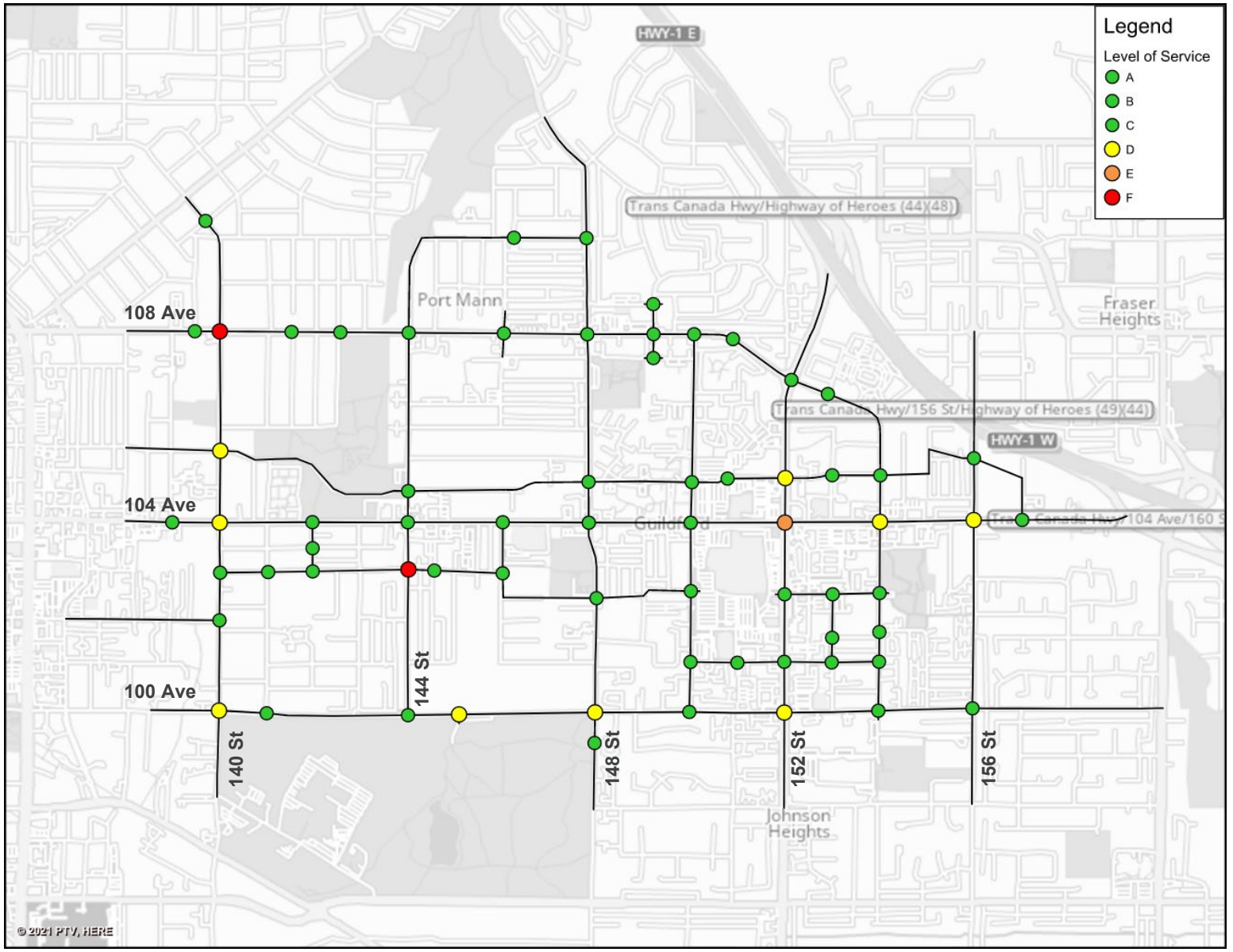


Figure 66: Level of Service Results for 2050 Base Scenario (PM)



4.4.4. Full Buildout Scenario

A high-level assessment of traffic operations beyond 2050 was also performed based on the traffic forecasts developed with the Visum model to identify additional network hotspot locations. This section summarizes the results of the Full Buildout Scenario traffic assignments, along with the operational performance of intersections within the study area.

The initial traffic assignment conducted for the Full Buildout Base Scenario resulted in unstable results due to highly congested conditions. There was significant level of unserved demand at both internal and external TAZ, as well as significant queueing through out the network. This queueing in Visum represents unserved demand that does not get capture at any downstream intersections and links. The network queuing for the AM and PM peak hours is illustrated in **Figure 67** and **Figure 68**. To fully assess the network, these queues must be minimized as much as possible. The queues were reduced by proposing road widening as needed for arterial and collector roads, up to a maximum of three through lanes per direction. The updated road network (i.e., Full Buildout with Road Widening Scenario) is shown in **Figure 69** and includes the following road widening:

- 140 Street: 2 lanes / direction + 3 lanes NB from Fraser Highway to 104 Avenue
- 148 Street: 2 lanes / direction for entire study area
- 152 Street: 3 lanes / direction for entire study area
- 156 Street: 2 lanes / direction for entire study area
- 100 Avenue: Extend 2 lanes / direction from 156 Street to 160 Street
- 104 Avenue: 3 lanes / direction for entire study area
- 108 Avenue: 3 lanes / direction from 142 Street to west of 140 Street

Figure 70 and **Figure 71** show the results of the traffic assignments conducted for the Full Buildout with Road Widening Scenario. There is significant growth along corridors that have increased road capacity. This is especially true for the western segments and the north south corridors. Locations that did not receive additional capacity and were already congested, such as 152 Street, do not experience much growth and may even have segments with lower volume due to upstream and downstream congestion. It should be noted that road widening was limited to three through lanes per direction. Therefore, there is still some queueing and unserved demand on the network.

With the road widening, the Visum model expects most of the intersections to operate at a LOS D or better in the AM peak hour, as illustrated in **Figure 72**. Several intersections along 100 Avenue and 140 street operate at a LOS D or E. In the PM peak hour, there are several intersections that operate at a LOS D or worse. As seen in **Figure 73**, the following intersections operate at a LOS E or F: 105A Avenue / 140 Street, 104 Avenue / 144 Street, 103 Avenue / 144 Street, 105 Avenue / 150 Street, and 104 Avenue / 156 Street. In Addition, there are several LOS D intersections along 100 Avenue, 105A/105 Avenue, and 140 Street.

Figure 67: Queuing Results for Full Buildout Base Scenario (AM)

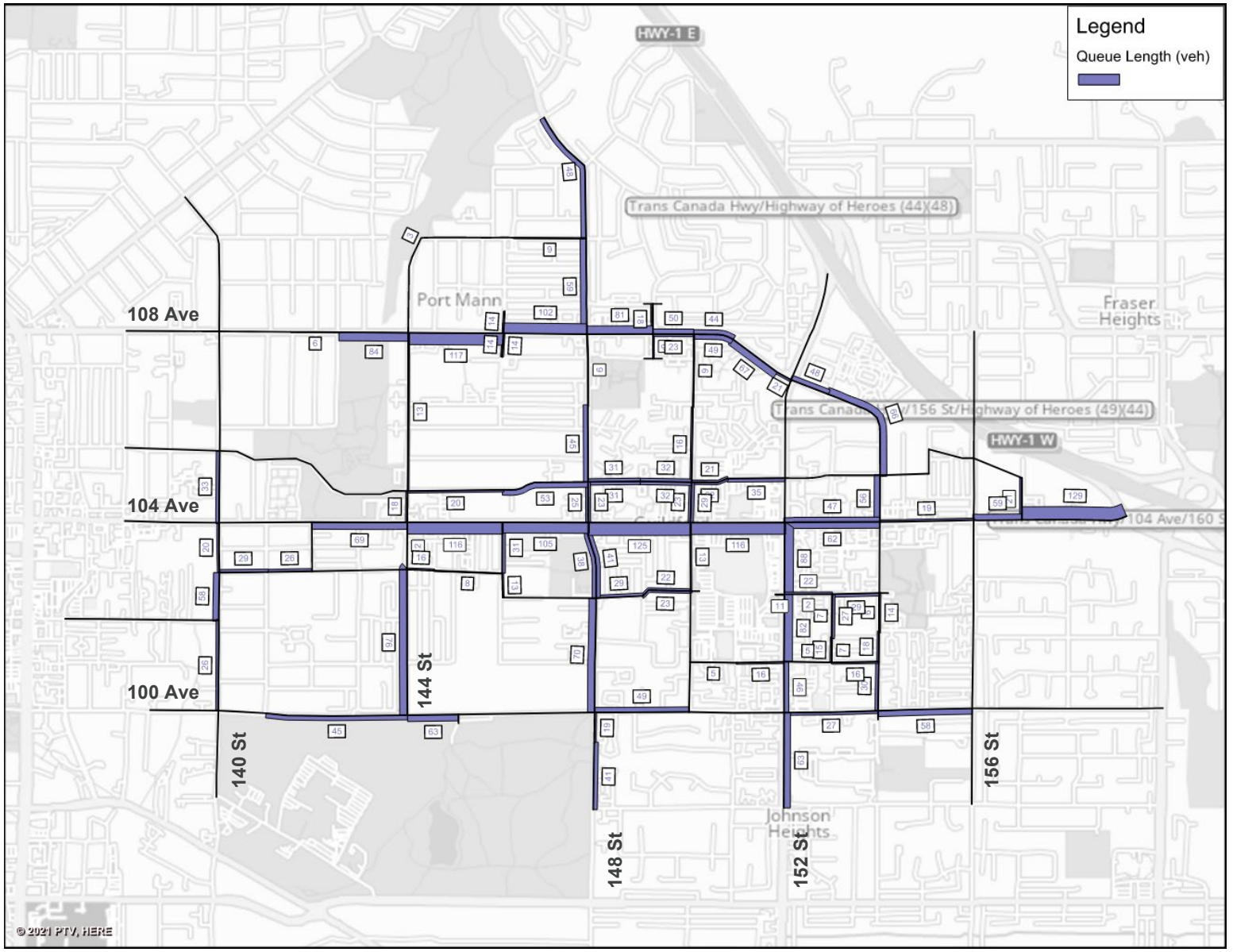


Figure 68: Queuing Results for Full Buildout Base Scenario (PM)

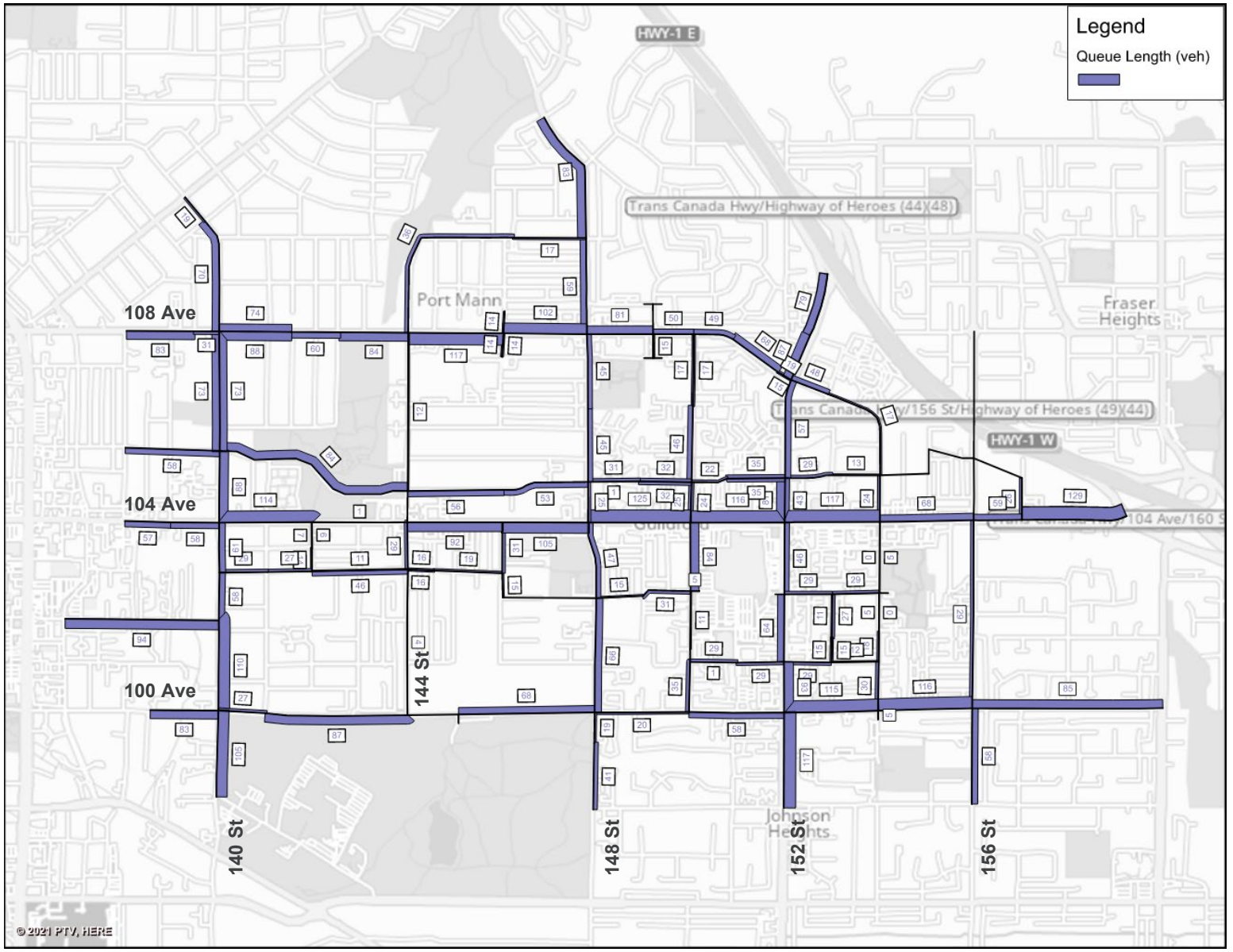


Figure 69: Number of Directional Lanes for Full Buildout with Road Widening Scenario

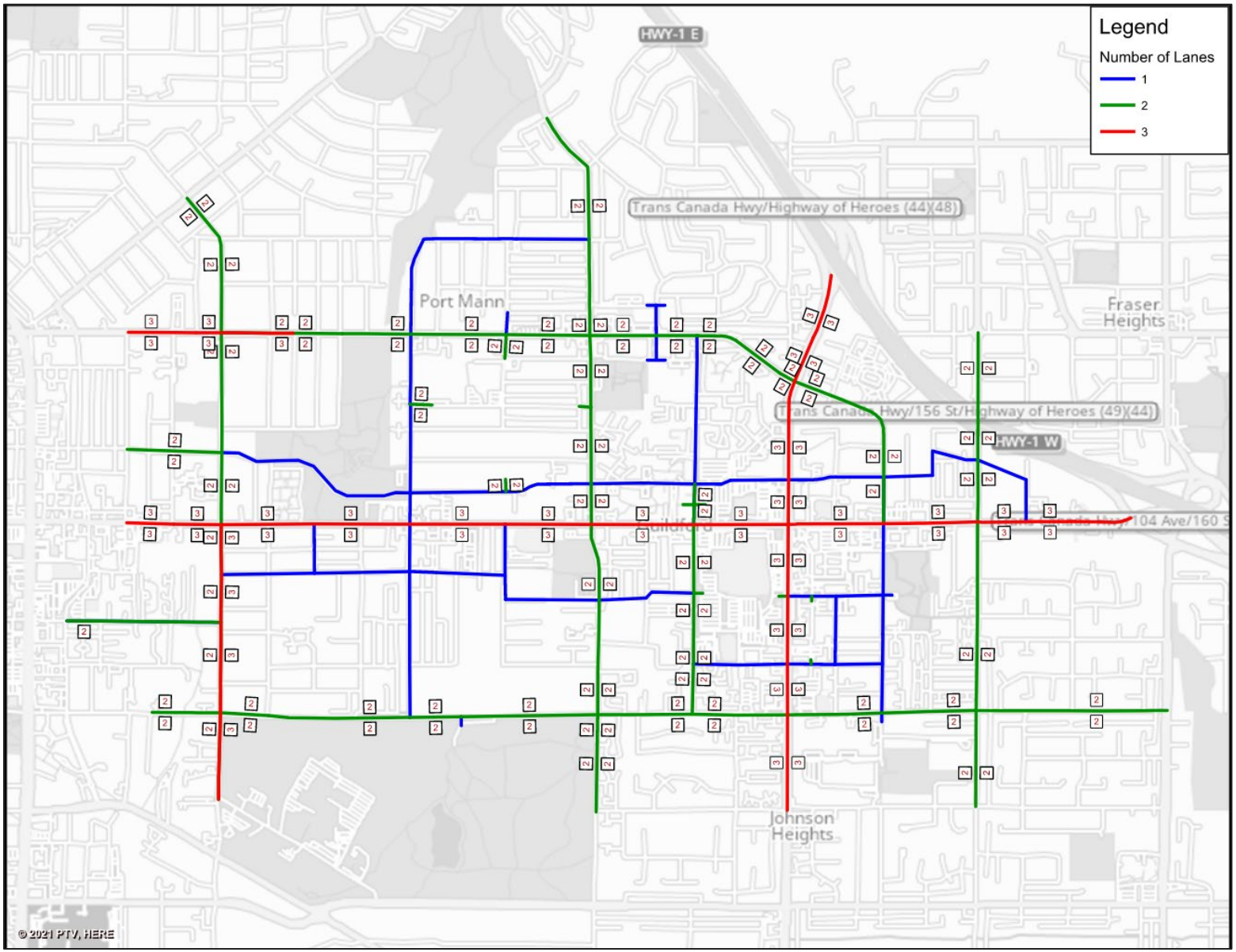


Figure 70: Traffic Assignment for Full Buildout with Road Widening Scenario (AM)

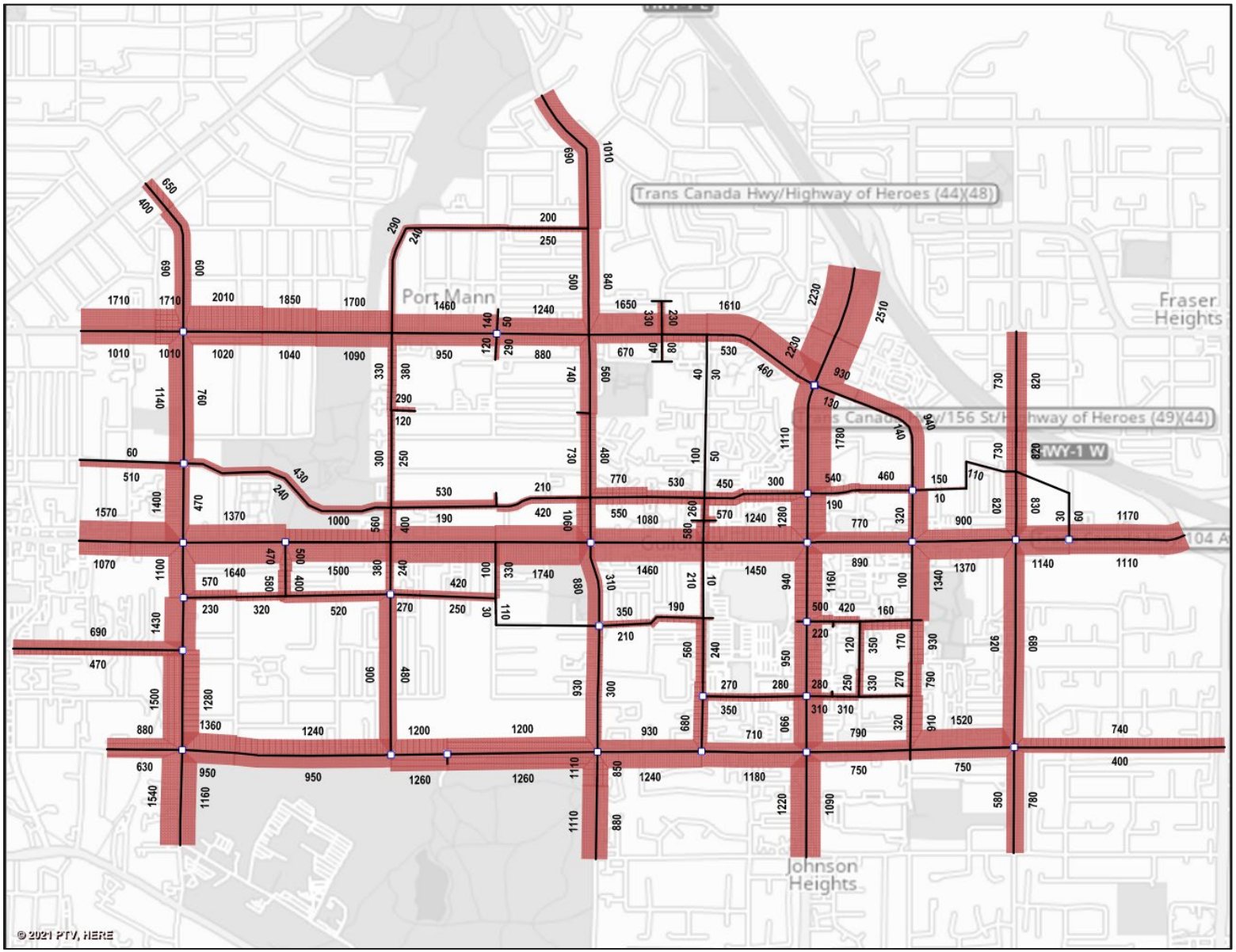


Figure 71: Traffic Assignment for Full Buildout with Road Widening Scenario (PM)

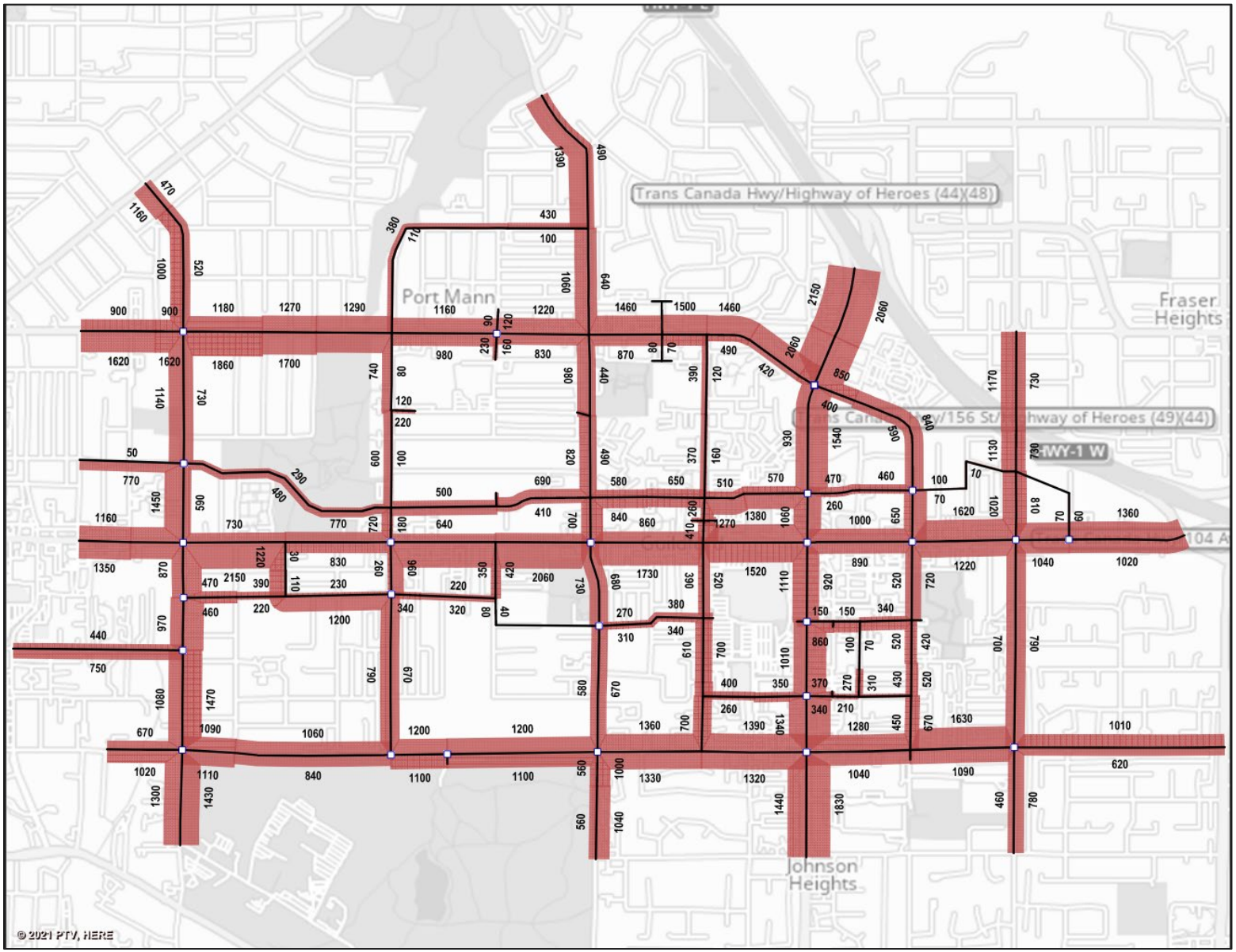


Figure 72: LOS Results for Full Buildout with Road Widening Scenario (AM)

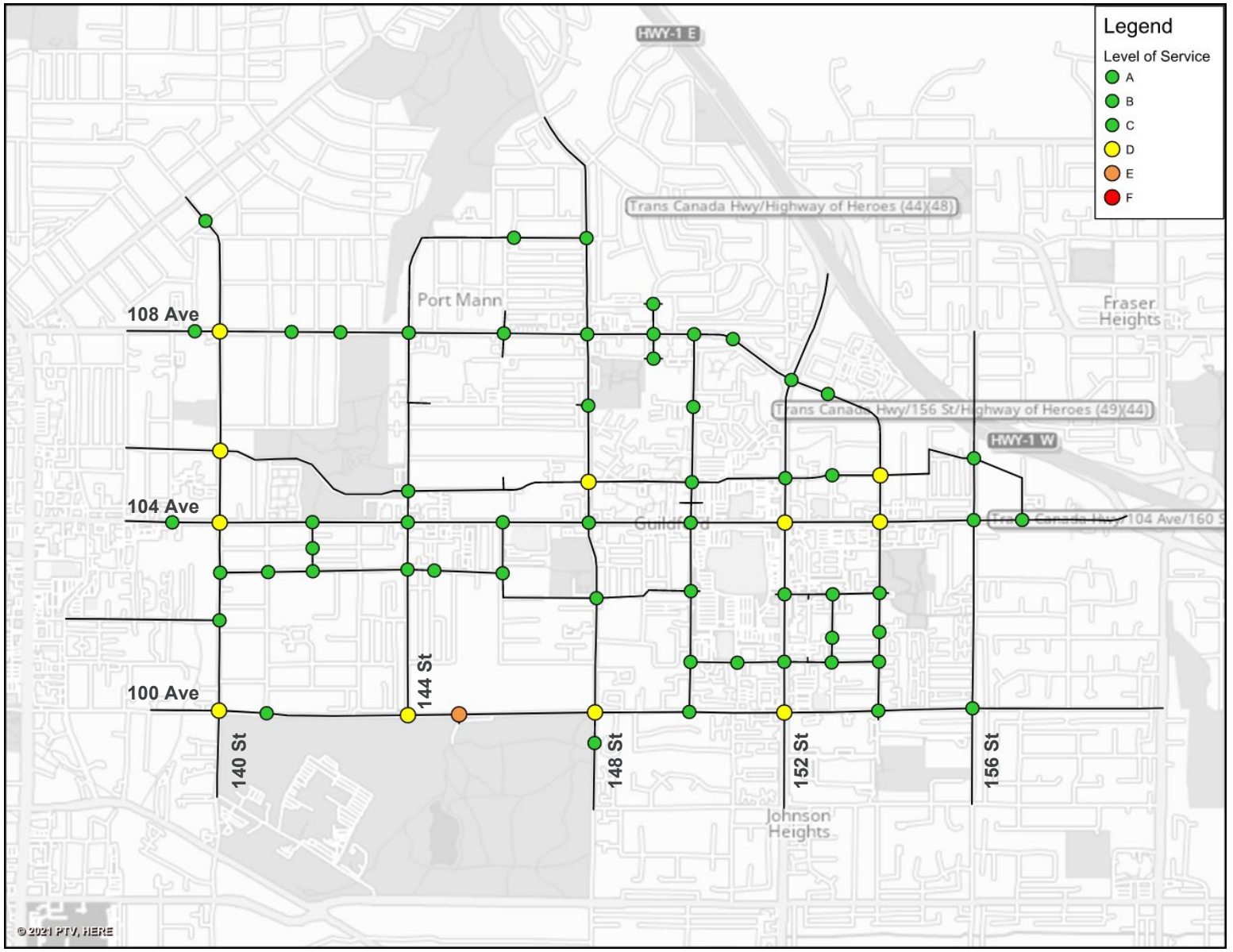
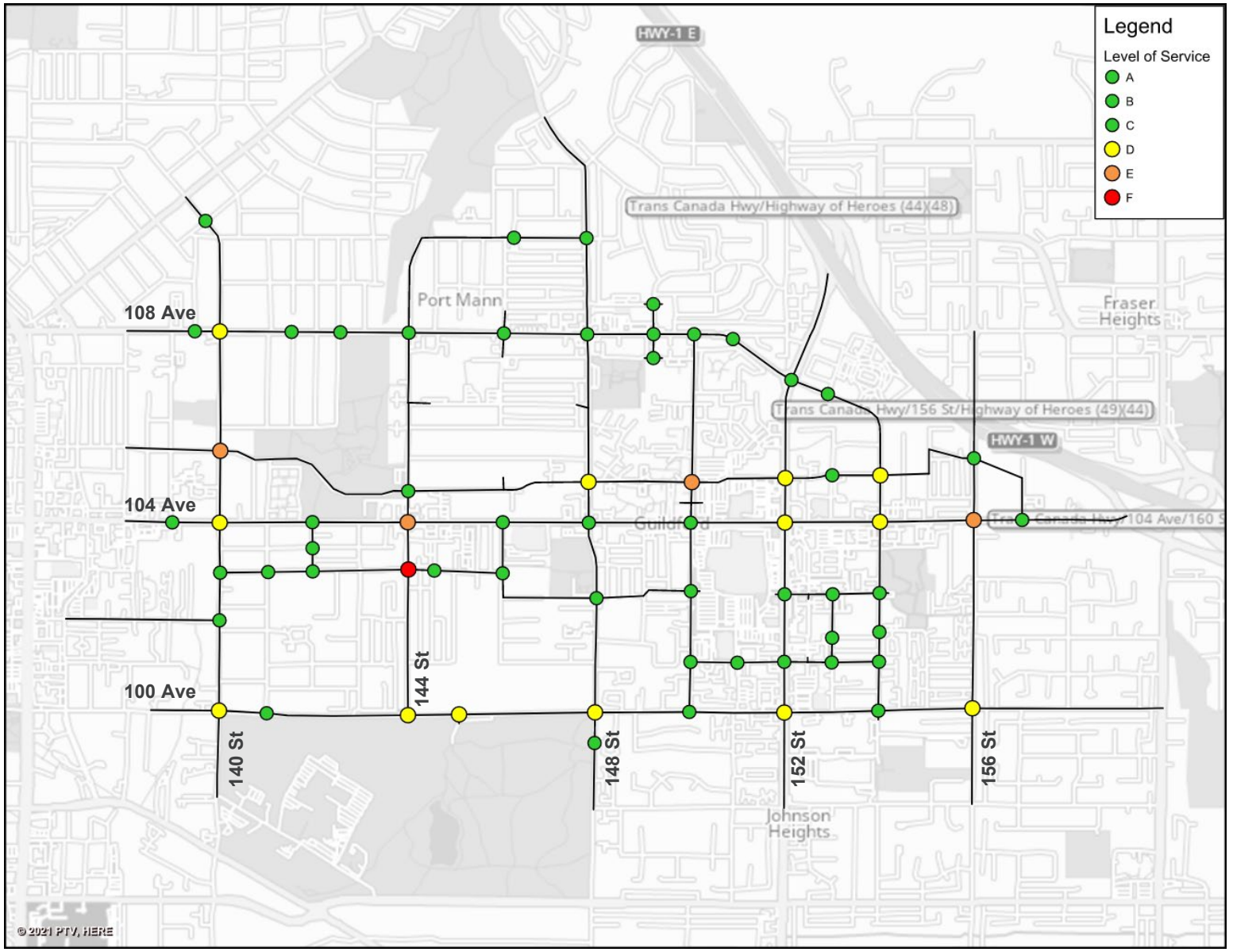


Figure 73: LOS Results for Full Buildout with Road Widening Scenario (PM)



5. GUILDFORD TRAFFIC OPERATIONS ANALYSIS (VISTRO)

A more detailed assessment of the Guildford scenarios was performed to evaluate traffic operations at key intersections within the Guildford Town Centre study area and identify any areas of congestion, queue spill back, and intersections which may require improvements. This section of the report therefore describes the development of the traffic impact analysis model used to assess traffic operations and presents the results of the traffic operations analysis.

5.1. 2017 VISTRO MODEL DEVELOPMENT

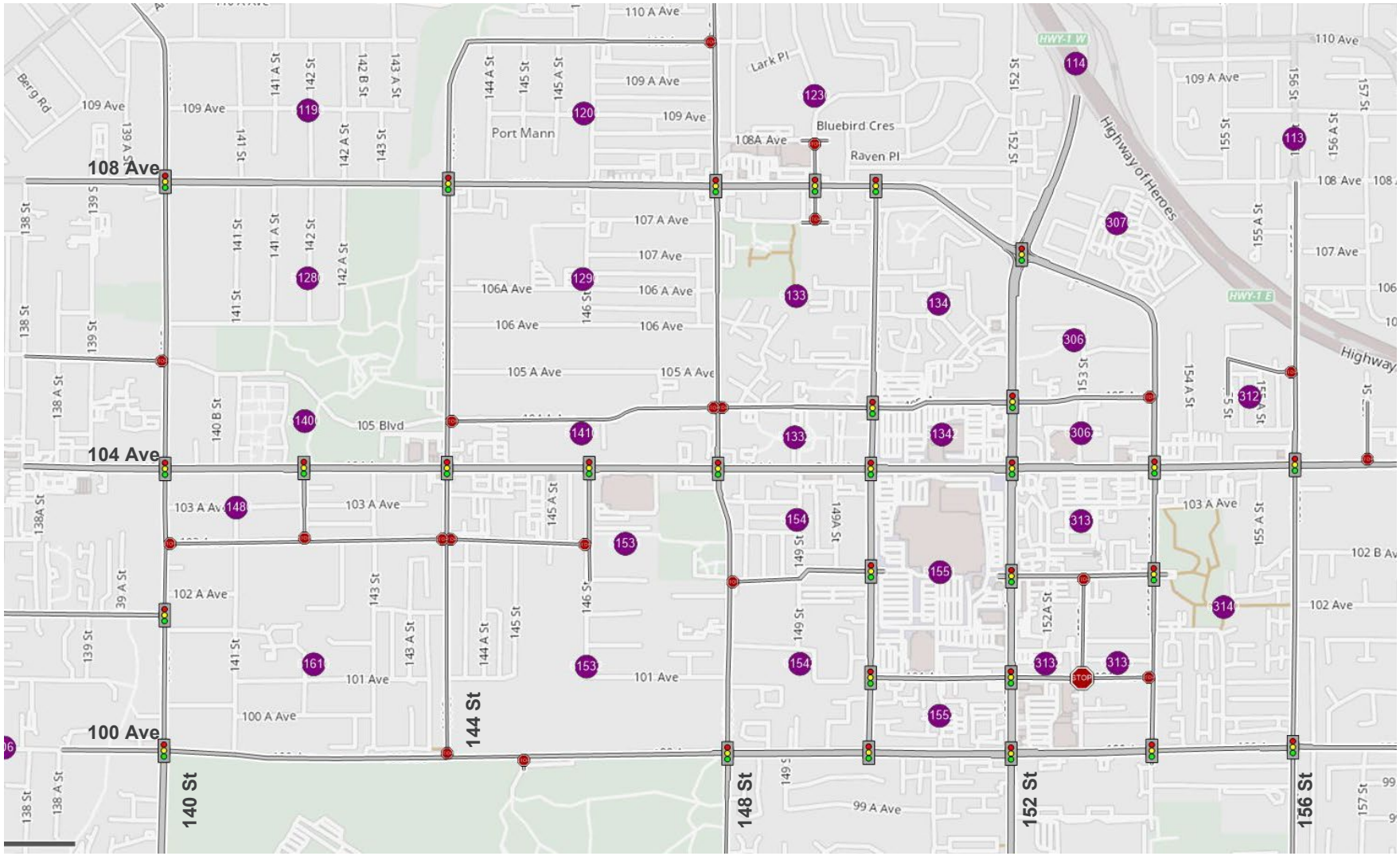
Analysis of intersection operations was performed for both the AM and PM peak periods, using PTV Group's Vistro software and following the methodologies outlined in the Highway Capacity Manual 6th Edition (HCM).

The Vistro network development started with coding the roadways within the Guildford Town Centre study area with the aid of Google's satellite images. This included inputting information on the number of lanes, intersection configurations, posted speed limits, storage lengths, channelization, and number and length of pedestrian crosswalks. Once the road network was established, signal timing specifications and traffic count volumes were added to the model.

Traffic volumes obtained from the Visum model were used as the basis for evaluating 2017 conditions in the Vistro model. In addition to the peak hour volumes, information on heavy truck percentages, which was also obtained from the Visum model, was coded into the Vistro model. The traffic volumes and heavy truck percentages that were modelled in Vistro are provided in **Appendix I**.

Signal timing specifications were provided by the City of Surrey and coded in the Vistro Model. This included important information on signal cycle lengths, phasing, timings, and coordination that are currently in effect at the study intersections. **Figure 74** shows the road network coded in the Vistro model for the 2017 Base Scenario.

Figure 74: Vistro Model Network for 2017 Base Scenario



5.2. Future Vistro Model Development

A more detailed assessment of the 2050 and Full Buildout Base Scenarios was undertaken using Vistro to determine capacity deficiencies as a result of growth in population and employment in the Guildford Town Centre area. This section presents the results of the evaluation of future traffic operations.

Similar to the future Visum models, the base year roadway network from the 2017 Base Scenario was used as the starting point for developing the future roadway network in Vistro. Since the base year road network in the 2017 Base Scenario was coded to reflect 2017 conditions, new traffic signals that were installed after 2017 were captured in the 2050 Base and Full Buildout Base Scenarios. These include intersections at:

- 100 Avenue and 144 Street,
- 105 Avenue and 140 Street,
- 104 Avenue and 157 Street, and
- 100 Avenue and Green Timbers Park Access.

The future year roadway network was also updated to include the road improvements listed in **Section 3.5**. This involved increasing the number of lanes, adding turn bays, and upgrading stop-controlled intersections to either a roundabout or signalized intersection. Additionally, the improvements identified in **Section 4.3**, i.e., the improvements to Guildford Drive and 152 Street and 104 Avenue and 157 Street, were coded in the future Vistro models.

For the full buildout horizon, the scenario without the additional road widening identified in **Section 4.4.4** (i.e., the Full Buildout Base Scenario) was considered for this section of the report. This was done to capture the intersection performance prior to all corridor and intersection improvements. The combined impact of the road widening and additional required intersection improvements is evaluated in **Section 6**.

The roadway networks coded for the 2050 Base Scenario and the Full Build Base Scenario, along with the control type of all intersections, are shown in **Figure 75** and **Figure 76**.

The forecast turning movement volumes that were applied to the future Vistro models were obtained directly from the respective future Visum models. The traffic volumes and heavy truck percentages that were used as inputs in the Vistro model to evaluate future traffic operations are provided in **Appendix J**.

Figure 75: Vistro Model Network for 2050 Base Scenario

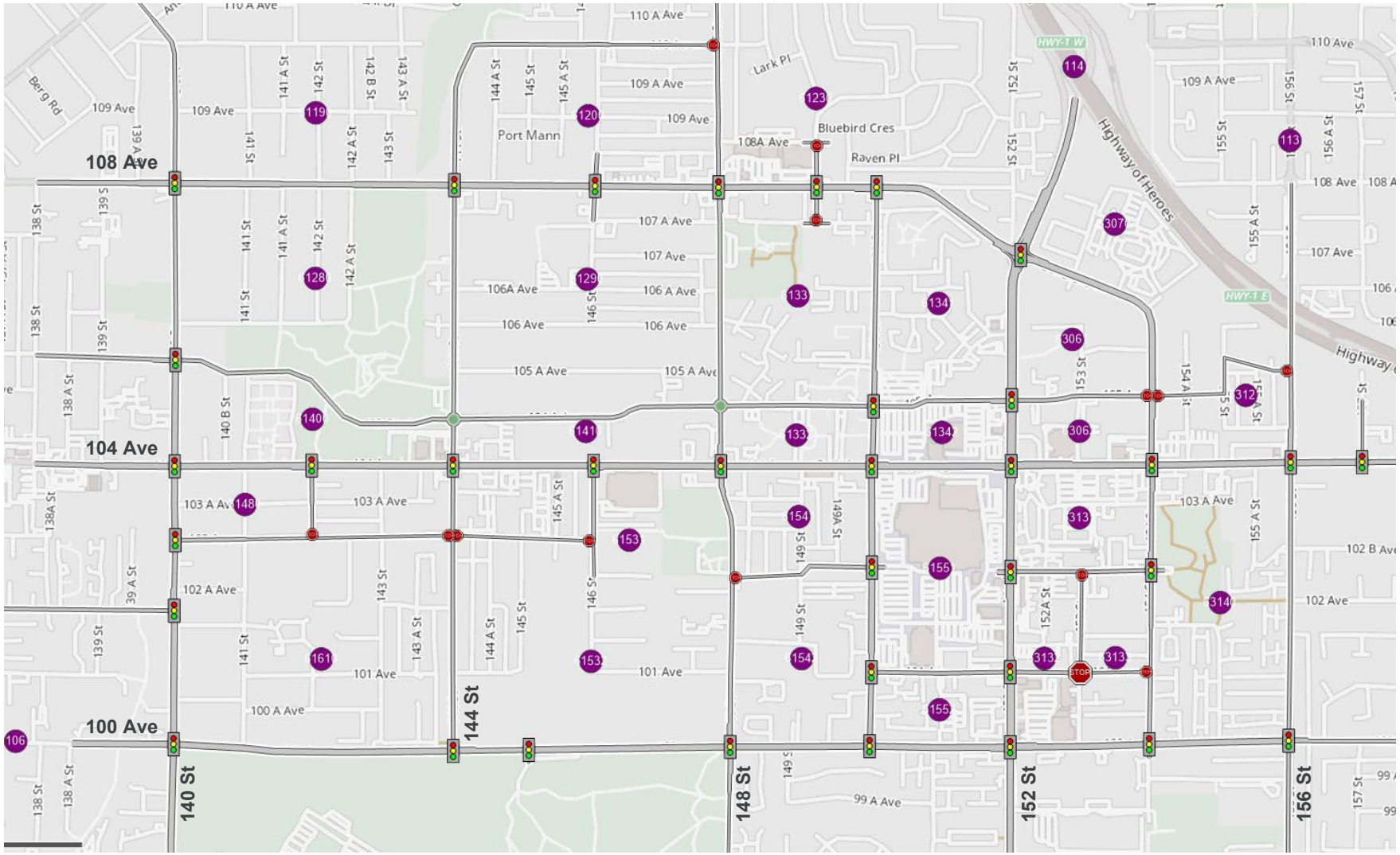
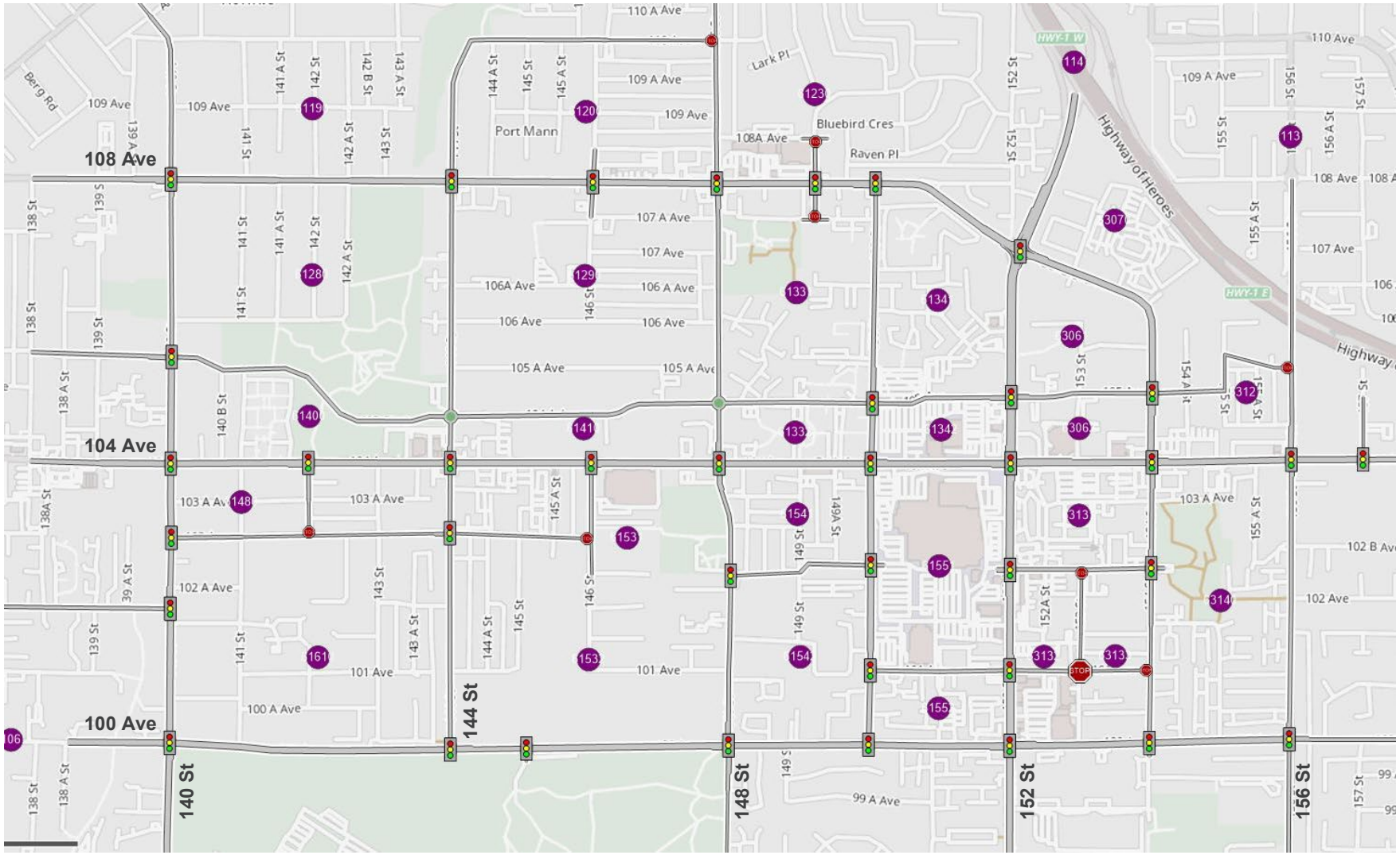


Figure 76: Vistro Model Network for Full Buildout Base Scenario



5.3. Traffic Operations Analysis Criteria

An assessment of traffic conditions was conducted with Vistro to understand operational performance at key intersections and identify the underlying causes for movements and intersections that experience LOS E or worse conditions.

As outlined in **Section 4.4.1**, intersections are evaluated in terms of LOS, which ranges from LOS A to LOS F. LOS A indicates operating conditions with little or no delays and ample capacity while LOS F denotes over-saturated conditions with significant delays and extensive queues. Acceptable operations are typically considered to be LOS D or better and therefore, any movement or intersection operating at LOS E or worse may require further improvements.

The v/c ratio measures traffic demand against capacity. When v/c > 1, the demand exceeds the capacity and congestion is anticipated for that movement, approach and/or intersection. In this case, operations are designated LOS F regardless of average delay.

The 95th percentile queue length also serves as a key performance indicator of traffic quality. It should be noted that the 95th percentile was reported as this is the metric typically used for design purposes.

5.4. 2017 Base Scenario Traffic Operations Analysis

Intersection level of service and queue results exported from Vistro are presented in **Figure 77** and **Figure 78** for the 2017 Base Scenario. Overall, all the intersections perform at LOS D or better during the AM peak hour except for the two-way stop-controlled intersection at 104 Avenue and 157 Street which operates at LOS E due to higher delays on the southbound approach. Similar findings are seen for the PM peak period, except there is one intersection where the delay exceeds the tolerance level. As shown in **Figure 78**, the results indicate that the intersection of 100 Avenue and 144 Street operates at LOS F, which is due to the high delays experienced by those making the SBL movement.

Detailed results of the traffic analysis at the movement level are provided for all intersection in **Table 12** and **Table 13**. The following movements operate at a LOS F:

- Guildford Drive / 152 Street: NB Left (AM & PM), WB Right (AM)
- 100 Avenue / 144 Street: SB Left (PM)
- 104 Avenue / 156 Street: SB Right (PM)

Figure 77: 2017 Base Scenario Results (AM Peak Hour)

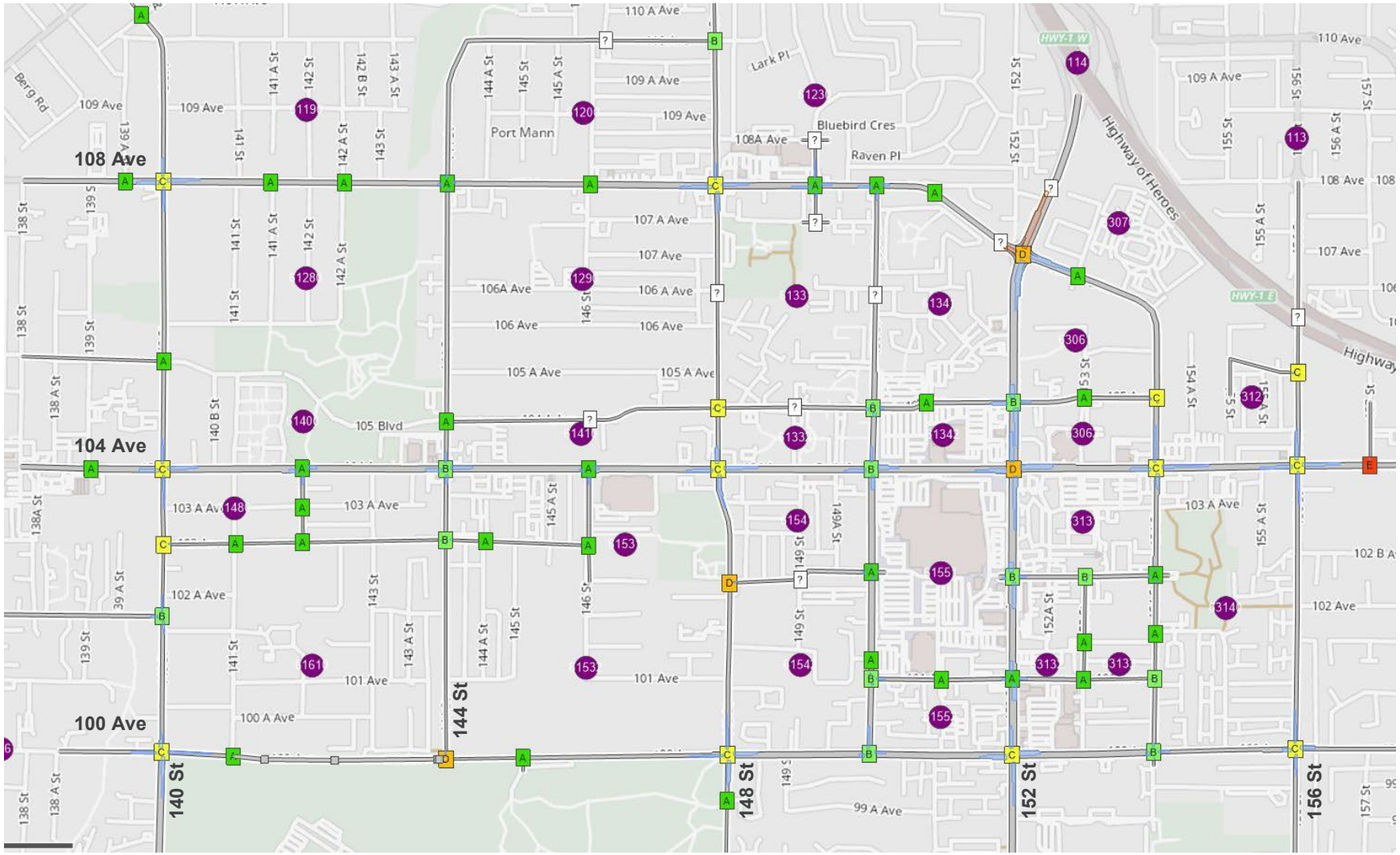


Figure 78: 2017 Base Scenario Results (PM Peak Hour)

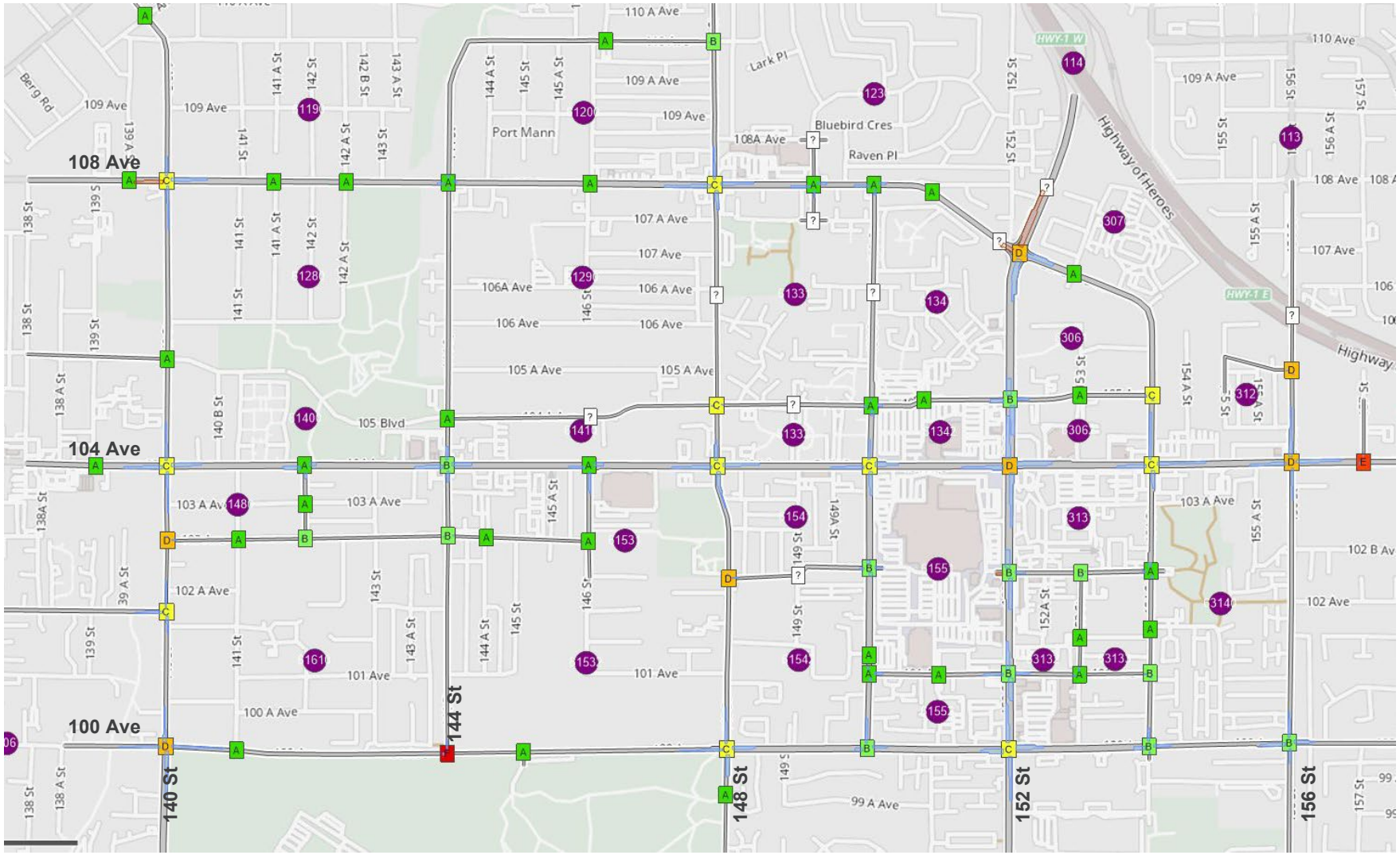


Table 14: 2017 Base Scenario Traffic Operations Results (AM Peak Hour)

2017 Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.26	0.83		0.53	0.47		0.08	0.42	0.42	0.05	0.58	0.58	-
	Delay (s/veh)	24.19	45.31		26.97	33.89		11.06	16.84	16.87	10.01	20.05	20.11	22.90
	LOS	C	D		C	C		B	B	B	B	C	C	C
	95% Queue (m)	25.40	71.14		51.33	43.89		3.62	65.15	64.05	3.09	92.90	90.46	-
105A Avenue / 140 Street (Two-way stop)	v/c Ratio	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	-	-
	Delay (s/veh)	7.59	0.00	-	-	0.00	0.00	12.10	-	9.22	-	-	-	0.00
	LOS	A	A	-	-	A	A	B	-	A	-	-	-	A
	95% Queue (m)	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	-	-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.62	0.84		0.05	0.81		0.16	0.30	0.30	0.14	0.46	0.46	-
	Delay (s/veh)	44.95	51.04		33.45	56.92		8.77	13.82	13.83	8.07	15.79	15.80	24.68
	LOS	D	D		C	E		A	B	B	A	B	B	C
	95% Queue (m)	72.14	96.03		3.21	70.88		7.29	55.24	54.21	10.66	86.59	85.49	-
103 Avenue / 140 Street (Two-way stop)	v/c Ratio	-	0.00	0.00	0.02	0.00	-	-	-	-	0.27	-	0.07	-
	Delay (s/veh)	-	0.00	0.00	8.47	0.00	-	-	-	-	19.69	-	15.60	2.78
	LOS	-	A	A	A	A	-	-	-	-	C	-	C	C
	95% Queue (m)	-	0.00	0.00	0.37	0.00	-	-	-	-	11.10	-	11.10	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.09	0.09	-	-	0.47		0.24	-	0.50	-	-	-	-
	Delay (s/veh)	6.30	8.09	-	-	13.91		23.99	-	26.60	-	-	-	12.92
	LOS	A	A	-	-	B		C	-	C	-	-	-	B
	95% Queue (m)	3.83	38.21	-	-	48.50		10.74	-	21.45	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.08	0.65	0.71	0.25	0.26	0.27	0.16	0.41		0.09	0.70		-
	Delay (s/veh)	18.69	37.17	40.72	22.28	28.57	28.72	21.70	30.96		19.20	39.19		34.09
	LOS	B	D	D	C	C	C	C	C		B	D		C
	95% Queue (m)	9.60	116.74	116.33	24.28	46.19	43.77	14.81	71.71		10.78	125.46		-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.18	-	0.53	-	-	-	-	0.23	0.01	0.03	0.34	-	-
	Delay (s/veh)	48.28	-	53.72	-	-	-	-	4.84	3.86	2.40	3.20	-	6.43
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	9.24	-	26.58	-	-	-	-	24.79	0.51	1.12	26.87	-	-
103 Avenue / 142 Street (Two-way stop)	v/c Ratio	-	-	-	0.02	-	0.04	0.04	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	9.91	-	8.73	7.39	0.00	-	-	0.00	0.00	4.61
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	1.39	-	1.39	0.88	0.88	-	-	0.00	0.00	-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.12	0.20		0.00	0.39		0.37	0.38	0.38	0.30	0.31	0.31	-
	Delay (s/veh)	45.63	44.29		0.00	48.15		2.50	2.56	2.64	2.14	2.18	2.22	3.40
	LOS	D	D		A	D		A	A	A	A	A	A	A
	95% Queue (m)	3.63	4.03		0.00	8.42		14.71	13.83	13.83	10.70	10.36	10.36	-
104A Avenue / 144 Street (Two-way stop)	v/c Ratio	-	0.00	0.00	0.01	0.00	-	-	-	-	0.03	-	0.01	-
	Delay (s/veh)	-	0.00	0.00	7.29	0.00	-	-	-	-	9.44	-	8.56	1.93
	LOS	-	A	A	A	A	-	-	-	-	A	-	A	A
	95% Queue (m)	-	0.00	0.00	0.13	0.13	-	-	-	-	0.85	-	0.85	-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.25	0.41		0.29	0.40		0.06	0.28	0.28	0.07	0.38	0.38	-
	Delay (s/veh)	42.25	54.81		42.85	54.12		4.95	9.02	9.02	4.70	9.69	9.69	13.94
	LOS	D	D		D	D		A	A	A	A	A	A	B
	95% Queue (m)	26.50	15.04		31.07	15.68		2.50	44.76	44.76	3.93	64.21	64.15	-
103 Avenue / 144 Street (Two-way stop)	v/c Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.02	0.03	0.01	-
	Delay (s/veh)	7.37	0.00	0.00	7.50	0.00	0.00	10.80	11.09	8.78	11.10	11.08	9.26	3.41
	LOS	A	A	A	A	A	A	B	B	A	B	B	A	B
	95% Queue (m)	0.53	0.53	0.53	0.00	0.00	0.00	1.19	1.19	1.19	1.66	1.66	1.66	-

2017 Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 144 Street (Two-way stop)	v/c Ratio	-	-	-	0.25	-	0.12	0.06	0.01	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	30.60	-	17.41	8.62	0.00	-	-	0.00	0.00	2.38
	LOS	-	-	-	D	-	C	A	A	-	-	A	A	D
	95% Queue (m)	-	-	-	12.60	-	12.60	1.38	0.00	-	-	0.00	0.00	-
100 Avenue / Green Timbers Park Access (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.01	0.00	0.00	0.01	-	-
	Delay (s/veh)	22.83	-	13.08	-	-	-	-	0.00	0.00	8.96	0.00	-	0.00
	LOS	C	-	B	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.17	-	0.63	-	-	-	-	0.25	0.26	0.07	0.32	-	-
	Delay (s/veh)	50.33	-	60.28	-	-	-	-	2.22	2.23	3.29	2.23	-	4.52
	LOS	D	-	E	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	6.51	-	24.74	-	-	-	-	13.87	13.94	2.69	16.60	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.00	-	0.01	-	-	-	-
	Delay (s/veh)	7.25	0.00	-	-	0.00	0.00	9.00	-	8.40	-	-	-	2.14
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.19	0.19	-	-	0.00	0.00	0.24	-	0.24	-	-	-	-
110 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.00	-	0.05	-	-	-	-
	Delay (s/veh)	7.91	0.00	-	-	0.00	0.00	12.72	-	10.19	-	-	-	0.87
	LOS	A	A	-	-	A	A	B	-	B	-	-	-	B
	95% Queue (m)	0.33	0.33	-	-	0.00	0.00	1.18	-	1.18	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.37	0.21	0.80	0.32	0.60		0.05	0.56	0.56	0.11	0.49	0.49	-
	Delay (s/veh)	27.21	33.94	45.38	25.45	38.35		9.77	19.81	19.86	10.98	17.04	17.11	22.84
	LOS	C	C	D	C	D		A	B	B	B	B	B	C
	95% Queue (m)	40.00	16.09	62.70	40.00	49.11		2.15	89.39	87.31	6.04	77.62	74.15	-
105 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.02	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.03	0.21	0.00	0.03	-
	Delay (s/veh)	7.78	0.00	0.00	8.18	0.00	0.00	17.23	16.55	10.04	19.96	19.11	13.80	2.83
	LOS	A	A	A	A	A	A	C	C	B	C	C	B	C
	95% Queue (m)	0.55	0.55	0.55	0.22	0.22	0.22	1.75	1.75	1.75	7.12	7.12	7.12	-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.21	0.76	0.84	0.25	0.40	0.25	0.08	0.41	0.41	0.00	0.51	0.51	-
	Delay (s/veh)	28.43	44.77	50.30	29.56	38.42	36.79	11.53	15.89	15.99	10.53	19.97	20.03	26.79
	LOS	C	D	D	C	D	D	B	B	B	B	B	C	C
	95% Queue (m)	24.44	97.42	98.97	21.94	52.56	27.13	4.63	75.80	70.93	0.15	97.23	93.92	-
102A Avenue / 148 Street (Two-way stop)	v/c Ratio	-	0.01	0.00	0.04	0.00	-	-	-	-	0.27	-	0.15	-
	Delay (s/veh)	-	0.00	0.00	9.13	0.00	-	-	-	-	27.67	-	20.32	2.98
	LOS	-	A	A	A	A	-	-	-	-	D	-	C	D
	95% Queue (m)	-	0.00	0.00	0.97	0.97	-	-	-	-	14.97	-	14.97	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.29	0.51	0.50	0.11	0.76		0.64	0.74		0.66	0.38	0.38	-
	Delay (s/veh)	18.63	29.86	30.08	16.08	45.32		27.29	41.95		29.17	30.82	30.87	32.29
	LOS	B	C	C	B	D		C	D		C	C	C	C
	95% Queue (m)	30.68	75.36	65.20	10.28	99.94		78.57	97.68		70.07	49.90	48.64	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.30	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.24			0.67			0.51	0.52	0.52	0.35	0.36	0.36	-
	Delay (s/veh)	35.28			41.25			6.60	6.83	7.04	5.25	5.33	5.44	9.76
	LOS	D			D			A	A	A	A	A	A	A
	95% Queue (m)	17.97			58.91			53.07	57.99	57.99	35.33	33.19	33.19	-

2017 Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.42	-	0.55	-	-	-	-	0.45	0.46	0.30	0.30	-	-
	Delay (s/veh)	40.25	-	42.61	-	-	-	-	4.79	4.82	3.65	3.70	-	7.05
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	23.14	-	27.82	-	-	-	-	40.52	40.88	22.69	21.12	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.02	0.11	0.22	0.03	0.06		0.04	0.23		0.30	0.18		-
	Delay (s/veh)	6.32	5.25	5.70	7.63	5.06		18.78	17.37		20.92	17.09		10.07
	LOS	A	A	A	A	A		B	B		C	B		B
	95% Queue (m)	1.08	5.32	9.51	1.22	2.75		1.74	8.25		12.50	6.25		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.32	0.63	0.70	0.29	0.73		0.28	0.35	0.35	0.15	0.36	0.06	-
	Delay (s/veh)	39.58	54.14	57.61	39.52	58.60		7.06	11.68	11.68	6.47	11.56	9.13	19.15
	LOS	D	D	E	D	E		A	B	B	A	B	A	B
	95% Queue (m)	31.03	41.61	40.83	28.18	44.50		16.50	62.39	61.77	8.55	60.90	8.06	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.05	0.12	0.12	0.08	0.05	0.05	0.26	0.18		0.08	0.10		-
	Delay (s/veh)	6.13	5.04	5.05	6.81	4.79	4.82	19.45	16.77		18.61	16.34		9.17
	LOS	A	A	A	A	A	A	B	B		B	B		A
	95% Queue (m)	1.93	5.20	5.06	3.33	2.05	1.98	10.83	5.97		2.86	3.21		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.10	0.11	0.07	0.08	-	-	-	-	0.65	-	0.22	-
	Delay (s/veh)	-	4.45	4.48	4.35	4.35	-	-	-	-	21.11	-	16.91	10.49
	LOS	-	A	A	A	A	-	-	-	-	C	-	B	B
	95% Queue (m)	-	4.02	4.08	2.95	2.72	-	-	-	-	24.68	-	6.50	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.21	-	0.81	0.12	0.19	-	-	0.29	0.32	-
	Delay (s/veh)	-	-	-	24.18	-	33.87	5.70	5.74	-	-	11.22	11.36	14.15
	LOS	-	-	-	C	-	C	A	A	-	-	B	B	B
	95% Queue (m)	-	-	-	15.01	-	62.89	5.59	14.64	-	-	30.69	31.23	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	1.16	0.94	0.00	0.46	0.43	0.95	0.95	0.58	0.07	0.01	0.54	0.99	-
	Delay (s/veh)	503.83	42.86	26.90	62.96	29.37	64.50	62.81	35.59	28.89	39.02	43.89	91.75	50.05
	LOS	F	D	C	E	C	E	E	D	C	D	D	F	D
	95% Queue (m)	3.60	148.11	0.26	10.42	65.64	181.83	175.9	85.95	7.58	0.65	58.18	123.86	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.30	0.61	0.06	0.00	0.23	0.23	0.39	0.08	0.48	0.22	0.47		-
	Delay (s/veh)	70.31	13.90	8.27	0.00	9.76	9.92	39.76	45.46	50.30	38.10	53.71		17.03
	LOS	E	B	A	A	A	A	D	D	D	D	D		B
	95% Queue (m)	1.72	107.99	7.04	0.00	34.39	36.80	49.59	5.06	28.77	28.25	21.07		-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.24	0.91	0.14	0.26	0.60	0.62	0.77	0.55	0.23	0.15	0.65	0.21	-
	Delay (s/veh)	45.72	50.64	28.83	49.65	37.67	41.37	40.14	37.24	33.01	21.57	39.43	32.80	41.36
	LOS	D	D	C	D	D	D	D	D	C	C	D	C	D
	95% Queue (m)	19.71	154.43	17.81	16.39	86.36	85.29	90.61	77.61	29.05	15.39	92.73	27.19	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.09	0.44	0.44	0.15	0.19	0.20	0.10	0.11		0.10	0.44		-
	Delay (s/veh)	3.93	10.50	10.51	5.78	7.70	7.85	41.22	41.31		51.32	52.70		11.31
	LOS	A	B	B	A	A	A	D	D		D	D		B
	95% Queue (m)	3.99	74.85	74.14	6.28	26.56	27.84	8.59	8.36		4.98	20.03		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.11	0.40	0.07	0.01	0.27	0.27	0.26	0.20		0.39	0.27		-
	Delay (s/veh)	2.98	5.23	3.65	3.05	6.70	6.75	52.59	47.02		53.65	47.53		9.20
	LOS	A	A	A	A	A	A	D	D		D	D		A
	95% Queue (m)	4.30	47.80	6.20	0.09	37.27	34.42	13.26	11.27		21.72	17.14		-

2017 Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.27	0.63	0.64	0.04	0.35	0.35	0.63	0.24	0.20	0.31	0.48	0.11	-
	Delay (s/veh)	13.30	27.42	27.50	13.54	23.10	23.10	37.87	36.85	37.02	28.81	40.35	35.69	29.38
	LOS	B	C	C	B	C	C	D	D	D	C	D	D	C
	95% Queue (m)	28.10	123.76	121.15	2.84	64.50	64.46	78.43	29.04	21.71	43.82	61.22	11.69	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.05	-	0.09	-	-	-	-	0.00	0.00	0.04	0.00	-	-
	Delay (s/veh)	10.00	-	9.02	-	-	-	-	0.00	0.00	7.39	0.00	-	6.85
	LOS	B	-	A	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	3.58	-	3.58	-	-	-	-	0.00	0.00	0.89	0.89	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.13	-	0.13	0.12		-	-	0.08		-
	Delay (s/veh)	-	-	-	7.40	-	7.40	8.04		-	-	6.98		7.50
	LOS	-	-	-	A	-	A	A		-	-	A		A
	95% Queue (m)	-	-	-	3.28	-	3.28	2.99		-	-	1.89		-
105 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.05	0.01	-	-	0.00	0.00	0.10	-	0.12	-	-	-	-
	Delay (s/veh)	8.09	0.00	-	-	0.00	0.00	16.88	-	9.83	-	-	-	1.86
	LOS	A	A	-	-	A	A	C	-	A	-	-	-	C
	95% Queue (m)	1.19	0.60	-	-	0.00	0.00	2.47	-	3.18	-	-	-	-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.24	0.43	0.74	0.68	0.21		0.12	0.32	0.32	0.25	0.64	0.66	-
	Delay (s/veh)	31.06	49.73	58.71	39.10	38.77		13.05	17.19	17.19	11.25	22.51	23.41	25.95
	LOS	C	D	E	D	D		B	B	B	B	C	C	C
	95% Queue (m)	32.49	27.83	45.01	103.87	22.94		5.53	60.48	60.48	23.26	133.54	121.23	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.01	0.31		0.00	0.19	0.18	0.20	0.05		0.00	0.00		-
	Delay (s/veh)	7.61	6.56		0.00	6.10	6.10	9.83	7.64		0.00	0.00		7.05
	LOS	A	A		A	A	A	A	A		A	A		A
	95% Queue (m)	0.18	5.57		0.00	3.22	2.64	4.73	0.62		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.05	0.00	-	-	0.00	0.00	0.00	-	0.02	-	-	-	-
	Delay (s/veh)	7.75	0.00	-	-	0.00	0.00	11.76	-	9.38	-	-	-	1.82
	LOS	A	A	-	-	A	A	B	-	A	-	-	-	B
	95% Queue (m)	1.20	0.00	-	-	0.00	0.00	0.59	-	0.59	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.11			0.41	0.33		0.10	0.33	0.01	0.05	0.75		-
	Delay (s/veh)	10.63			12.46	11.56		14.50	7.24	5.99	9.33	10.70		10.21
	LOS	B			B	B		B	A	A	A	B		B
	95% Queue (m)	3.80			7.20	9.13		2.57	10.61	0.18	1.51	32.08		-
105A Avenue / 156 Street (Two-way stop)	v/c Ratio	0.03	0.01	-	-	0.00	0.00	0.03	-	0.12	-	-	-	-
	Delay (s/veh)	7.97	0.00	-	-	0.00	0.00	19.49	-	10.89	-	-	-	1.45
	LOS	A	A	-	-	A	A	C	-	B	-	-	-	C
	95% Queue (m)	0.81	0.81	-	-	0.00	0.00	4.15	-	4.15	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.35	0.55		0.20	0.27	0.77	0.59	0.49	0.49	0.64	0.56	0.56	-
	Delay (s/veh)	28.35	30.25		53.08	36.69	48.51	21.66	25.78	25.78	21.99	27.39	27.40	28.59
	LOS	C	C		D	D	D	C	C	C	C	C	C	C
	95% Queue (m)	52.86	93.57		8.28	34.59	90.40	57.82	92.50	92.50	67.34	107.75	107.32	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.27	0.47		0.02	0.80		0.26	0.22	0.16	0.02	0.37	0.09	-
	Delay (s/veh)	15.44	15.53		28.80	30.90		22.87	15.21	14.80	18.00	16.46	14.30	20.03
	LOS	B	B		C	C		C	B	B	B	B	B	C
	95% Queue (m)	16.52	60.82		1.10	92.30		19.86	23.91	14.60	1.75	43.07	8.12	-
104 Avenue / 157 Street (Two-way stop)	v/c Ratio	-	-	-	0.09	-	0.04	0.02	0.01	-	-	0.01	0.00	-
	Delay (s/veh)	-	-	-	45.39	-	15.67	11.18	0.00	-	-	0.00	0.00	0.42
	LOS	-	-	-	E	-	C	B	A	-	-	A	A	E
	95% Queue (m)	-	-	-	3.59	-	3.59	0.47	0.00	-	-	0.00	0.00	-

Table 15: 2017 Base Scenario Traffic Operations Results (PM Peak Hour)

2017 Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.23	0.91		0.53	0.38		0.13	0.75	0.75	0.07	0.62	0.62	-
	Delay (s/veh)	20.26	49.82		25.14	28.49		16.29	32.08	32.28	18.01	28.90	29.16	32.10
	LOS	C	D		C	C		B	C	C	B	C	C	C
	95% Queue (m)	25.58	126.51		43.72	53.58		7.72	138.27	134.19	3.31	105.39	98.72	-
105A Avenue / 140 Street (Two-way stop)	v/c Ratio	0.00	0.01	-	-	0.00	0.00	0.00	-	0.00	-	-	-	-
	Delay (s/veh)	7.88	0.00	-	-	0.00	0.00	15.78	-	9.98	-	-	-	0.00
	LOS	A	A	-	-	A	A	C	-	A	-	-	-	A
	95% Queue (m)	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	-	-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.38	0.87		0.09	0.89		0.38	0.53	0.53	0.10	0.43	0.43	-
	Delay (s/veh)	37.68	53.59		33.61	57.85		13.24	19.18	19.25	11.46	18.52	18.54	27.30
	LOS	D	D		C	E		B	B	B	B	B	B	C
	95% Queue (m)	35.21	119.12		6.00	111.99		30.66	111.21	108.42	6.04	86.95	85.10	-
103 Avenue / 140 Street (Two-way stop)	v/c Ratio	-	0.00	0.00	0.04	0.00	-	-	-	-	0.37	-	0.03	-
	Delay (s/veh)	-	0.00	0.00	8.63	0.00	-	-	-	-	26.39	-	19.13	2.95
	LOS	-	A	A	A	A	-	-	-	-	D	-	C	D
	95% Queue (m)	-	0.00	0.00	0.94	0.00	-	-	-	-	13.98	-	13.98	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.08	0.47	-	-	0.68		0.15	-	0.88	-	-	-	-
	Delay (s/veh)	8.63	10.46	-	-	19.64		17.70	-	35.37	-	-	-	20.18
	LOS	A	B	-	-	B		B	-	D	-	-	-	C
	95% Queue (m)	3.06	49.49	-	-	76.80		9.72	-	77.73	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.14	0.64	0.76	0.33	0.54	0.54	0.25	0.62		0.45	0.75		-
	Delay (s/veh)	22.08	38.77	45.19	25.22	35.96	36.01	24.32	36.77		26.05	42.18		37.05
	LOS	C	D	D	C	D	D	C	D		C	D		D
	95% Queue (m)	14.03	122.74	134.01	35.27	103.20	101.40	22.26	119.39		49.75	152.01		-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.09	-	0.43	-	-	-	-	0.37	0.02	0.12	0.28	-	-
	Delay (s/veh)	52.34	-	57.05	-	-	-	-	5.91	4.10	2.98	2.54	-	5.78
	LOS	D	-	E	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	4.02	-	19.19	-	-	-	-	51.01	2.08	3.30	19.27	-	-
103 Avenue / 142 Street (Two-way stop)	v/c Ratio	-	-	-	0.01	-	0.06	0.05	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	10.44	-	8.99	7.51	0.00	-	-	0.00	0.00	4.26
	LOS	-	-	-	B	-	A	A	A	-	-	A	A	B
	95% Queue (m)	-	-	-	1.79	-	1.79	1.12	1.12	-	-	0.00	0.00	-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.13	0.16		0.00	0.37		0.48	0.49	0.49	0.31	0.31	0.31	-
	Delay (s/veh)	50.92	49.56		0.00	54.32		2.83	2.91	3.01	1.92	1.96	2.00	3.30
	LOS	D	D		A	D		A	A	A	A	A	A	A
	95% Queue (m)	3.73	3.06		0.00	7.23		18.93	19.19	19.44	9.45	9.73	10.00	-
104A Avenue / 144 Street (Two-way stop)	v/c Ratio	-	0.00	0.00	0.01	0.00	-	-	-	-	0.03	-	0.01	-
	Delay (s/veh)	-	0.00	0.00	7.30	0.00	-	-	-	-	9.64	-	8.59	1.82
	LOS	-	A	A	A	A	-	-	-	-	A	-	A	A
	95% Queue (m)	-	0.00	0.00	0.16	0.16	-	-	-	-	0.95	-	0.95	-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.28	0.58		0.34	0.43		0.06	0.43	0.43	0.27	0.32	0.32	-
	Delay (s/veh)	43.87	60.08		44.36	55.30		5.04	11.77	11.77	7.53	9.65	9.65	15.76
	LOS	D	E		D	E		A	B	B	A	A	A	B
	95% Queue (m)	31.93	28.08		37.95	22.52		3.16	81.34	81.34	13.75	58.16	58.08	-
103 Avenue / 144 Street (Two-way stop)	v/c Ratio	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.04	0.08	0.03	-
	Delay (s/veh)	7.58	0.00	0.00	7.61	0.00	0.00	13.23	12.88	9.21	13.51	13.31	10.15	3.55
	LOS	A	A	A	A	A	A	B	B	A	B	B	B	B
	95% Queue (m)	1.00	1.00	1.00	0.00	0.00	0.00	1.24	1.24	1.24	3.84	3.84	3.84	-

2017 Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 144 Street (Two-way stop)	v/c Ratio	-	-	-	0.24	-	0.32	0.12	0.01	-	-	0.01	0.00	-
	Delay (s/veh)	-	-	-	51.16	-	25.16	9.48	0.00	-	-	0.00	0.00	3.62
	LOS	-	-	-	F	-	D	A	A	-	-	A	A	F
	95% Queue (m)	-	-	-	24.30	-	24.30	3.00	0.00	-	-	0.00	0.00	-
100 Avenue / Green Timbers Park Access (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.01	0.00	0.00	0.01	-	-
	Delay (s/veh)	30.34	-	13.95	-	-	-	-	0.00	0.00	9.23	0.00	-	0.00
	LOS	D	-	B	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.12	-	0.81	-	-	-	-	0.40	0.40	0.16	0.31	-	-
	Delay (s/veh)	48.12	-	64.02	-	-	-	-	4.34	4.37	8.10	3.50	-	8.11
	LOS	D	-	E	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	8.34	-	61.90	-	-	-	-	45.11	45.54	8.46	29.28	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.00	-	0.03	-	-	-	-
	Delay (s/veh)	7.30	0.00	-	-	0.00	0.00	9.11	-	8.59	-	-	-	2.83
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.18	0.18	-	-	0.00	0.00	0.64	-	0.64	-	-	-	-
110 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.03	0.00	-	-	0.00	0.00	0.01	-	0.04	-	-	-	-
	Delay (s/veh)	8.16	0.00	-	-	0.00	0.00	14.47	-	10.76	-	-	-	0.78
	LOS	A	A	-	-	A	A	B	-	B	-	-	-	B
	95% Queue (m)	0.60	0.60	-	-	0.00	0.00	1.07	-	1.07	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.37	0.33	0.62	0.69	0.51		0.11	0.70	0.70	0.15	0.53	0.53	-
	Delay (s/veh)	29.51	37.19	41.55	38.32	39.34		11.06	24.79	24.93	14.06	20.19	20.31	26.77
	LOS	C	D	D	D	D		B	C	C	B	C	C	C
	95% Queue (m)	44.08	32.23	55.97	93.70	49.44		6.11	132.93	130.23	7.49	94.48	89.06	-
105 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.02	0.00	0.00	0.02	0.00	0.00	0.04	0.00	0.05	0.20	0.00	0.02	-
	Delay (s/veh)	7.82	0.00	0.00	8.54	0.00	0.00	20.04	19.63	10.32	23.61	21.94	14.89	2.49
	LOS	A	A	A	A	A	A	C	C	B	C	C	B	C
	95% Queue (m)	0.57	0.57	0.57	0.58	0.58	0.58	2.35	2.35	2.35	6.30	6.30	6.30	-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.14	0.85	0.73	0.30	0.47	0.27	0.25	0.55	0.56	0.01	0.50	0.50	-
	Delay (s/veh)	32.66	56.42	50.36	35.02	43.79	41.51	12.40	16.93	17.14	10.92	19.37	19.43	26.35
	LOS	C	E	D	D	D	D	B	B	B	B	B	B	C
	95% Queue (m)	15.60	109.33	79.87	26.50	60.65	29.50	16.91	114.60	108.03	0.29	104.41	99.87	-
102A Avenue / 148 Street (Two-way stop)	v/c Ratio	-	0.01	0.00	0.10	0.00	-	-	-	-	0.35	-	0.10	-
	Delay (s/veh)	-	0.00	0.00	9.08	0.00	-	-	-	-	33.41	-	22.01	3.63
	LOS	-	A	A	A	A	-	-	-	-	D	-	C	D
	95% Queue (m)	-	0.00	0.00	2.58	2.58	-	-	-	-	16.40	-	16.40	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.31	0.38	0.48	0.16	0.80		0.73	0.86		0.54	0.50	0.50	-
	Delay (s/veh)	19.12	27.36	29.75	16.15	48.04		32.01	50.71		26.51	33.30	33.33	34.86
	LOS	B	C	C	B	D		C	D		C	C	C	C
	95% Queue (m)	32.94	56.89	63.39	16.91	105.97		84.47	123.46		51.03	67.10	66.63	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.30	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.35			0.00			0.56	0.57	0.57	0.36	0.37	0.38	-
	Delay (s/veh)	46.12			0.00			4.99	5.14	5.31	3.37	3.46	3.54	5.45
	LOS	D			A			A	A	A	A	A	A	A
	95% Queue (m)	21.00			0.00			56.57	54.65	52.73	22.86	49.52	26.66	-

2017 Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.34	-	0.06	-	-	-	-	0.52	0.53	0.31	0.32	-	-
	Delay (s/veh)	46.71	-	43.87	-	-	-	-	4.34	4.38	2.86	2.91	-	4.65
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	14.97	-	2.36	-	-	-	-	44.54	45.05	20.14	19.29	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.07	0.10	0.34	0.08	0.05		0.00	0.21		0.32	0.19		-
	Delay (s/veh)	6.55	5.29	6.38	9.25	5.12		18.50	17.16		20.88	17.01		9.78
	LOS	A	A	A	A	A		B	B		C	B		A
	95% Queue (m)	3.09	4.62	15.88	3.32	2.27		0.13	7.69		13.70	7.00		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.46	0.50	0.77	0.22	0.79		0.31	0.47	0.47	0.35	0.36	0.16	-
	Delay (s/veh)	41.94	49.41	57.05	38.18	63.42		9.26	15.87	15.92	11.38	13.74	11.89	22.38
	LOS	D	D	E	D	E		A	B	B	B	B	B	C
	95% Queue (m)	56.85	49.92	68.54	20.18	57.69		22.48	94.79	91.32	22.38	67.32	24.74	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.12	0.16	0.16	0.13	0.15	0.16	0.28	0.23		0.41	0.32		-
	Delay (s/veh)	9.20	6.89	6.91	9.27	6.87	6.90	20.89	15.67		21.23	16.33		11.63
	LOS	A	A	A	A	A	A	C	B		C	B		B
	95% Queue (m)	5.90	9.43	9.13	6.10	9.05	8.55	12.34	10.67		20.59	15.16		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.16	0.17	0.20	0.19	-	-	-	-	0.63	-	0.46	-
	Delay (s/veh)	-	4.94	4.97	5.60	5.18	-	-	-	-	20.21	-	18.46	9.74
	LOS	-	A	A	A	A	-	-	-	-	C	-	B	A
	95% Queue (m)	-	6.92	6.99	6.48	7.71	-	-	-	-	25.39	-	15.79	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.37	-	0.82	0.19	0.24	-	-	0.36	0.40	-
	Delay (s/veh)	-	-	-	25.33	-	34.02	6.89	6.48	-	-	12.77	13.07	14.98
	LOS	-	-	-	C	-	C	A	A	-	-	B	B	B
	95% Queue (m)	-	-	-	29.54	-	68.66	9.52	20.70	-	-	41.25	42.45	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	1.09	0.84	0.01	0.61	0.54	0.97	0.90	0.80	0.11	0.04	0.90	0.81	-
	Delay (s/veh)	621.66	40.48	29.07	66.76	31.97	70.57	50.12	42.03	27.05	43.80	57.93	64.85	46.88
	LOS	F	D	C	E	C	E	D	D	C	D	E	E	D
	95% Queue (m)	2.34	128.24	1.10	20.41	86.15	198.23	173.8	140.8	14.65	3.18	85.59	76.77	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.00	0.49	0.11	0.00	0.28	0.28	0.29	0.18	0.69	0.27	0.34		-
	Delay (s/veh)	0.00	10.80	7.60	0.00	8.76	8.96	43.71	52.03	62.94	43.70	54.48		14.99
	LOS	A	B	A	A	A	A	D	D	E	D	D		B
	95% Queue (m)	0.00	85.67	14.84	0.00	44.94	47.38	34.90	10.17	38.00	33.55	16.85		-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.42	0.93	0.31	0.14	0.81	0.82	0.87	0.66	0.29	0.15	0.69	0.03	-
	Delay (s/veh)	48.88	59.39	36.93	44.37	49.23	58.12	51.72	43.95	38.00	23.63	44.78	34.08	49.75
	LOS	D	E	D	D	D	E	D	D	D	C	D	C	D
	95% Queue (m)	47.64	156.64	44.49	13.12	124.49	123.88	119.45	95.92	39.33	16.47	101.03	2.95	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.13	0.44	0.44	0.23	0.27	0.27	0.30	0.37		0.33	0.34		-
	Delay (s/veh)	8.00	16.60	16.60	10.27	13.62	13.87	37.46	37.73		57.60	46.99		19.15
	LOS	A	B	B	B	B	B	D	D		E	D		B
	95% Queue (m)	8.66	89.94	89.94	15.93	49.40	51.07	40.44	49.20		17.08	29.81		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.19	0.38	0.15	0.01	0.41	0.41	0.42	0.49		0.55	0.23		-
	Delay (s/veh)	7.79	9.67	7.92	6.40	13.42	13.45	48.90	43.61		56.48	40.22		17.46
	LOS	A	A	A	A	B	B	D	D		E	D		B
	95% Queue (m)	11.85	65.66	20.27	0.14	80.47	77.74	39.75	58.73		41.20	30.16		-

2017 Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.57	0.60	0.60	0.20	0.53	0.53	0.38	0.52	0.47	0.64	0.33	0.12	-
	Delay (s/veh)	19.71	25.22	25.32	14.43	23.54	23.61	34.03	45.10	46.95	42.93	42.03	39.72	30.04
	LOS	B	C	C	B	C	C	C	D	D	D	D	D	C
	95% Queue (m)	50.38	127.08	124.20	13.64	110.83	106.23	54.44	66.21	58.27	80.64	42.11	12.91	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.06	-	0.10	-	-	-	-	0.00	0.00	0.07	0.00	-	-
	Delay (s/veh)	11.32	-	9.42	-	-	-	-	0.00	0.00	7.58	0.00	-	6.31
	LOS	B	-	A	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	4.42	-	4.42	-	-	-	-	0.00	0.00	1.79	1.79	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.31	-	0.31	0.25		-	-	0.08		-
	Delay (s/veh)	-	-	-	9.12	-	9.12	9.37		-	-	7.59		9.01
	LOS	-	-	-	A	-	A	A		-	-	A		A
	95% Queue (m)	-	-	-	10.32	-	10.32	7.47		-	-	1.98		-
105 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.07	0.01	-	-	0.01	0.00	0.10	-	0.15	-	-	-	-
	Delay (s/veh)	8.83	0.00	-	-	0.00	0.00	23.26	-	10.87	-	-	-	1.64
	LOS	A	A	-	-	A	A	C	-	B	-	-	-	C
	95% Queue (m)	1.80	0.90	-	-	0.00	0.00	2.52	-	3.89	-	-	-	-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.27	0.70	0.74	0.81	0.48		0.11	0.41	0.41	0.42	0.60	0.69	-
	Delay (s/veh)	31.51	59.05	62.44	45.51	41.51		15.59	22.59	22.59	15.84	23.65	27.32	30.64
	LOS	C	E	E	D	D		B	C	C	B	C	C	C
	95% Queue (m)	32.55	51.81	48.75	135.18	67.73		5.66	84.72	84.72	42.83	130.03	139.43	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.05	0.27		0.00	0.43	0.25	0.29	0.17		0.00	0.00		-
	Delay (s/veh)	10.26	7.23		0.00	8.01	7.19	10.41	8.25		0.00	0.00		8.27
	LOS	B	A		A	A	A	B	A		A	A		A
	95% Queue (m)	1.20	6.82		0.00	11.96	5.40	9.31	3.44		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.04	0.00	-	-	0.00	0.00	0.04	-	0.12	-	-	-	-
	Delay (s/veh)	7.93	0.00	-	-	0.00	0.00	14.55	-	10.75	-	-	-	2.40
	LOS	A	A	-	-	A	A	B	-	B	-	-	-	B
	95% Queue (m)	1.06	0.00	-	-	0.00	0.00	4.31	-	4.31	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.09			0.75	0.24		0.28	0.50	0.01	0.06	0.69		-
	Delay (s/veh)	14.14			21.31	14.82		18.18	8.62	6.09	12.42	10.63		12.57
	LOS	B			C	B		B	A	A	B	B		B
	95% Queue (m)	4.82			36.58	10.89		10.59	31.56	0.40	2.49	49.49		-
105A Avenue / 156 Street (Two-way stop)	v/c Ratio	0.10	0.01	-	-	0.00	0.00	0.05	-	0.09	-	-	-	-
	Delay (s/veh)	8.73	0.00	-	-	0.00	0.00	30.95	-	12.56	-	-	-	1.38
	LOS	A	A	-	-	A	A	D	-	B	-	-	-	D
	95% Queue (m)	2.50	2.50	-	-	0.00	0.00	3.52	-	3.52	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.34	0.56		0.08	0.49	1.00	0.85	0.43	0.43	0.45	0.63	0.64	-
	Delay (s/veh)	33.68	35.69		55.84	43.65	90.15	35.49	21.40	21.40	15.62	33.11	33.16	35.74
	LOS	C	D		E	D	F	D	C	C	B	C	C	D
	95% Queue (m)	45.84	92.37		3.36	64.33	143.29	104.42	89.13	89.13	43.48	129.45	127.81	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.26	0.35		0.15	0.68		0.48	0.59	0.25	0.05	0.50	0.03	-
	Delay (s/veh)	14.79	14.14		27.19	26.12		28.74	19.02	15.53	25.57	17.88	13.96	19.78
	LOS	B	B		C	C		C	B	B	C	B	B	B
	95% Queue (m)	18.00	42.18		9.00	75.54		34.72	72.96	23.53	2.82	61.79	2.96	-
104 Avenue / 157 Street (Two-way stop)	v/c Ratio	-	-	-	0.08	-	0.04	0.03	0.01	-	-	0.01	0.00	-
	Delay (s/veh)	-	-	-	46.48	-	14.95	11.12	0.00	-	-	0.00	0.00	0.40
	LOS	-	-	-	E	-	B	B	A	-	-	A	A	E
	95% Queue (m)	-	-	-	3.00	-	3.00	0.78	0.00	-	-	0.00	0.00	-

5.5. 2050 Base Scenario Traffic Operations Analysis

The 2050 Base Scenario is generally able to accommodate the 2050 demand during both peak hours with the support of the proposed capacity improvements which includes signalization of eleven intersections within the study area, road widening along 100 Avenue and 140 Street, the completion of the 105 Avenue corridor, and the intersection improvements at Guildford Drive / Ferguson Diversion and 152 Street.

As seen in **Figure 79**, three intersections, 102A Avenue and 148 Street, 105 Avenue and 154 Street, and 104 Avenue and 154 Street, operate at LOS E or LOS F during the AM peak. Additionally, there are queues extending beyond the upstream intersection at the following locations: southbound along 144 Street at 104 Avenue, westbound along 144 Street at 154 and 156 Street, westbound on Guildford Drive at 152 Street.

During the PM peak period, six intersections are expected to operate at either LOS E or F. As illustrated in **Figure 80**, these are intersections at 108 Avenue and 140 Street, 103 Avenue and 144 Street, 102A Avenue and 148 Street, 100 Avenue and 148 Street, 104 Avenue and 152 Street, and 105 Avenue and 154 Street. Queues extending beyond the upstream intersection (as identified by the orange queue bars) are expected southbound along 144 Street at 104 Avenue and southbound along 152 Street at 104 Avenue.

Detailed traffic analysis results for all movements at all intersection in the study area are presented in **Table 14** and **Table 15**. The following movements operate at a LOS F during the AM peak hour:

- 104 Avenue / 142 Street: NB Left
- 100 Avenue / 148 Street: EB Through, EB Left
- 108 Avenue (Guildford Drive) / 152 Street: NB Left, SB Right, SB Through
- 105 Avenue / 152 Street: SB Left
- 100 Avenue / 152 Street: EB Left
- 105 Avenue / 154 Street: WB
- 104 Avenue / 154 Street: NB Through, WB Through, WB Right
- 104 Avenue / 156 Street: SB Right
- 100 Avenue / 156 Street: SB Through + Right

The following movements operate at a LOS F during the PM peak hour:

- 108 Avenue / 140 Street: NB Through + Right, EB Through, EB Right
- 100 Avenue / 140 Street: SB Left
- 103 Avenue / 144 Street: EB, WB
- 100 Avenue / 148 Street: EB Through + Right
- 105 Avenue / 152 Street: SB Left, EB Left
- 104 Avenue / 152 Street: EB Left
- 100 Avenue / 152 Street: EB Left, EB Through, WB Left
- 105 Avenue / 154 Street: WB
- 104 Avenue / 154 Street: NB Through, WB Right
- 104 Avenue / 156 Street: SB Right
- 100 Avenue / 156 Street: SB Through + Right, EB Left

Figure 79: 2050 Base Scenario Results (AM Peak Hour)

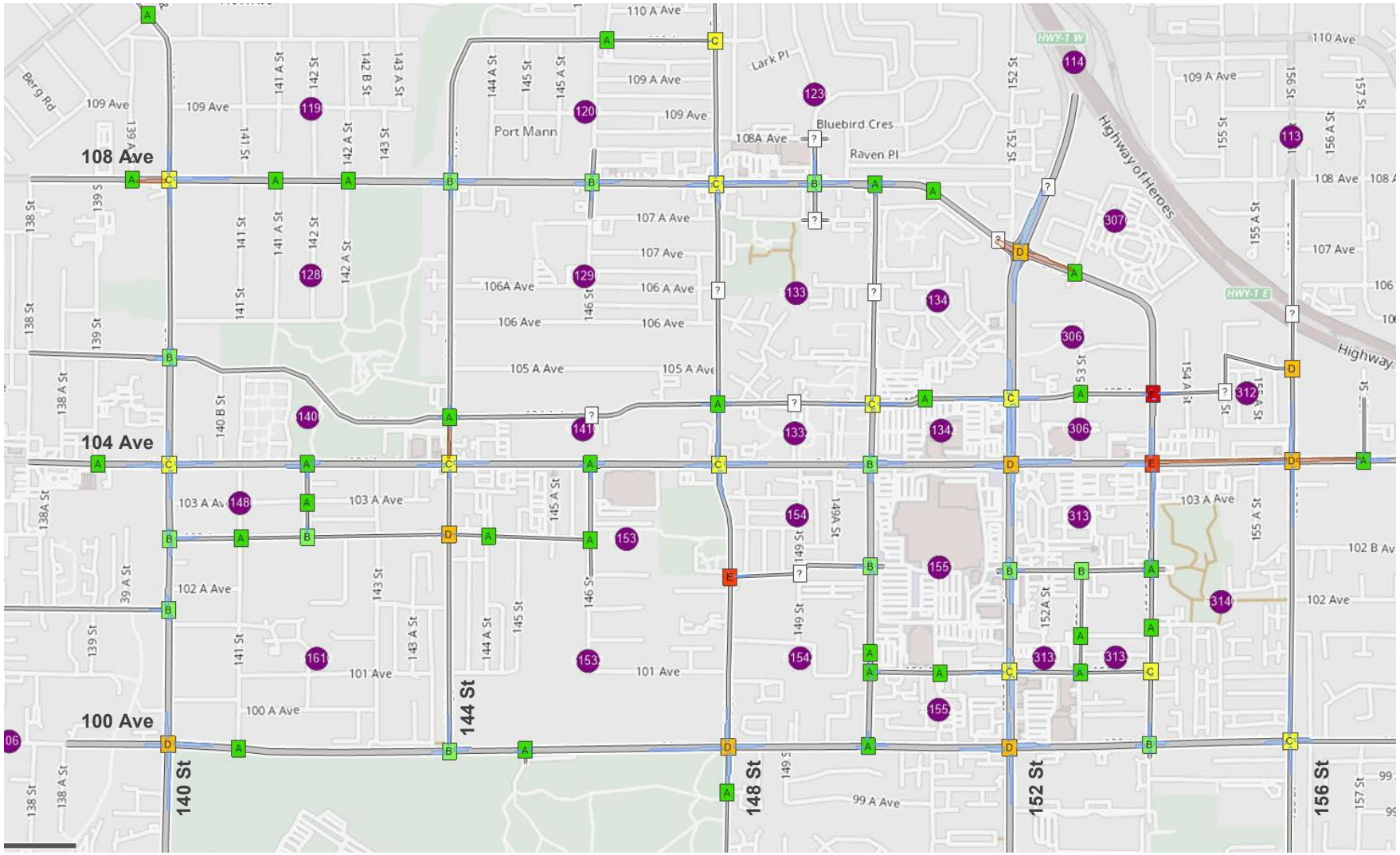


Figure 80: 2050 Base Scenario Results (PM Peak Hour)

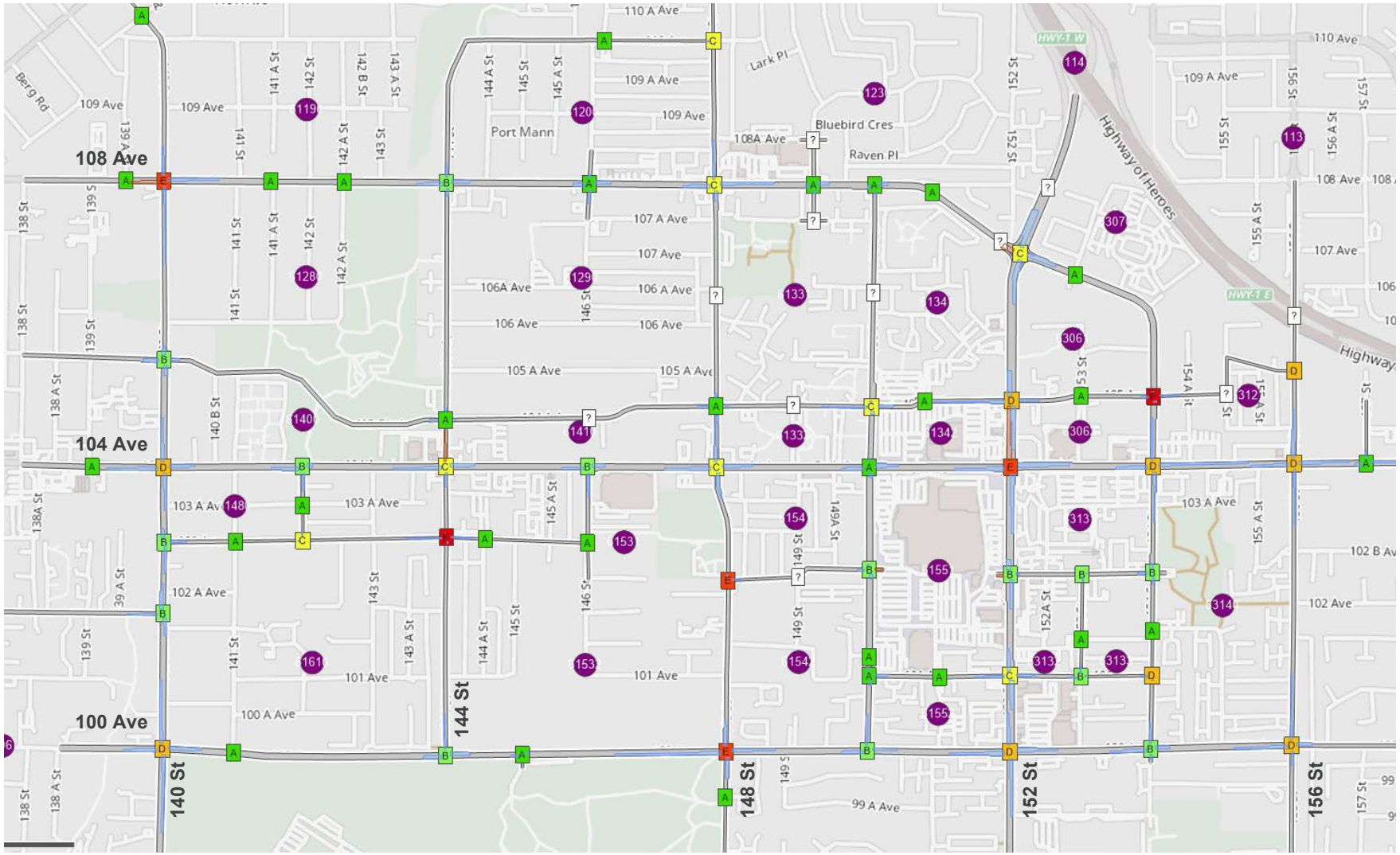


Table 16: 2050 Base Scenario Traffic Operations Results (AM Peak Hour)

2050 Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.47	0.75		0.59	0.80		0.17	0.59	0.59	0.58	0.83	0.86	-
	Delay (s/veh)	29.51	41.37		27.57	43.00		15.97	25.16	25.20	18.21	31.49	32.98	29.67
	LOS	C	D		C	D		B	C	C	B	C	C	C
	95% Queue (m)	41.37	66.07		59.98	69.92		5.94	89.76	88.25	49.39	154.25	157.29	-
105A Avenue / 140 Street (Signalized)	v/c Ratio	0.00	0.12	0.12	0.00	0.27	0.27	0.09	0.44	0.55	0.11	0.55		-
	Delay (s/veh)	0.00	6.42	6.42	0.00	7.10	7.10	21.32	17.83	19.07	20.43	19.05		12.37
	LOS	A	A	A	A	A	A	C	B	B	C	B		B
	95% Queue (m)	0.00	6.33	6.33	0.00	16.33	16.30	3.33	24.59	27.03	4.26	28.41		-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.69	0.33	0.40	0.46	0.54	0.55	0.17	0.59	0.59	0.17	0.58	0.58	-
	Delay (s/veh)	37.37	32.86	33.90	25.21	35.82	36.12	16.97	28.58	28.68	17.05	27.38	27.39	30.11
	LOS	D	C	C	C	D	D	B	C	C	B	C	C	C
	95% Queue (m)	81.59	48.99	52.53	56.03	80.83	72.17	6.73	106.57	103.01	12.81	110.58	109.99	-
103 Avenue / 140 Street (Signalized)	v/c Ratio	-	0.36	0.38	0.04	0.21	-	-	-	-	0.81	-	0.15	-
	Delay (s/veh)	-	11.38	11.55	6.17	6.41	-	-	-	-	29.20	-	20.39	14.12
	LOS	-	B	B	A	A	-	-	-	-	C	-	C	B
	95% Queue (m)	-	38.92	39.71	1.63	16.03	-	-	-	-	67.25	-	9.16	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.26	0.27	-	-	0.30	0.32	0.17	-	0.75	-	-	-	-
	Delay (s/veh)	5.07	4.55	-	-	9.99	10.73	23.22	-	31.53	-	-	-	10.04
	LOS	A	A	-	-	A	B	C	-	C	-	-	-	B
	95% Queue (m)	11.30	16.05	-	-	25.74	26.71	7.56	-	37.17	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.14	0.86	0.86	0.51	0.44	0.44	0.22	0.28	0.28	0.79	0.42	0.42	-
	Delay (s/veh)	19.83	49.75	51.08	30.77	31.65	31.69	20.56	28.76	28.76	39.88	31.26	31.32	37.67
	LOS	B	D	D	C	C	C	C	C	C	D	C	C	D
	95% Queue (m)	14.83	171.31	157.18	40.80	77.59	76.38	23.48	49.85	49.79	113.90	73.79	71.24	-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.81	-	0.44	-	-	-	-	0.37	0.14	0.38	0.32	-	-
	Delay (s/veh)	102.23	-	52.22	-	-	-	-	6.78	5.46	5.24	3.02	-	7.01
	LOS	F	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	14.14	-	20.30	-	-	-	-	50.73	15.26	14.07	23.78	-	-
103 Avenue / 142 Street (Two-way stop)	v/c Ratio	-	-	-	0.21	-	0.29	0.05	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	14.26	-	12.76	7.50	0.00	-	-	0.00	0.00	9.71
	LOS	-	-	-	B	-	B	A	A	-	-	A	A	B
	95% Queue (m)	-	-	-	21.73	-	21.73	1.08	1.08	-	-	0.00	0.00	-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.15	0.49		0.02	0.77		0.14	0.44	0.44	0.13	0.52	0.52	-
	Delay (s/veh)	43.29	38.49		38.90	45.36		12.94	5.67	5.78	10.69	6.40	6.40	10.00
	LOS	D	D		D	D		B	A	A	B	A	A	B
	95% Queue (m)	5.99	31.96		1.16	56.14		6.14	46.50	42.45	6.70	59.99	59.99	-
104A Avenue / 144 Street (Roundabout)	v/c Ratio	0.09	0.22		0.18	0.28		0.00	0.22		0.14	0.12		-
	Delay (s/veh)	5.03	5.03		5.95	5.95		6.77	6.77		4.21	4.21		5.41
	LOS	A	A		A	A		A	A		A	A		A
	95% Queue (m)	2.33	6.41		4.99	8.67		0.06	6.41		3.58	3.15		-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.25	0.32		0.64	0.97		0.41	0.43	0.43	0.49	0.53	0.54	-
	Delay (s/veh)	35.71	46.50		42.29	72.24		13.25	17.11	17.14	12.81	17.73	17.78	24.26
	LOS	D	D		D	E		B	B	B	B	B	B	C
	95% Queue (m)	19.73	24.58		82.70	96.71		26.17	81.42	79.35	40.17	103.45	101.82	-
103 Avenue / 144 Street (Two-way stop)	v/c Ratio	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.31	0.31	0.08	0.02	-
	Delay (s/veh)	8.48	0.00	0.00	7.57	0.00	0.00	21.17	20.11	14.15	34.79	26.25	18.81	6.16
	LOS	A	A	A	A	A	A	C	C	B	D	D	C	D
	95% Queue (m)	1.52	1.52	1.52	0.00	0.00	0.00	11.30	11.30	11.30	13.96	13.96	13.96	-

2050 Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 144 Street (Signalized)	v/c Ratio	-	-	-	0.83	-	0.75	0.09	0.37	-	-	0.36	0.27	-
	Delay (s/veh)	-	-	-	33.19	-	29.55	7.44	8.63	-	-	13.26	12.77	17.09
	LOS	-	-	-	C	-	C	A	A	-	-	B	B	B
	95% Queue (m)	-	-	-	87.90	-	69.59	4.42	37.93	-	-	40.10	26.55	-
100 Avenue / Green Timbers Park Access (Signalized)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.48	0.48	0.00	0.31	-	-
	Delay (s/veh)	0.00	-	0.00	-	-	-	-	4.96	4.96	0.00	2.47	-	3.94
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	19.74	19.74	0.00	3.58	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.33	-	0.55	-	-	-	-	0.32	0.32	0.17	0.44	-	-
	Delay (s/veh)	52.20	-	57.37	-	-	-	-	2.55	2.57	4.70	2.81	-	4.61
	LOS	D	-	E	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	13.31	-	21.58	-	-	-	-	18.89	19.08	7.50	27.86	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.00	-	0.02	-	-	-	-
	Delay (s/veh)	7.31	0.00	-	-	0.00	0.00	9.14	-	8.55	-	-	-	2.95
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.28	0.28	-	-	0.00	0.00	0.47	-	0.47	-	-	-	-
108 Avenue / 146 Street (Signalized)	v/c Ratio	0.50	0.30		0.21	0.20		0.06	0.34	0.34	0.33	0.50	0.50	-
	Delay (s/veh)	41.65	34.15		39.07	33.23		10.54	5.70	5.74	11.24	7.27	7.28	10.32
	LOS	D	C		D	C		B	A	A	B	A	A	B
	95% Queue (m)	35.19	21.15		12.60	14.07		2.47	36.01	33.59	22.63	63.52	63.40	-
110 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.02	0.00	-	-	0.00	0.00	0.16	-	0.06	-	-	-	-
	Delay (s/veh)	8.33	0.00	-	-	0.00	0.00	18.61	-	12.97	-	-	-	1.61
	LOS	A	A	-	-	A	A	C	-	B	-	-	-	C
	95% Queue (m)	0.40	0.40	-	-	0.00	0.00	6.20	-	6.20	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.41	0.27	0.14	0.27	0.81		0.06	0.48	0.48	0.22	0.88	0.92	-
	Delay (s/veh)	28.36	33.40	32.39	25.05	44.29		17.46	19.07	19.25	11.09	33.16	36.74	29.52
	LOS	C	C	C	C	D		B	B	B	B	C	D	C
	95% Queue (m)	39.53	22.64	9.91	31.18	71.71		1.53	74.65	69.43	14.72	178.38	189.25	-
105 Avenue / 148 Street (Roundabout)	v/c Ratio	0.09	0.37		0.26	0.37		0.01	0.53		0.34	0.25		-
	Delay (s/veh)	7.24	7.24		8.33	8.33		14.14	14.14		6.19	6.19		8.40
	LOS	A	A		A	A		A	B		A	A		A
	95% Queue (m)	2.37	13.23		7.77	12.92		0.18	23.51		11.40	7.65		-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.44	0.71	0.19	0.57	0.81	0.76	0.29	0.46	0.46	0.20	0.61	0.61	-
	Delay (s/veh)	33.40	44.96	37.50	32.74	48.51	47.64	15.50	20.66	20.75	12.76	24.20	24.25	29.48
	LOS	C	D	D	C	D	D	B	C	C	B	C	C	C
	95% Queue (m)	48.16	85.44	18.40	63.06	97.51	80.78	17.86	84.39	79.56	15.54	121.28	119.32	-
102A Avenue / 148 Street (Two-way stop)	v/c Ratio	-	0.00	0.00	0.11	0.00	-	-	-	-	0.48	-	0.29	-
	Delay (s/veh)	-	0.00	0.00	8.83	0.00	-	-	-	-	49.23	-	36.82	9.29
	LOS	-	A	A	A	A	-	-	-	-	E	-	E	E
	95% Queue (m)	-	0.00	0.00	2.96	2.96	-	-	-	-	47.33	-	47.33	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.32	0.56	0.60	0.29	0.76	0.12	0.33	1.07	1.08	0.44	0.65	0.65	-
	Delay (s/veh)	18.96	31.03	32.91	18.25	44.84	29.08	21.15	97.20	99.60	25.44	37.61	37.73	52.43
	LOS	B	C	C	B	D	C	C	F	F	C	D	D	D
	95% Queue (m)	34.15	82.85	79.44	28.99	99.91	12.30	30.36	209.38	195.94	33.85	87.51	85.73	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.30	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.29	0.03		0.25	0.84	0.53	0.23	0.23	0.02	0.62	0.62	0.29	-
	Delay (s/veh)	47.03	31.79		31.79	35.65	46.68	46.68	31.50	5.14	5.15	6.73	9.24	13.49
	LOS	D	C		C	D	D	D	C	A	A	A	A	B
	95% Queue (m)	9.36	1.80		19.51	69.55	34.76	22.87	22.56	1.20	84.91	84.89	9.36	-

2050 Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.31	-	0.08	-	-	-	-	0.17	0.13	0.01	0.56	-	-
	Delay (s/veh)	41.41	-	39.32	-	-	-	-	2.31	2.30	3.18	4.19	-	4.47
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	12.59	-	2.99	-	-	-	-	7.96	5.79	0.22	41.52	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.10	0.03	0.08	0.19	0.04		0.04	0.91		0.21	0.76		-
	Delay (s/veh)	11.98	9.78	10.04	13.18	9.85		27.41	31.32		30.42	21.10		23.63
	LOS	B	A	B	B	A		C	C		C	C		C
	95% Queue (m)	6.74	2.29	5.18	13.18	3.05		1.18	109.98		5.71	78.66		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.02	0.29	0.64	0.12	0.05		0.08	0.32	0.32	0.13	0.51	0.06	-
	Delay (s/veh)	39.01	49.00	56.11	40.04	43.63		6.38	10.11	10.11	5.41	11.06	7.21	13.45
	LOS	D	D	E	D	D		A	B	B	A	B	A	B
	95% Queue (m)	1.59	16.76	34.15	11.13	3.44		2.64	52.79	52.72	7.27	85.14	7.21	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.18	0.05	0.08	0.06	0.01	0.05	0.31	0.68		0.21	0.08		-
	Delay (s/veh)	7.42	5.34	5.43	6.94	5.18	5.34	19.34	21.20		23.25	15.76		13.77
	LOS	A	A	A	A	A	A	B	C		C	B		B
	95% Queue (m)	9.36	2.48	3.16	2.57	0.27	2.13	14.43	30.15		6.16	3.28		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.15	0.29	0.23	0.14	-	-	-	-	0.37	-	0.46	-
	Delay (s/veh)	-	4.51	5.11	8.49	4.49	-	-	-	-	17.92	-	18.87	8.52
	LOS	-	A	A	A	A	-	-	-	-	B	-	B	A
	95% Queue (m)	-	5.83	10.96	9.14	4.99	-	-	-	-	12.22	-	13.99	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.46	-	0.54	0.46	0.33	-	-	0.40	0.42	-
	Delay (s/veh)	-	-	-	28.84	-	30.23	7.45	4.43	-	-	10.22	10.33	9.66
	LOS	-	-	-	C	-	C	A	A	-	-	B	B	A
	95% Queue (m)	-	-	-	23.27	-	25.38	19.83	19.85	-	-	40.08	40.71	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	0.38	0.91	0.01	0.54	0.55	**1.02**	**1.22**	0.04	0.02	0.01	0.40	0.95	-
	Delay (s/veh)	85.57	31.97	19.76	53.58	22.63	53.52	152.73	15.86	15.75	25.03	26.22	58.36	43.75
	LOS	F	C	B	D	C	F	F	B	B	C	C	E	D
	95% Queue (m)	2.10	130.35	1.37	14.93	77.20	172.49	88.70	4.79	1.53	0.88	55.50	154.97	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.91	0.75	0.06	**1.03**	0.59	0.59	0.89	0.45	0.13	0.28	0.41		-
	Delay (s/veh)	70.60	28.08	16.89	494.79	29.60	32.00	57.01	35.50	31.86	25.55	36.92		34.90
	LOS	E	C	B	F	C	C	E	D	C	C	D		C
	95% Queue (m)	54.90	139.87	7.97	1.98	97.71	94.50	144.84	67.07	14.77	32.92	56.16		-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.21	0.93	0.28	0.18	0.59	0.91	0.86	0.48	0.05	0.03	0.94	0.19	-
	Delay (s/veh)	45.19	53.18	30.85	55.79	37.42	64.56	52.19	35.88	30.48	20.10	58.40	32.51	49.62
	LOS	D	D	C	E	D	E	D	D	C	C	E	C	D
	95% Queue (m)	17.01	158.77	37.10	3.88	84.54	143.25	85.98	67.11	6.28	3.13	153.08	24.00	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.11	0.50	0.50	0.01	0.17	0.17	0.10	0.17		0.02	0.49		-
	Delay (s/veh)	3.89	8.80	8.84	5.13	7.66	7.77	41.46	42.17		42.17	51.55		10.61
	LOS	A	A	A	A	A	A	D	D		D	D		B
	95% Queue (m)	5.65	78.61	77.47	0.32	23.26	24.76	8.28	13.58		0.77	23.34		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.14	0.53	0.22	0.08	0.30	0.30	0.94	0.46		0.34	0.40		-
	Delay (s/veh)	7.75	13.80	10.52	10.16	13.52	13.54	79.38	37.69		46.70	36.88		22.33
	LOS	A	B	B	B	B	B	E	D		D	D		C
	95% Queue (m)	10.79	92.89	31.00	1.59	53.99	52.84	91.82	58.93		25.57	54.06		-

2050 Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.35	0.72	0.72	0.18	0.43	0.43	0.98	0.51	0.24	0.76	0.73	0.12	-
	Delay (s/veh)	14.73	30.49	30.68	16.42	24.52	24.53	88.41	40.78	37.80	46.64	46.61	35.86	38.61
	LOS	B	C	C	B	C	C	F	D	D	D	D	D	D
	95% Queue (m)	35.36	143.92	141.17	11.68	78.35	77.71	130.40	63.92	27.28	96.77	91.78	12.99	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.01	-	0.13	-	-	-	-	0.00	0.00	0.07	0.00	-	-
	Delay (s/veh)	11.25	-	9.22	-	-	-	-	0.00	0.00	7.52	0.00	-	5.93
	LOS	B	-	A	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	3.56	-	3.56	-	-	-	-	0.00	0.00	1.70	1.70	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.26	-	0.26	0.40		-	-	0.16		-
	Delay (s/veh)	-	-	-	9.13	-	9.13	10.96		-	-	8.34		9.84
	LOS	-	-	-	A	-	A	B		-	-	A		A
	95% Queue (m)	-	-	-	7.92	-	7.92	14.78		-	-	4.38		-
105 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.10	0.01	0.00	0.00	0.00	0.00	0.11	0.05	0.29	0.47	0.36	0.08	-
	Delay (s/veh)	7.71	0.00	0.00	10.12	0.00	0.00	34.01	35.60	10.66	142.63	120.23	98.39	11.37
	LOS	A	A	A	B	A	A	D	E	B	F	F	F	F
	95% Queue (m)	2.59	0.00	0.00	0.06	0.00	0.00	2.88	11.27	11.27	45.59	45.59	45.59	-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.07	1.06	0.26	0.75	0.19		0.42	0.37	0.37	0.79	1.05	1.20	-
	Delay (s/veh)	21.70	99.05	38.18	34.43	28.80		29.34	28.01	28.03	32.70	87.46	136.91	72.69
	LOS	C	F	D	C	C		C	C	C	C	F	F	E
	95% Queue (m)	8.61	173.50	26.73	84.44	27.80		23.73	64.59	64.11	109.28	295.40	390.31	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.05	0.55		0.00	0.58	0.31	0.35	0.07		0.00	0.00		-
	Delay (s/veh)	11.36	8.63		0.00	8.87	7.32	11.10	8.06		0.00	0.00		8.95
	LOS	B	A		A	A	A	B	A		A	A		A
	95% Queue (m)	1.26	16.71		0.00	18.02	7.08	11.62	1.31		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.06	0.00	-	-	0.00	0.00	0.04	-	0.04	-	-	-	-
	Delay (s/veh)	8.51	0.00	-	-	0.00	0.00	19.01	-	11.59	-	-	-	1.08
	LOS	A	A	-	-	A	A	C	-	B	-	-	-	C
	95% Queue (m)	1.42	0.00	-	-	0.00	0.00	1.97	-	1.97	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.05	0.16		0.51	0.77		0.54	0.18	0.18	0.02	0.44	0.44	-
	Delay (s/veh)	26.88	17.60		23.83	24.77		17.69	6.30	6.30	8.07	7.83	7.86	12.61
	LOS	C	B		C	C		B	A	A	A	A	A	B
	95% Queue (m)	1.46	8.14		23.16	49.77		27.70	10.98	10.93	1.04	33.23	30.35	-
105A Avenue / 156 Street (Two-way stop)	v/c Ratio	0.03	0.01	-	-	0.01	0.00	0.04	-	0.02	-	-	-	-
	Delay (s/veh)	8.59	0.00	-	-	0.00	0.00	26.10	-	12.44	-	-	-	0.50
	LOS	A	A	-	-	A	A	D	-	B	-	-	-	D
	95% Queue (m)	0.80	0.80	-	-	0.00	0.00	1.49	-	1.49	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.48	0.89		0.18	0.38	1.02	0.70	0.42	0.42	0.75	0.96	0.97	-
	Delay (s/veh)	30.05	46.29		56.89	38.23	92.01	38.81	24.27	24.27	29.91	55.02	56.21	46.63
	LOS	C	D		E	D	F	D	C	C	C	E	E	D
	95% Queue (m)	70.10	175.33		5.02	49.07	151.52	50.41	78.04	78.01	88.01	239.24	243.64	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.42	0.58		0.02	1.03		0.76	0.30	0.19	0.03	0.46	0.46	-
	Delay (s/veh)	20.09	17.56		32.28	70.61		38.64	16.03	15.16	19.59	17.57	17.63	31.23
	LOS	C	B		C	F		D	B	B	B	B	B	C
	95% Queue (m)	25.69	78.24		0.96	169.75		59.29	34.34	17.39	2.54	56.76	52.85	-
104 Avenue / 157 Street (Signalized)	v/c Ratio	-	-	-	0.34	-	0.34	0.12	0.28	-	-	0.64	0.64	-
	Delay (s/veh)	-	-	-	38.59	-	38.59	11.29	2.65	-	-	5.94	5.96	5.49
	LOS	-	-	-	D	-	D	B	A	-	-	A	A	A
	95% Queue (m)	-	-	-	10.13	-	10.13	3.83	13.85	-	-	59.67	59.89	-

Table 17: 2050 Base Scenario Traffic Operations Results (PM Peak Hour)

2050 Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.47	1.10		0.74	0.58		0.18	1.18	1.19	0.90	0.83	0.84	-
	Delay (s/veh)	21.71	102.72		28.09	29.27		21.17	136.97	138.24	56.72	44.02	45.13	77.16
	LOS	C	F		C	C		C	F	F	E	D	D	E
	95% Queue (m)	50.51	221.72		67.26	87.48		10.06	298.02	292.13	90.91	146.27	139.97	-
105A Avenue / 140 Street (Signalized)	v/c Ratio	0.01	0.37	0.37	0.13	0.40	0.40	0.37	0.57	0.54	0.15	0.40		-
	Delay (s/veh)	13.36	9.77	9.80	13.97	9.97	9.97	21.99	17.78	17.67	22.19	16.37		13.30
	LOS	B	A	A	B	A	A	C	B	B	C	B		B
	95% Queue (m)	0.44	28.31	26.76	5.98	30.99	30.85	20.00	44.68	35.82	6.40	26.53		-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.92	0.72	0.72	0.79	0.86	0.86	0.35	0.67	0.68	0.12	0.37	0.37	-
	Delay (s/veh)	75.53	45.53	45.82	47.74	51.39	51.53	15.65	27.46	27.74	16.61	22.13	22.16	37.98
	LOS	E	D	D	D	D	D	B	C	C	B	C	C	D
	95% Queue (m)	107.19	102.80	94.72	77.98	126.48	123.04	32.81	147.90	143.00	6.52	74.40	73.17	-
103 Avenue / 140 Street (Signalized)	v/c Ratio	-	0.61	0.69	0.21	0.34	-	-	-	-	0.72	-	0.66	-
	Delay (s/veh)	-	15.69	17.60	8.30	5.71	-	-	-	-	29.54	-	28.65	14.78
	LOS	-	B	B	A	A	-	-	-	-	C	-	C	B
	95% Queue (m)	-	74.93	81.01	7.41	25.81	-	-	-	-	48.38	-	38.05	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.37	0.51	-	-	0.75	0.18	0.36	-	0.91	-	-	-	-
	Delay (s/veh)	12.33	10.77	-	-	22.18	15.03	18.41	-	38.37	-	-	-	19.40
	LOS	B	B	-	-	C	B	B	-	D	-	-	-	B
	95% Queue (m)	19.63	50.41	-	-	73.89	13.52	26.96	-	87.64	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.22	0.96	0.96	0.94	0.86	0.86	0.48	0.49	0.49	0.75	0.50	0.50	-
	Delay (s/veh)	26.66	66.34	68.69	81.72	51.72	52.15	25.91	33.32	33.42	40.33	33.52	33.66	49.67
	LOS	C	E	E	F	D	D	C	C	C	D	C	C	D
	95% Queue (m)	16.23	223.96	209.56	92.40	182.15	178.81	54.86	95.48	91.36	88.47	96.03	90.56	-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.28	-	0.78	-	-	-	-	0.48	0.03	0.24	0.20	-	-
	Delay (s/veh)	51.25	-	64.45	-	-	-	-	8.31	5.19	5.75	2.95	-	10.71
	LOS	D	-	E	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	17.81	-	52.37	-	-	-	-	76.73	3.04	7.91	15.98	-	-
103 Avenue / 142 Street (Two-way stop)	v/c Ratio	-	-	-	0.14	-	0.21	0.14	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	20.37	-	12.35	8.13	0.00	-	-	0.00	0.00	5.24
	LOS	-	-	-	C	-	B	A	A	-	-	A	A	C
	95% Queue (m)	-	-	-	11.80	-	11.80	3.81	3.81	-	-	0.00	0.00	-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.38	0.27		0.02	0.50		0.37	0.54	0.56	0.25	0.42	0.42	-
	Delay (s/veh)	48.37	37.85		40.96	40.75		14.21	7.79	8.20	15.80	6.29	6.29	10.67
	LOS	D	D		D	D		B	A	A	B	A	A	B
	95% Queue (m)	20.22	21.58		1.26	41.78		24.55	75.32	73.22	13.33	54.56	54.47	-
104A Avenue / 144 Street (Roundabout)	v/c Ratio	0.14	0.11		0.22	0.27		0.01	0.49		0.04	0.10		-
	Delay (s/veh)	4.99	4.99		5.55	5.55		10.60	10.60		3.90	3.90		6.82
	LOS	A	A		A	A		A	B		A	A		A
	95% Queue (m)	3.75	2.78		6.37	8.22		0.28	20.73		0.90	2.66		-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.14	0.43		0.85	0.64		0.02	0.63	0.64	0.59	0.37	0.37	-
	Delay (s/veh)	34.84	48.10		59.08	48.67		8.14	21.84	21.99	21.58	13.31	13.36	26.65
	LOS	C	D		E	D		A	C	C	C	B	B	C
	95% Queue (m)	13.62	41.39		119.62	73.99		1.30	138.17	133.21	39.75	71.93	68.19	-
103 Avenue / 144 Street (Two-way stop)	v/c Ratio	0.20	0.00	0.00	0.03	0.01	0.00	0.46	0.53	0.27	1.35	0.23	0.00	-
	Delay (s/veh)	9.36	0.00	0.00	7.69	0.00	0.00	215.66	208.70	187.03	459.00	407.73	384.90	70.28
	LOS	A	A	A	A	A	A	F	F	F	F	F	F	F
	95% Queue (m)	5.80	5.80	5.80	0.73	0.73	0.73	106.02	106.02	106.02	64.07	64.07	64.07	-

2050 Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 144 Street (Signalized)	v/c Ratio	-	-	-	0.87	-	0.61	0.09	0.43	-	-	0.41	0.50	-
	Delay (s/veh)	-	-	-	36.90	-	26.24	8.37	9.99	-	-	14.60	15.84	17.99
	LOS	-	-	-	D	-	C	A	A	-	-	B	B	B
	95% Queue (m)	-	-	-	103.74	-	60.26	4.50	50.23	-	-	49.50	57.43	-
100 Avenue / Green Timbers Park Access (Signalized)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.52	0.52	0.00	0.40	-	-
	Delay (s/veh)	0.00	-	0.00	-	-	-	-	5.22	5.22	0.00	2.73	-	4.10
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	22.47	22.47	0.00	5.10	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.36	-	0.83	-	-	-	-	0.45	0.46	0.29	0.34	-	-
	Delay (s/veh)	48.69	-	62.35	-	-	-	-	5.49	5.50	12.47	4.24	-	10.30
	LOS	D	-	E	-	-	-	-	A	A	B	A	-	B
	95% Queue (m)	31.17	-	71.22	-	-	-	-	60.92	61.04	17.21	36.98	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.01	-	0.04	-	-	-	-
	Delay (s/veh)	7.29	0.00	-	-	0.00	0.00	9.46	-	8.61	-	-	-	3.47
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.32	0.32	-	-	0.00	0.00	1.17	-	1.17	-	-	-	-
108 Avenue / 146 Street (Signalized)	v/c Ratio	0.53	0.35		0.09	0.12		0.07	0.32	0.32	0.21	0.42	0.42	-
	Delay (s/veh)	41.22	34.89		38.64	32.77		8.88	5.48	5.50	9.00	6.24	6.25	9.70
	LOS	D	C		D	C		A	A	A	A	A	A	A
	95% Queue (m)	39.34	24.78		4.93	8.13		3.29	33.94	32.73	12.22	48.37	47.73	-
110 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.04	0.00	-	-	0.01	0.00	0.16	-	0.10	-	-	-	-
	Delay (s/veh)	8.99	0.00	-	-	0.00	0.00	21.78	-	16.16	-	-	-	1.98
	LOS	A	A	-	-	A	A	C	-	C	-	-	-	C
	95% Queue (m)	0.89	0.89	-	-	0.00	0.00	8.10	-	8.10	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.25	0.29	0.03	0.55	0.90		0.09	0.45	0.45	0.14	0.77	0.78	-
	Delay (s/veh)	26.87	35.52	33.21	30.67	54.72		15.48	20.18	20.42	11.84	27.66	28.36	29.22
	LOS	C	D	C	C	D		B	C	C	B	C	C	C
	95% Queue (m)	18.41	30.18	2.22	73.43	117.95		3.14	78.28	71.48	10.40	153.53	149.25	-
105 Avenue / 148 Street (Roundabout)	v/c Ratio	0.06	0.47		0.33	0.33		0.00	0.57		0.27	0.12		-
	Delay (s/veh)	9.57	9.57		7.35	7.35		15.93	15.93		5.07	5.07		8.94
	LOS	A	B		A	A		A	C		A	A		A
	95% Queue (m)	1.51	19.29		10.94	11.04		0.11	27.04		8.24	3.21		-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.35	0.63	0.13	0.55	0.85	0.63	0.39	0.62	0.63	0.44	0.43	0.43	-
	Delay (s/veh)	35.75	48.07	41.43	36.70	55.51	46.81	13.78	23.15	23.39	18.44	19.28	19.30	28.72
	LOS	D	D	D	D	E	D	B	C	C	B	B	B	C
	95% Queue (m)	32.54	75.95	12.50	65.50	112.74	71.64	33.39	133.89	129.09	28.32	86.56	84.61	-
102A Avenue / 148 Street (Two-way stop)	v/c Ratio	-	0.00	0.00	0.18	0.00	-	-	-	-	0.43	-	0.14	-
	Delay (s/veh)	-	0.00	0.00	8.60	0.00	-	-	-	-	44.34	-	25.38	6.05
	LOS	-	A	A	A	A	-	-	-	-	E	-	D	E
	95% Queue (m)	-	0.00	0.00	4.94	4.94	-	-	-	-	25.22	-	25.22	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.41	0.40	0.45	0.34	0.59	0.19	0.20	**1.23**	**1.23**	0.31	0.85	0.85	-
	Delay (s/veh)	19.67	27.74	28.93	18.33	37.55	29.98	20.63	154.80	156.49	23.40	50.23	50.62	76.29
	LOS	B	C	C	B	D	C	C	F	F	C	D	D	E
	95% Queue (m)	51.22	60.08	58.57	39.86	74.84	19.25	15.15	303.30	294.51	22.92	125.42	121.47	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.30	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.20	0.10		0.00	0.00	0.00	0.22	0.22	0.03	0.46	0.46	0.20	-
	Delay (s/veh)	47.94	45.35		0.00	0.00	0.00	0.00	2.25	2.26	3.12	3.50	3.50	3.82
	LOS	D	D		A	A	A	A	A	A	A	A	A	A
	95% Queue (m)	9.16	3.12		0.00	0.00	0.00	11.57	11.51	1.33	32.39	32.39	9.16	-

2050 Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.17	-	0.16	-	-	-	-	0.19	0.02	0.01	0.45	-	-
	Delay (s/veh)	46.64	-	46.60	-	-	-	-	1.83	1.48	2.66	2.78	-	3.15
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	5.63	-	4.61	-	-	-	-	7.38	0.56	0.52	24.53	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.12	0.03	0.11	0.05	0.01		0.05	0.96		0.05	0.47		-
	Delay (s/veh)	11.78	9.76	10.19	12.60	9.70		22.33	40.60		29.53	15.87		28.42
	LOS	B	A	B	B	A		C	D		C	B		C
	95% Queue (m)	8.69	1.92	7.06	3.31	0.91		2.22	131.53		1.25	42.55		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.02	0.20	0.29	0.00	0.05		0.11	0.40	0.40	0.05	0.43	0.11	-
	Delay (s/veh)	47.90	53.49	54.76	47.79	52.90		3.95	7.17	7.17	3.66	7.78	5.69	8.50
	LOS	D	D	D	D	D		A	A	A	A	A	A	A
	95% Queue (m)	1.86	10.18	12.48	0.37	2.04		3.22	62.68	62.68	1.66	67.17	13.31	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.18	0.05	0.16	0.03	0.01	0.01	0.04	0.29		0.59	0.11		-
	Delay (s/veh)	11.25	9.11	9.71	11.78	8.91	8.91	15.07	14.51		22.85	13.31		15.37
	LOS	B	A	A	B	A	A	B	B		C	B		B
	95% Queue (m)	12.77	3.51	10.34	1.76	0.46	0.46	2.69	19.64		41.53	7.09		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.27	0.31	0.28	0.28	-	-	-	-	0.72	-	0.24	-
	Delay (s/veh)	-	6.26	6.52	6.57	6.39	-	-	-	-	20.86	-	15.96	9.91
	LOS	-	A	A	A	A	-	-	-	-	C	-	B	A
	95% Queue (m)	-	14.61	15.20	9.94	13.99	-	-	-	-	37.66	-	9.20	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.65	-	0.85	0.59	0.50	-	-	0.51	0.55	-
	Delay (s/veh)	-	-	-	29.75	-	38.24	15.06	9.45	-	-	17.71	18.11	17.88
	LOS	-	-	-	C	-	D	B	A	-	-	B	B	B
	95% Queue (m)	-	-	-	67.61	-	86.27	42.94	61.77	-	-	68.59	70.16	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	0.73	0.86	0.03	0.78	0.55	0.84	0.80	0.05	0.04	0.29	0.56	0.85	-
	Delay (s/veh)	62.31	31.21	20.39	56.52	23.21	29.31	45.29	19.39	19.36	38.09	36.33	45.93	32.16
	LOS	E	C	C	E	C	C	D	B	B	D	D	D	C
	95% Queue (m)	26.68	130.97	3.67	46.77	82.02	117.11	61.68	6.66	4.75	15.94	61.67	89.77	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.82	0.62	0.08	**1.98**	0.37	0.37	**1.10**	0.76	0.34	0.23	0.78		-
	Delay (s/veh)	64.49	19.24	12.38	554.61	18.19	18.64	130.60	53.81	46.02	36.91	62.85		42.80
	LOS	E	B	B	F	B	B	F	D	D	D	E		D
	95% Queue (m)	50.93	124.62	12.84	29.00	71.00	72.75	203.22	83.76	31.68	22.25	59.00		-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.48	0.97	0.27	0.14	0.61	0.96	**1.01**	0.65	0.13	0.16	0.92	0.34	-
	Delay (s/veh)	50.59	66.33	36.12	44.41	41.84	80.00	90.90	43.76	35.31	23.73	59.83	38.95	58.68
	LOS	D	E	D	D	D	E	F	D	D	C	E	D	E
	95% Queue (m)	55.56	170.32	35.55	14.21	89.77	164.08	140.22	94.34	16.22	17.31	147.38	46.16	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.13	0.45	0.46	0.08	0.18	0.18	0.38	0.61		0.02	0.32		-
	Delay (s/veh)	4.45	10.61	10.62	5.86	8.28	8.42	47.48	50.07		59.06	58.92		14.95
	LOS	A	B	B	A	A	A	D	D		E	E		B
	95% Queue (m)	7.18	83.00	82.42	3.37	27.44	28.64	48.28	60.04		0.44	9.30		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.28	0.47	0.26	0.02	0.32	0.33	0.69	0.68		0.78	0.43		-
	Delay (s/veh)	8.60	11.61	9.71	7.95	13.27	13.28	57.57	46.64		69.68	41.30		20.74
	LOS	A	B	A	A	B	B	E	D		E	D		C
	95% Queue (m)	21.57	84.60	39.36	0.31	64.16	63.22	60.41	88.10		49.28	57.14		-

2050 Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.46	0.73	0.75	0.30	0.44	0.44	**1.07**	**1.00**	0.77	0.99	0.78	0.55	-
	Delay (s/veh)	15.97	30.06	30.80	19.23	21.73	21.74	123.89	80.35	61.66	105.34	53.27	49.56	51.53
	LOS	B	C	C	B	C	C	**F**	**F**	**E**	**F**	D	D	D
	95% Queue (m)	42.74	165.85	161.99	18.43	90.97	89.66	158.13	148.34	98.13	118.24	100.20	67.79	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.00	-	0.31	-	-	-	-	0.00	0.00	0.08	0.00	-	-
	Delay (s/veh)	12.14	-	10.06	-	-	-	-	0.00	0.00	7.49	0.00	-	8.09
	LOS	B	-	B	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	10.40	-	10.40	-	-	-	-	0.00	0.00	1.88	1.88	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.55	-	0.55	0.57		-	-	0.57		-
	Delay (s/veh)	-	-	-	13.92	-	13.92	15.15		-	-	9.26		13.89
	LOS	-	-	-	B	-	B	C		-	-	A		B
	95% Queue (m)	-	-	-	25.74	-	25.74	27.55		-	-	4.22		-
105 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.17	0.01	0.00	0.00	0.00	0.00	0.27	0.10	0.38	**1.00**	0.16	0.04	-
	Delay (s/veh)	8.32	0.00	0.00	9.11	0.00	0.00	42.27	41.84	13.41	266.85	239.83	213.32	19.96
	LOS	A	A	A	A	A	A	**E**	**E**	B	**F**	**F**	**F**	**F**
	95% Queue (m)	4.58	0.00	0.00	0.10	0.00	0.00	7.91	19.65	19.65	56.68	56.68	56.68	-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.14	0.99	0.77	0.85	0.44		0.24	0.48	0.48	0.42	0.96	**1.01**	-
	Delay (s/veh)	23.19	83.59	53.53	42.46	33.31		33.31	28.17	30.48	30.49	21.48	59.36	51.01
	LOS	C	**F**	D	D	C		C	C	C	C	C	**F**	D
	95% Queue (m)	16.66	144.47	83.44	120.63	72.38		11.77	92.19	91.99	46.85	248.70	255.52	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.13	0.55		0.00	0.32	0.35	0.55	0.11		0.00	0.00		-
	Delay (s/veh)	13.03	11.76		0.00	10.25	10.53	11.42	6.70		0.00	0.00		10.98
	LOS	B	B		A	B	B	B	A		A	A		B
	95% Queue (m)	4.07	21.16		0.00	11.03	10.69	26.56	3.12		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.07	0.00	-	-	0.00	0.00	0.27	-	0.22	-	-	-	-
	Delay (s/veh)	8.11	0.00	-	-	0.00	0.00	25.09	-	16.89	-	-	-	4.82
	LOS	A	A	-	-	A	A	D	-	C	-	-	-	D
	95% Queue (m)	1.75	0.00	-	-	0.00	0.00	20.04	-	20.04	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.24	0.18		0.65	0.71		0.91	0.32	0.32	0.13	0.39	0.39	-
	Delay (s/veh)	35.62	23.30		33.28	29.88		46.84	7.53	7.53	11.16	8.00	8.01	18.38
	LOS	D	C		C	C		D	A	A	B	A	A	B
	95% Queue (m)	9.41	13.85		42.87	61.79		104.34	31.93	31.58	6.84	40.92	38.75	-
105A Avenue / 156 Street (Two-way stop)	v/c Ratio	0.07	0.01	-	-	0.01	0.00	0.03	-	0.00	-	-	-	-
	Delay (s/veh)	8.82	0.00	-	-	0.00	0.00	31.65	-	12.44	-	-	-	0.61
	LOS	A	A	-	-	A	A	D	-	B	-	-	-	D
	95% Queue (m)	1.84	1.84	-	-	0.00	0.00	0.72	-	0.72	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.66	0.88		0.07	0.53	**1.00**	0.81	0.52	0.52	0.77	0.68	0.69	-
	Delay (s/veh)	44.66	52.45		59.64	44.31	89.01	34.64	23.20	23.44	29.24	31.80	32.09	38.40
	LOS	D	D		**E**	D	**F**	C	C	C	C	C	C	D
	95% Queue (m)	87.79	162.72		1.79	69.14	141.69	83.48	109.51	104.50	77.20	146.93	145.05	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.37	0.36		0.61	**1.07**		**1.13**	0.61	0.16	0.06	0.42	0.42	-
	Delay (s/veh)	18.68	14.24		34.11	81.77		121.49	19.43	14.89	26.28	17.09	17.14	44.83
	LOS	B	B		C	**F**		**F**	B	B	C	B	B	D
	95% Queue (m)	20.60	43.94		43.96	188.68		152.85	75.95	14.83	3.49	50.93	48.02	-
104 Avenue / 157 Street (Signalized)	v/c Ratio	-	-	-	0.45	-	0.45	0.06	0.32	-	-	0.54	0.55	-
	Delay (s/veh)	-	-	-	42.04	-	42.04	4.01	3.09	-	-	8.10	8.12	7.08
	LOS	-	-	-	D	-	D	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	18.72	-	18.72	0.96	20.92	-	-	72.98	73.18	-

5.6. Full Buildout Base Scenario Traffic Operations Analysis

The Full Buildout Base Scenario is generally unable to accommodate the demand during both peak hours, even with the 2050 horizon year proposed improvements. As illustrated in **Figure 81** and **Figure 82**, there are numerous intersections that operate at a LOS E or F, and/or experience significant queues despite the model unable to serve all the demand from the traffic zones. If the full auto demand was able to enter the network, the impact would be even worse. The intersections that operate at a LOS E or F, or have significant queues in either the AM or PM peak hour are:

- 104 Avenue / 140 Street
- 104 Avenue / 142 Street
- 103 Avenue / 142 Street
- 104 Avenue / 144 Street
- 103 Avenue / 144 Street
- 110 Avenue / 148 Street
- 104 Avenue / 148 Street
- 100 Avenue / 150 Street
- Guildford Drive / 152 Street
- 104 Avenue / 152 Street
- 102A Avenue / 154 Street
- 101 Avenue / 154 Street
- 105A Avenue / 156 Street
- 104 Avenue / 156 Street

Detailed results of the traffic analysis at the turn movement level are provided for all intersection in the study area in **Table 16** for the AM peak hour and in **Table 17** for the PM peak hour. There are several intersections that have at least one movement that operates at a LOS F. Exclusive of the intersections identified above; this includes the following:

- 108 Avenue / 140 Street
- 100 Avenue / 140 Street
- 104 Avenue / 146 Street
- 100 Avenue / 148 Street
- 105 Avenue / 150 Street
- 100 Avenue / 150 Street
- 102A Avenue / 152 Street
- 100 Avenue / 154 Street
- 100 Avenue / 156 Street

Additionally, there are several intersections with at least one LOS E movement that are not listed above or movement where the v/c is almost 1, indicating near LOS F conditions. In total, this represents over thirty intersections in the study area that require review and potential network enhancements or improvements. Therefore, it is apparent that the full buildout horizon will require both the road widening identified previously in **Section 4.4.4** as well as additional intersection treatments.

Figure 81: Full Buildout Base Scenario Results (AM Peak Hour)

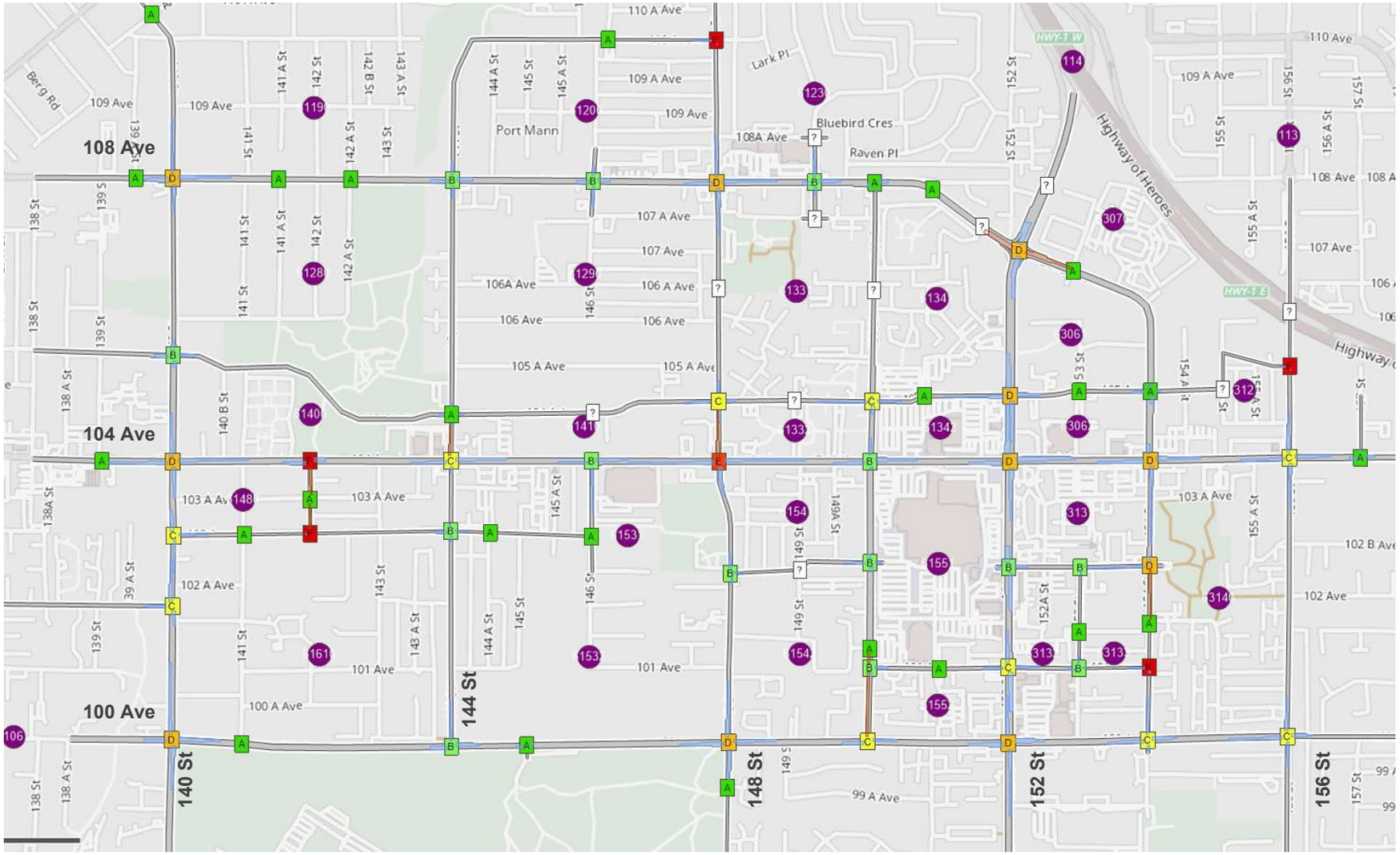


Figure 82: Full Buildout Base Scenario Results (PM Peak Hour)

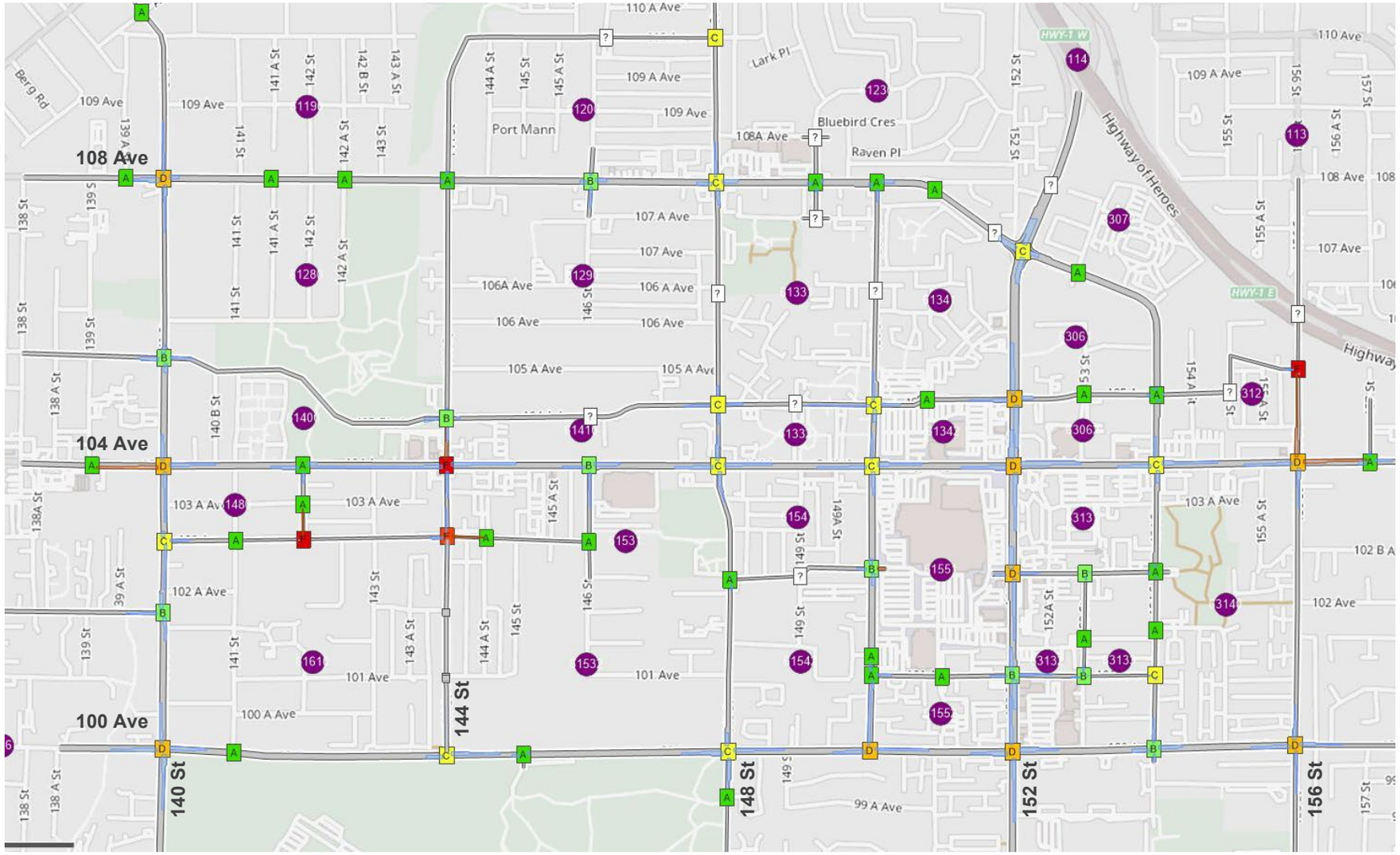


Table 18: Full Buildout Base Scenario Traffic Operations Results (AM Peak Hour)

Full Buildout Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.82	0.72	0.53	0.56	**1.04**		0.25	0.53	0.53	0.47	0.86	0.86	-
	Delay (s/veh)	51.02	34.42	31.73	23.99	71.81		18.83	24.97	27.26	17.41	37.86	38.62	36.66
	LOS	D	C	C	C	**F**		B	C	C	B	D	D	D
	95% Queue (m)	68.27	84.59	40.58	49.24	155.68		13.16	71.16	65.78	41.88	152.11	150.85	-
105A Avenue / 140 Street (Signalized)	v/c Ratio	0.00	0.26	0.26	0.22	0.45	0.45	0.19	0.37	0.56	0.27	0.64		-
	Delay (s/veh)	0.00	9.28	9.28	13.32	10.52	10.52	23.66	15.95	17.81	20.70	18.88		13.65
	LOS	A	A	A	B	B	B	C	B	B	C	B		B
	95% Queue (m)	0.00	17.87	17.81	11.55	36.61	36.55	7.74	27.42	38.11	14.75	47.37		-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.78	0.57	0.60	0.95	0.61	0.61	0.29	0.88	0.88	0.93	0.92	0.93	-
	Delay (s/veh)	41.90	33.31	34.06	66.63	34.10	34.14	29.25	51.39	51.99	63.96	52.56	53.09	48.08
	LOS	D	C	C	**E**	C	C	C	D	D	**E**	D	D	D
	95% Queue (m)	88.03	90.93	84.17	124.24	98.57	95.78	11.08	168.05	160.62	97.03	204.20	204.66	-
103 Avenue / 140 Street (Signalized)	v/c Ratio	-	0.74	0.81	0.15	0.57	-	-	-	-	0.85	-	0.27	-
	Delay (s/veh)	-	25.86	28.43	11.60	12.24	-	-	-	-	27.04	-	17.37	20.46
	LOS	-	C	C	B	B	-	-	-	-	C	-	B	C
	95% Queue (m)	-	91.22	98.15	6.41	62.23	-	-	-	-	87.02	-	19.64	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.69	0.48	-	-	0.97	0.60	0.24	-	0.84	-	-	-	-
	Delay (s/veh)	18.90	9.39	-	-	39.64	22.20	18.19	-	28.77	-	-	-	24.79
	LOS	B	A	-	-	D	C	B	-	C	-	-	-	C
	95% Queue (m)	44.78	44.89	-	-	117.52	55.94	16.70	-	68.29	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.37	0.76	0.23	**1.00**	0.96	0.97	0.59	0.36	0.36	0.72	0.65	0.66	-
	Delay (s/veh)	30.03	38.85	17.07	96.11	66.30	68.05	29.04	31.57	31.62	32.25	35.19	35.62	46.43
	LOS	C	D	B	**F**	**E**	**E**	C	C	C	C	D	D	D
	95% Queue (m)	24.47	128.66	39.06	118.19	208.03	206.53	55.73	63.23	61.75	100.43	121.44	114.38	-
104 Avenue / 142 Street (Signalized)	v/c Ratio	**4.52**	-	0.45	-	-	-	-	0.74	0.45	0.26	0.52	-	-
	Delay (s/veh)	1642	-	22.43	-	-	-	-	16.35	13.16	8.52	6.78	-	161.61
	LOS	**F**	-	C	-	-	-	-	B	B	A	A	-	**F**
	95% Queue (m)	370.76	-	19.21	-	-	-	-	67.44	34.56	8.22	32.85	-	-
103 Avenue / 142 Street (Two-way stop)	v/c Ratio	-	-	-	**1.16**	-	0.37	0.10	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	273.69	-	267.46	8.35	0.00	-	-	0.00	0.00	129.85
	LOS	-	-	-	**F**	-	**F**	A	A	-	-	A	A	**F**
	95% Queue (m)	-	-	-	275.18	-	275.18	2.67	2.67	-	-	0.00	0.00	-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.51	0.39		0.01	0.48		0.11	0.40	0.40	0.03	0.36	0.36	-
	Delay (s/veh)	41.18	31.74		33.66	32.94		12.04	7.93	8.02	11.93	7.45	7.45	12.72
	LOS	D	C		C	C		B	A	A	B	A	A	B
	95% Queue (m)	35.42	36.06		0.53	44.39		6.67	53.15	49.13	1.97	45.41	45.39	-
104A Avenue / 144 Street (Roundabout)	v/c Ratio	0.15	0.23		0.07	0.26		0.01	0.33		0.20	0.28		-
	Delay (s/veh)	4.85	4.85		6.76	6.76		7.25	7.25		6.07	6.07		6.07
	LOS	A	A		A	A		A	A		A	A		A
	95% Queue (m)	4.14	6.86		1.67	7.93		0.27	10.83		5.64	8.67		-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.03	0.36		0.71	0.81		0.41	0.54	0.54	0.15	0.70	0.72	-
	Delay (s/veh)	34.05	48.97		43.66	50.60		18.01	16.65	16.65	9.85	21.36	22.15	24.24
	LOS	C	D		D	D		B	B	B	A	C	C	C
	95% Queue (m)	1.75	21.28		95.22	87.41		18.96	101.99	101.99	7.87	148.12	144.69	-
103 Avenue / 144 Street (Signalized)	v/c Ratio	0.38	0.13		0.22			0.25		0.76	0.67			-
	Delay (s/veh)	15.04	9.09		9.55			8.75		12.63	14.14			12.28
	LOS	B	A		A			A		B	B			B
	95% Queue (m)	15.44	4.49		10.36			11.16		34.87	36.63			-

Full Buildout Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 144 Street (Signalized)	v/c Ratio	-	-	-	0.90	-	0.36	0.02	0.43	-	-	0.56	0.30	-
	Delay (s/veh)	-	-	-	38.50	-	20.95	9.81	10.93	-	-	15.02	12.84	18.36
	LOS	-	-	-	D	-	C	A	B	-	-	B	B	B
	95% Queue (m)	-	-	-	116.50	-	33.24	0.57	48.54	-	-	68.13	29.65	-
100 Avenue / Green Timbers Park Access (Signalized)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.52	0.52	0.00	0.45	-	-
	Delay (s/veh)	0.00	-	0.00	-	-	-	-	5.22	5.22	0.00	2.91	-	4.10
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	22.41	22.41	0.00	6.13	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.18	-	0.98	-	-	-	-	0.53	0.53	0.52	0.58	-	-
	Delay (s/veh)	37.14	-	84.90	-	-	-	-	9.39	9.42	27.39	9.31	-	17.63
	LOS	D	-	F	-	-	-	-	A	A	C	A	-	B
	95% Queue (m)	19.53	-	131.12	-	-	-	-	85.24	85.37	42.54	91.49	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.03	0.00	-	-	0.00	0.00	0.02	-	0.02	-	-	-	-
	Delay (s/veh)	7.30	0.00	-	-	0.00	0.00	9.71	-	8.49	-	-	-	4.40
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.80	0.80	-	-	0.00	0.00	0.79	-	0.79	-	-	-	-
108 Avenue / 146 Street (Signalized)	v/c Ratio	0.59	0.61		0.43	0.13		0.03	0.29	0.29	0.41	0.29	0.29	-
	Delay (s/veh)	38.48	34.13		43.73	28.60		9.23	7.28	7.31	14.77	7.24	7.24	15.18
	LOS	D	C		D	C		A	A	A	B	A	A	B
	95% Queue (m)	55.68	58.83		22.90	11.36		2.13	35.43	32.57	35.99	35.23	34.79	-
110 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.06	0.01	-	-	0.01	0.00	0.75	-	0.16	-	-	-	-
	Delay (s/veh)	9.04	0.00	-	-	0.00	0.00	115.09	-	87.41	-	-	-	9.43
	LOS	A	A	-	-	A	A	F	-	F	-	-	-	F
	95% Queue (m)	1.43	1.43	-	-	0.00	0.00	52.01	-	52.01	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.53	0.96	0.20	0.51	0.94		0.15	0.56	0.57	0.34	0.87	0.89	-
	Delay (s/veh)	27.40	60.49	27.91	24.01	55.09		17.81	26.03	26.61	16.49	39.53	42.94	38.53
	LOS	C	E	C	C	E		B	C	C	B	D	D	D
	95% Queue (m)	47.09	138.20	18.45	37.95	123.07		6.02	83.57	75.59	26.34	158.63	150.99	-
105 Avenue / 148 Street (Roundabout)	v/c Ratio	0.12	0.64		0.34	0.62		0.08	0.89		0.50	0.38		-
	Delay (s/veh)	12.61	12.61		12.11	12.11		44.58	44.58		9.82	9.82		16.95
	LOS	A	B		A	B		A	E		B	A		C
	95% Queue (m)	2.98	36.21		11.73	33.34		2.02	72.39		22.03	13.83		-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.42	0.59	0.11	0.69	0.94	0.65	0.67	1.00	1.02	0.68	0.97	0.99	-
	Delay (s/veh)	29.83	35.87	29.74	33.64	59.65	36.45	36.51	72.01	76.03	37.68	63.07	65.98	56.82
	LOS	C	D	C	C	E	D	D	F	F	D	E	E	E
	95% Queue (m)	30.12	89.82	13.80	79.63	182.87	91.76	48.89	245.78	246.83	48.96	231.12	232.49	-
102A Avenue / 148 Street (Signalized)	v/c Ratio	-	0.48		0.43	0.80	-	-	-	-	0.68	-	0.68	-
	Delay (s/veh)	-	7.22		13.18	10.36	-	-	-	-	16.35	-	16.35	10.80
	LOS	-	A		B	B	-	-	-	-	B	-	B	B
	95% Queue (m)	-	21.64		17.44	49.82	-	-	-	-	25.41	-	25.41	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.48	0.59	0.43	0.31	1.00	0.40	0.11	0.89	0.90	0.55	0.85	0.85	-
	Delay (s/veh)	22.84	31.89	28.52	18.66	78.29	33.55	19.58	45.94	59.12	27.47	49.33	49.44	45.16
	LOS	C	C	C	B	F	C	B	D	E	C	D	D	D
	95% Queue (m)	48.02	87.96	55.65	30.40	163.76	43.50	8.23	119.39	124.76	48.76	123.70	122.44	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.50	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.64	0.06		0.28	0.86		0.38	0.22	0.22	0.03	0.49	0.49	-
	Delay (s/veh)	54.59	30.45		34.86	48.69		19.22	5.76	5.77	7.46	8.20	8.26	14.85
	LOS	D	C		C	D		B	A	A	A	A	A	B
	95% Queue (m)	22.04	4.27		23.48	80.06		24.00	23.42	23.13	1.60	65.80	64.62	-

Full Buildout Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.22	-	0.12	-	-	-	-	0.21	0.01	0.01	0.44	-	-
	Delay (s/veh)	41.65	-	40.79	-	-	-	-	2.16	1.68	3.08	3.08	-	3.50
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	7.45	-	3.71	-	-	-	-	8.69	0.35	0.33	24.35	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.12	0.02	0.29	0.04	0.03		0.03	0.99		0.82	0.72		-
	Delay (s/veh)	11.92	9.75	11.35	15.66	9.76		26.94	47.42		46.46	19.90		31.10
	LOS	B	A	B	B	A		C	D		D	B		C
	95% Queue (m)	8.55	1.74	21.15	2.18	1.83		0.97	144.04		27.30	73.59		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.08	0.09	0.09	0.10	0.76		0.48	0.51	0.51	0.44	0.66	0.12	-
	Delay (s/veh)	40.59	48.04	48.08	40.78	60.04		17.20	12.42	12.47	10.81	14.03	8.06	15.49
	LOS	D	D	D	D	E		B	B	B	B	B	A	B
	95% Queue (m)	5.88	4.61	4.60	10.55	48.85		19.93	89.99	89.11	20.73	120.63	14.88	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.22	0.05	0.14	0.08	0.16	0.17	0.02	0.83		0.52	0.04		-
	Delay (s/veh)	11.63	7.73	8.20	10.38	8.28	8.30	15.12	23.00		29.76	13.72		15.70
	LOS	B	A	A	B	A	A	B	C		C	B		B
	95% Queue (m)	12.27	2.93	8.24	4.52	11.00	10.73	1.06	61.36		16.74	2.09		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.22	0.26	0.49	0.52	-	-	-	-	0.73	-	0.14	-
	Delay (s/veh)	-	6.03	6.23	9.40	8.22	-	-	-	-	21.18	-	15.39	10.26
	LOS	-	A	A	A	A	-	-	-	-	C	-	B	B
	95% Queue (m)	-	11.55	11.94	27.92	31.45	-	-	-	-	38.89	-	5.25	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.71	-	1.11	0.45	0.48	-	-	0.48	0.53	-
	Delay (s/veh)	-	-	-	29.84	-	103.49	13.96	11.46	-	-	18.62	19.26	33.11
	LOS	-	-	-	C	-	F	B	B	-	-	B	B	C
	95% Queue (m)	-	-	-	86.37	-	212.81	32.65	63.48	-	-	67.10	68.63	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	0.64	0.90	0.07	0.27	0.52	0.56	1.34	0.06	0.13	0.17	0.51	0.96	-
	Delay (s/veh)	54.35	27.49	16.60	36.68	16.87	10.74	198.61	21.57	22.20	34.18	33.27	57.59	37.21
	LOS	D	C	B	D	B	B	F	C	C	C	C	E	D
	95% Queue (m)	16.29	125.56	6.18	15.42	68.95	63.62	115.01	6.77	8.91	8.18	43.17	164.36	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.80	0.66	0.66	0.37	0.60	0.60	0.96	0.58	0.76	0.59	0.44	0.30	-
	Delay (s/veh)	66.05	31.53	33.12	34.51	28.49	29.82	68.99	39.28	46.21	30.56	39.15	37.63	37.56
	LOS	E	C	C	C	C	C	E	D	D	C	D	D	D
	95% Queue (m)	32.43	109.67	117.10	14.77	101.47	105.72	173.02	80.43	93.33	72.42	58.51	32.61	-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.44	0.89	0.06	0.72	0.63	0.77	0.94	0.60	0.11	0.07	0.96	0.22	-
	Delay (s/veh)	55.68	46.77	26.27	75.27	37.34	21.62	72.71	33.40	26.25	20.29	58.84	30.63	43.23
	LOS	E	D	C	E	D	C	E	C	C	C	E	C	D
	95% Queue (m)	35.41	152.24	7.31	41.31	85.32	148.25	97.29	95.23	14.91	6.24	170.94	28.49	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.71	0.58	0.58	0.24	0.28	0.28	0.10	0.15		0.51	0.21		-
	Delay (s/veh)	59.89	17.34	17.41	10.56	12.12	12.48	34.40	34.86		51.97	42.53		19.11
	LOS	E	B	B	B	B	B	C	C		D	D		B
	95% Queue (m)	29.78	111.25	109.64	12.15	46.39	48.13	11.00	16.65		37.76	17.72		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.07	0.62	0.32	0.12	0.51	0.51	0.57	0.29		0.63	0.53		-
	Delay (s/veh)	12.56	21.49	17.23	16.18	21.42	21.47	34.48	28.12		50.31	38.38		24.96
	LOS	B	C	B	B	C	C	C	C		D	D		C
	95% Queue (m)	4.39	114.88	52.63	2.93	96.70	93.95	61.65	45.38		57.25	72.05		-

Full Buildout Base Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.35	0.94	0.95	0.21	0.69	0.69	0.76	0.73	0.78	0.49	0.66	0.05	-
	Delay (s/veh)	19.71	52.53	54.05	22.06	31.75	31.77	37.65	38.57	47.34	27.11	37.36	28.58	40.19
	LOS	B	D	D	C	C	C	D	D	D	C	D	C	D
	95% Queue (m)	24.88	192.16	189.17	11.29	117.76	116.95	84.24	96.59	103.02	46.82	84.87	5.50	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.02	-	0.31	-	-	-	-	0.00	0.00	0.05	0.00	-	-
	Delay (s/veh)	12.14	-	10.56	-	-	-	-	0.00	0.00	7.55	0.00	-	7.46
	LOS	B	-	B	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	10.99	-	10.99	-	-	-	-	0.00	0.00	1.28	1.28	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.56	-	0.56	0.55		-	-	0.35		-
	Delay (s/veh)	-	-	-	14.66	-	14.66	15.21		-	-	10.99		13.97
	LOS	-	-	-	B	-	B	C		-	-	B		B
	95% Queue (m)	-	-	-	26.97	-	26.97	25.78		-	-	11.84		-
105 Avenue / 154 Street (Signalized)	v/c Ratio	0.33	0.47	0.47	0.01	0.17	0.19	0.12	0.78		0.06	0.27		-
	Delay (s/veh)	6.31	6.87	6.87	20.32	13.54	13.63	15.43	17.66		19.94	12.64		9.73
	LOS	A	A	A	C	B	B	B	B		B	B		A
	95% Queue (m)	15.64	22.73	22.68	0.25	6.00	5.88	4.61	37.98		1.54	10.93		-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.44	0.92	0.42	0.59	0.05		0.16	0.90	0.90	0.53	0.87	0.70	-
	Delay (s/veh)	16.51	41.99	21.53	24.30	17.49		27.60	68.12	68.21	35.24	49.91	35.51	41.51
	LOS	B	D	C	C	B		C	E	E	D	D	D	D
	95% Queue (m)	72.72	222.87	69.01	27.25	8.21		9.96	136.05	135.77	52.62	128.79	118.45	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.10	0.99		0.00	0.11	0.17	0.99	0.43		0.00	0.00		-
	Delay (s/veh)	13.16	44.73		0.00	10.47	10.89	56.31	15.99		0.00	0.00		39.78
	LOS	B	D		A	B	B	E	B		A	A		D
	95% Queue (m)	7.56	184.77		0.00	9.59	13.79	161.30	38.10		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.16	0.01	-	-	0.00	0.00	0.69	-	0.18	-	-	-	-
	Delay (s/veh)	8.83	0.00	-	-	0.00	0.00	90.41	-	64.86	-	-	-	10.46
	LOS	A	A	-	-	A	A	F	-	F	-	-	-	F
	95% Queue (m)	4.29	0.00	-	-	0.00	0.00	51.55	-	51.55	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.03	0.18		1.02	0.40		1.03	0.30	0.30	0.10	0.58	0.62	-
	Delay (s/veh)	28.83	23.02		83.48	24.87		90.88	7.84	7.84	11.10	10.43	11.10	26.74
	LOS	C	C		F	C		F	A	A	B	B	B	C
	95% Queue (m)	1.76	15.05		108.77	33.60		103.64	31.01	30.82	5.70	73.16	69.44	-
105A Avenue / 156 Street (Two-way stop)	v/c Ratio	0.04	0.01	-	-	0.01	0.00	0.23	-	0.25	-	-	-	-
	Delay (s/veh)	9.25	0.00	-	-	0.00	0.00	50.06	-	25.16	-	-	-	2.48
	LOS	A	A	-	-	A	A	F	-	D	-	-	-	F
	95% Queue (m)	0.89	0.89	-	-	0.00	0.00	18.74	-	18.74	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.50	0.71	0.26	0.74	0.76	0.64	0.80	0.67	0.67	0.93	0.53	0.53	-
	Delay (s/veh)	32.01	33.27	24.90	72.12	43.16	31.68	38.42	31.77	31.88	54.34	25.86	25.87	34.73
	LOS	C	C	C	E	D	C	D	C	C	D	C	C	C
	95% Queue (m)	50.06	130.77	38.46	27.17	117.06	106.12	82.66	127.34	125.41	105.79	101.60	101.19	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.63	0.53		0.27	0.80	0.71	1.19	0.63	0.32	0.07	0.50	0.50	-
	Delay (s/veh)	22.61	16.44		35.08	32.30	28.53	147.29	21.07	17.22	28.12	19.07	19.09	33.75
	LOS	C	B		D	C	C	F	C	B	C	B	B	C
	95% Queue (m)	56.48	73.78		12.40	99.76	74.19	153.72	81.02	31.93	3.93	63.32	61.80	-
104 Avenue / 157 Street (Signalized)	v/c Ratio	-	-	-	0.34	-	0.34	0.12	0.39	-	-	0.44	0.44	-
	Delay (s/veh)	-	-	-	38.52	-	38.52	6.64	3.10	-	-	3.78	3.80	4.05
	LOS	-	-	-	D	-	D	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	10.11	-	10.11	4.52	21.55	-	-	29.91	30.02	-

Table 19: Full Buildout Base Scenario Traffic Operations Results (PM Peak Hour)

Full Buildout Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	1.02	0.54	0.34	0.32	0.98		0.03	0.47	0.39	0.04	0.17	0.18	-
	Delay (s/veh)	88.31	31.52	29.07	21.33	61.53		13.70	22.29	22.14	14.84	19.11	19.16	39.33
	LOS	F	C	C	C	E		B	C	C	B	B	B	D
	95% Queue (m)	137.86	76.01	39.47	32.62	148.00		2.99	75.87	55.27	2.59	27.37	26.81	-
105A Avenue / 140 Street (Signalized)	v/c Ratio	0.02	0.32	0.32	0.46	0.25	0.25	0.03	0.68	0.26	0.07	0.78		-
	Delay (s/veh)	12.27	10.24	10.24	17.74	9.82	9.82	25.00	18.88	14.91	23.49	22.08		15.14
	LOS	B	B	B	B	A	A	C	B	B	C	C		B
	95% Queue (m)	0.74	25.11	25.11	27.21	18.92	18.92	0.90	61.39	17.08	2.60	65.83		-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.56	0.60	0.87	0.84	0.31	0.32	0.04	0.95	0.95	0.30	0.66	0.66	-
	Delay (s/veh)	26.25	35.07	44.68	41.07	35.63	35.63	21.05	60.54	61.23	29.54	33.75	34.07	43.37
	LOS	C	D	D	D	D	D	C	E	E	C	C	C	D
	95% Queue (m)	89.91	106.03	144.11	74.53	50.57	50.12	2.32	222.47	217.89	17.92	133.32	123.84	-
103 Avenue / 140 Street (Signalized)	v/c Ratio	-	0.81	0.90	0.22	0.20	-	-	-	-	0.70	-	0.76	-
	Delay (s/veh)	-	24.24	32.26	12.71	6.40	-	-	-	-	25.96	-	28.08	23.63
	LOS	-	C	C	B	A	-	-	-	-	C	-	C	C
	95% Queue (m)	-	111.08	127.94	7.72	15.32	-	-	-	-	56.35	-	56.85	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.42	0.63	-	-	0.49	0.25	0.50	-	0.91	-	-	-	-
	Delay (s/veh)	11.29	12.38	-	-	18.07	16.27	19.54	-	39.32	-	-	-	18.22
	LOS	B	B	-	-	B	B	B	-	D	-	-	-	B
	95% Queue (m)	28.01	66.14	-	-	43.30	18.60	39.40	-	89.97	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.17	0.80	0.55	0.63	0.57	0.57	0.82	0.72	0.72	0.82	0.57	0.57	-
	Delay (s/veh)	20.60	39.10	33.67	34.70	33.09	33.15	51.98	46.18	46.42	48.16	37.57	37.84	39.68
	LOS	C	D	C	C	C	C	D	D	D	D	D	D	D
	95% Queue (m)	15.39	158.09	95.61	54.60	114.09	111.07	94.46	131.70	126.96	94.36	106.75	99.28	-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.49	-	0.59	-	-	-	-	0.51	0.33	0.48	0.32	-	-
	Delay (s/veh)	56.15	-	58.86	-	-	-	-	7.91	6.79	9.37	3.03	-	8.66
	LOS	E	-	E	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	28.13	-	31.17	-	-	-	-	78.95	44.56	16.55	26.32	-	-
103 Avenue / 142 Street (Two-way stop)	v/c Ratio	-	-	-	1.28	-	0.43	0.11	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	358.90	-	351.98	8.44	0.00	-	-	0.00	0.00	170.72
	LOS	-	-	-	F	-	F	A	A	-	-	A	A	F
	95% Queue (m)	-	-	-	317.85	-	317.85	2.81	2.81	-	-	0.00	0.00	-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.06	0.18		0.02	0.37		0.02	0.19	0.19	0.05	0.07	0.07	-
	Delay (s/veh)	49.65	48.46		48.55	51.76		1.85	1.70	1.71	2.48	1.34	1.34	3.95
	LOS	D	D		D	D		A	A	A	A	A	A	A
	95% Queue (m)	1.82	4.07		0.72	9.52		0.60	6.93	6.80	1.73	2.12	2.12	-
104A Avenue / 144 Street (Roundabout)	v/c Ratio	0.09	0.63		0.01	0.15		0.00	0.66		0.31	0.33		-
	Delay (s/veh)	12.59	12.59		7.37	7.37		14.85	14.85		5.67	5.67		10.31
	LOS	A	B		A	A		A	B		A	A		B
	95% Queue (m)	2.12	35.50		0.33	3.97		0.00	39.27		10.32	11.04		-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.73	0.40		0.26	0.64		1.01	1.42	1.43	0.76	1.14	1.14	-
	Delay (s/veh)	35.47	23.54		15.74	27.43		87.22	253.85	258.43	43.24	147.42	147.84	119.69
	LOS	D	C		B	C		F	F	F	D	F	F	F
	95% Queue (m)	78.80	75.23		29.32	118.92		181.10	352.66	349.66	93.81	184.64	182.31	-
103 Avenue / 144 Street (Signalized)	v/c Ratio	1.02	0.83		0.87			0.47		0.56	1.50			-
	Delay (s/veh)	66.50	17.96		24.88			15.41		16.30	265.55			65.00
	LOS	F	B		C			B		B	F			E
	95% Queue (m)	47.61	86.52		71.26			33.53		36.96	265.24			-

Full Buildout Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 144 Street (Signalized)	v/c Ratio	-	-	-	0.90	-	0.84	0.39	0.37	-	-	0.38	0.90	-
	Delay (s/veh)	-	-	-	43.18	-	37.45	11.61	10.08	-	-	16.72	35.94	25.19
	LOS	-	-	-	D	-	D	B	B	-	-	B	D	C
	95% Queue (m)	-	-	-	121.71	-	97.53	29.94	45.64	-	-	48.88	139.90	-
100 Avenue / Green Timbers Park Access (Signalized)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.51	0.51	0.00	0.46	-	-
	Delay (s/veh)	0.00	-	0.00	-	-	-	-	5.15	5.15	0.00	2.95	-	4.06
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	21.70	21.70	0.00	6.35	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.11	-	0.89	-	-	-	-	0.41	0.42	0.69	0.35	-	-
	Delay (s/veh)	41.91	-	69.72	-	-	-	-	6.79	6.84	29.49	5.88	-	15.01
	LOS	D	-	E	-	-	-	-	A	A	C	A	-	B
	95% Queue (m)	11.86	-	101.50	-	-	-	-	63.38	63.63	76.14	47.79	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.02	-	0.05	-	-	-	-
	Delay (s/veh)	7.33	0.00	-	-	0.00	0.00	9.33	-	8.74	-	-	-	4.62
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.33	0.33	-	-	0.00	0.00	1.58	-	1.58	-	-	-	-
108 Avenue / 146 Street (Signalized)	v/c Ratio	0.60	0.70		0.12	0.05		0.02	0.18	0.18	0.35	0.03	0.04	-
	Delay (s/veh)	39.22	37.94		42.51	29.80		5.54	5.55	5.64	10.28	4.77	4.79	18.18
	LOS	D	D		D	C		A	A	A	B	A	A	B
	95% Queue (m)	55.22	62.14		4.98	3.69		1.25	18.47	16.99	31.50	3.26	3.05	-
110 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.03	0.00	-	-	0.01	0.00	0.01	-	0.02	-	-	-	-
	Delay (s/veh)	9.03	0.00	-	-	0.00	0.00	19.69	-	13.25	-	-	-	0.44
	LOS	A	A	-	-	A	A	C	-	B	-	-	-	C
	95% Queue (m)	0.82	0.82	-	-	0.00	0.00	0.66	-	0.66	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.38	0.43	0.02	0.73	0.82		0.05	0.26	0.26	0.02	0.23	0.31	-
	Delay (s/veh)	29.00	36.35	32.48	39.45	47.40		10.72	15.47	15.58	10.48	16.40	17.56	28.28
	LOS	C	D	C	D	D		B	B	B	B	B	B	C
	95% Queue (m)	34.28	47.68	1.92	96.46	100.27		4.35	42.77	39.93	1.53	37.63	45.98	-
105 Avenue / 148 Street (Roundabout)	v/c Ratio	0.28	0.57		0.10	0.58		0.08	0.82		0.20	0.69		-
	Delay (s/veh)	12.49	12.49		14.93	14.93		21.99	21.99		14.28	14.28		16.38
	LOS	A	B		A	C		A	C		A	C		C
	95% Queue (m)	8.85	27.54		2.54	28.47		1.98	72.06		5.63	43.50		-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.24	0.73	0.14	0.55	0.59	0.56	0.25	0.54	0.54	0.00	0.63	0.63	-
	Delay (s/veh)	33.77	49.75	40.93	37.78	46.23	46.06	13.26	16.35	16.41	0.00	22.31	22.54	26.03
	LOS	C	D	D	D	D	D	B	B	B	A	C	C	C
	95% Queue (m)	25.37	89.25	14.15	57.68	73.74	62.13	12.54	109.21	106.22	0.00	136.31	128.55	-
102A Avenue / 148 Street (Two-way stop)	v/c Ratio	-	0.66		0.12	0.22	-	-	-	-	0.46	-	0.46	-
	Delay (s/veh)	-	9.68		3.59	3.29	-	-	-	-	19.40	-	19.40	7.25
	LOS	-	A		A	A	-	-	-	-	B	-	B	A
	95% Queue (m)	-	21.16		1.19	2.72	-	-	-	-	3.09	-	3.09	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.52	0.60	0.43	0.21	0.28	0.01	0.10	0.77	0.36	0.49	0.83	0.84	-
	Delay (s/veh)	25.97	35.44	21.51	21.00	28.70	25.45	17.65	31.51	24.08	23.19	39.53	39.96	31.70
	LOS	C	D	C	C	C	C	B	C	C	C	D	D	C
	95% Queue (m)	68.61	82.78	62.27	20.19	36.27	1.20	5.78	117.15	47.38	35.02	144.30	140.83	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.50	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.03	0.34		0.00	0.00		0.00	0.22	0.22	0.06	0.17	0.17	-
	Delay (s/veh)	46.21	48.30		0.00	0.00		0.00	2.28	2.28	3.31	2.09	2.09	3.53
	LOS	D	D		A	A		A	A	A	A	A	A	A
	95% Queue (m)	1.37	11.52		0.00	0.00		0.00	11.86	11.81	2.43	8.60	8.60	-

Full Buildout Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.58	-	0.45	-	-	-	-	0.16	0.18	0.45	0.18	-	-
	Delay (s/veh)	48.30	-	46.16	-	-	-	-	2.59	2.84	7.33	2.65	-	7.88
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	33.62	-	22.45	-	-	-	-	9.48	10.89	36.40	10.94	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.84	0.18	0.19	0.19	0.81		0.53	**1.05**		0.68	0.59		-
	Delay (s/veh)	42.68	10.56	10.70	15.10	20.22		30.78	64.97		38.46	17.20		33.53
	LOS	D	B	B	B	C		C	**F**		D	B		C
	95% Queue (m)	35.75	13.92	13.34	11.59	85.01		22.57	175.73		20.31	57.64		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.47	0.46	0.48	0.62	0.54		0.22	0.65	0.66	0.50	0.63	0.24	-
	Delay (s/veh)	35.69	42.62	43.27	38.61	46.80		15.54	27.03	27.14	21.64	23.80	17.93	28.71
	LOS	D	D	D	D	D		B	C	C	C	C	B	C
	95% Queue (m)	67.70	61.96	57.78	76.74	62.85		13.77	140.92	138.86	35.96	126.62	41.30	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.50	0.28	0.28	0.18	0.20	0.21	0.33	0.40		0.52	0.31		-
	Delay (s/veh)	16.74	10.27	10.31	14.32	9.80	9.85	19.66	15.38		23.03	14.67		14.30
	LOS	B	B	B	B	A	A	B	B		C	B		B
	95% Queue (m)	34.41	22.18	20.50	9.15	15.36	14.55	20.35	26.75		31.83	19.88		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.42	0.44	0.36	0.39	-	-	-	-	0.73	-	0.27	-
	Delay (s/veh)	-	7.49	7.69	7.04	7.34	-	-	-	-	20.80	-	15.88	9.98
	LOS	-	A	A	A	A	-	-	-	-	C	-	B	A
	95% Queue (m)	-	26.54	27.15	19.48	22.09	-	-	-	-	42.07	-	11.49	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.82	-	**1.00**	0.94	0.45	-	-	0.82	0.91	-
	Delay (s/veh)	-	-	-	37.88	-	68.06	55.60	10.80	-	-	29.97	40.14	35.66
	LOS	-	-	-	D	-	**F**	**E**	B	-	-	C	D	D
	95% Queue (m)	-	-	-	107.94	-	152.83	91.85	61.47	-	-	133.17	153.11	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	0.82	0.60	0.06	0.40	0.69	0.73	0.79	0.03	0.09	0.64	0.28	0.25	-
	Delay (s/veh)	44.28	17.46	12.80	50.21	25.30	26.59	37.39	19.81	20.31	46.45	35.13	35.35	25.80
	LOS	D	B	B	D	C	C	D	B	C	D	D	D	C
	95% Queue (m)	65.22	79.30	6.10	5.80	81.94	76.80	60.45	3.60	8.61	26.26	15.36	12.57	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.91	0.56	0.56	0.31	0.83	0.83	0.60	0.07	0.56	0.51	0.15	0.22	-
	Delay (s/veh)	58.58	26.26	27.14	42.14	48.04	54.05	37.68	27.24	33.97	55.90	46.94	47.81	39.59
	LOS	**E**	C	C	D	D	D	D	C	C	**E**	D	D	D
	95% Queue (m)	122.26	107.13	113.84	12.95	139.25	143.48	112.39	11.43	89.90	39.02	12.56	16.66	-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.96	0.91	0.24	0.38	0.60	0.47	0.84	0.71	0.45	0.26	0.96	0.91	-
	Delay (s/veh)	110.81	52.18	32.01	40.21	40.68	12.67	49.57	35.99	31.72	23.39	63.97	66.90	47.39
	LOS	**F**	D	C	D	D	B	D	D	C	C	**E**	**E**	D
	95% Queue (m)	101.09	165.75	34.94	35.64	83.55	78.97	97.59	128.02	75.16	20.84	172.80	151.54	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.53	**1.09**	**1.10**	0.82	0.46	0.46	0.45	0.41		0.66	0.94		-
	Delay (s/veh)	28.40	90.04	91.93	28.44	18.70	19.87	18.32	15.63		35.28	44.81		47.75
	LOS	C	**F**	**F**	C	B	B	B	B		D	D		D
	95% Queue (m)	16.17	176.07	169.72	63.89	34.99	37.42	33.72	29.79		17.26	60.81		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.23	0.47	0.34	0.18	0.36	0.36	0.38	0.74		0.85	0.05		-
	Delay (s/veh)	7.20	11.33	10.39	10.13	11.73	11.75	55.92	62.97		58.86	40.22		18.20
	LOS	A	B	B	B	B	B	**E**	**E**		**E**	D		B
	95% Queue (m)	14.38	84.03	56.04	3.88	68.46	67.30	24.27	47.17		92.90	5.76		-

Full Buildout Base Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.93	0.81	0.82	0.42	0.66	0.66	0.84	0.62	0.66	0.48	0.73	0.65	-
	Delay (s/veh)	67.85	39.90	40.68	27.11	32.32	32.56	52.47	38.34	42.94	30.54	44.33	46.17	41.34
	LOS	E	D	D	C	C	C	D	D	D	C	D	D	D
	95% Queue (m)	101.12	181.04	179.56	27.86	137.16	129.78	100.75	101.57	103.02	48.32	112.14	95.78	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.22	0.06		-	-	-	-	0.00	0.00	0.06	0.00	-	-
	Delay (s/veh)	12.59	11.00		-	-	-	-	0.00	0.00	7.88	0.00	-	5.63
	LOS	B	B		-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	8.73	8.73		-	-	-	-	0.00	0.00	1.41	1.41	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.52	-	0.52	0.53		-	-	0.07		-
	Delay (s/veh)	-	-	-	12.65	-	12.65	13.96		-	-	8.27		12.98
	LOS	-	-	-	B	-	B	B		-	-	A		B
	95% Queue (m)	-	-	-	23.03	-	23.03	24.09		-	-	1.63		-
105 Avenue / 154 Street (Signalized)	v/c Ratio	0.16	0.12	0.12	0.04	0.18	0.19	0.05	0.37		0.00	0.07		-
	Delay (s/veh)	5.73	5.53	5.54	14.15	12.15	12.18	13.93	13.42		0.00	12.03		9.12
	LOS	A	A	A	B	B	B	B	B		A	B		A
	95% Queue (m)	6.02	4.10	3.98	1.33	6.09	6.00	1.90	11.98		0.00	2.12		-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.05	0.30	0.65	0.43	0.14		0.34	0.47	0.47	0.36	0.72	0.17	-
	Delay (s/veh)	36.47	53.19	60.86	41.00	43.20		16.24	15.83	15.85	11.46	20.27	4.91	20.25
	LOS	D	D	E	D	D		B	B	B	B	C	A	C
	95% Queue (m)	6.05	17.41	34.86	62.37	13.15		14.24	95.58	94.60	24.60	158.16	19.45	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.19	0.08		0.00	0.11	0.34	0.17	0.34		0.00	0.00		-
	Delay (s/veh)	9.30	6.85		0.00	6.92	7.91	9.14	8.35		0.00	0.00		8.27
	LOS	A	A		A	A	A	A	A		A	A		A
	95% Queue (m)	5.36	1.80		0.00	2.30	7.02	4.73	6.87		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.05	0.00	-	-	0.00	0.00	0.01	-	0.18	-	-	-	-
	Delay (s/veh)	8.01	0.00	-	-	0.00	0.00	16.71	-	11.12	-	-	-	2.27
	LOS	A	A	-	-	A	A	C	-	B	-	-	-	C
	95% Queue (m)	1.11	0.00	-	-	0.00	0.00	5.31	-	5.31	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.32	0.22		0.90	0.39		0.70	0.34	0.34	0.15	0.56	0.57	-
	Delay (s/veh)	31.45	23.34		54.47	24.82		32.52	8.07	8.07	12.12	10.05	10.15	16.98
	LOS	C	C		D	C		C	A	A	B	B	B	B
	95% Queue (m)	19.63	17.35		74.76	32.45		49.20	36.55	36.15	7.88	69.43	66.92	-
105A Avenue / 156 Street (Two-way stop)	v/c Ratio	0.16	0.01	-	-	0.01	0.00	0.26	-	0.35	-	-	-	-
	Delay (s/veh)	12.15	0.00	-	-	0.00	0.00	115.77	-	51.60	-	-	-	3.32
	LOS	B	A	-	-	A	A	F	-	F	-	-	-	F
	95% Queue (m)	4.27	4.27	-	-	0.00	0.00	25.42	-	25.42	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.81	0.51	0.36	0.18	0.52	0.91	0.52	0.72	0.72	0.69	1.09	1.09	-
	Delay (s/veh)	49.10	27.43	25.30	48.11	36.22	32.23	22.55	41.43	41.73	31.12	124.09	124.58	48.77
	LOS	D	C	C	D	D	C	C	D	D	C	F	F	D
	95% Queue (m)	113.12	98.27	61.42	11.13	86.68	240.76	77.65	137.82	132.73	77.73	184.42	179.76	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.78	0.81		0.28	0.62	0.84	0.94	0.58	0.17	0.13	0.80	0.80	-
	Delay (s/veh)	35.12	42.41		21.51	35.32	48.37	57.03	20.53	14.71	42.07	37.34	37.73	37.17
	LOS	D	D		C	D	D	E	C	B	D	D	D	D
	95% Queue (m)	87.32	122.35		20.97	76.77	101.28	111.94	101.02	21.31	6.34	122.04	116.64	-
104 Avenue / 157 Street (Signalized)	v/c Ratio	-	-	-	0.42	-	0.42	0.08	0.34	-	-	0.41	0.41	-
	Delay (s/veh)	-	-	-	42.04	-	42.04	2.94	3.07	-	-	6.89	6.91	5.97
	LOS	-	-	-	D	-	D	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	16.30	-	16.30	1.50	22.07	-	-	51.57	51.69	-

6. NETWORK DEFICIENCIES AND IMPROVEMENTS

6.1. IDENTIFYING DEFICIENCIES

To ensure that the road network is able to accommodate projected traffic volumes for the 2050 and full buildout horizon years, operational deficiencies of all intersections within the study area were identified and evaluated using the Visum and Vistro models. The Visum models were applied to identify potential hot spot locations and problematic movements. The Vistro models allow for a more detailed assessment of traffic operations at the intersection level. Therefore, they were employed to identify areas with capacity, queuing, and/or travel delay concerns, and identify potential improvements to address these deficiencies. Generally, road network improvements were considered to improve movements with a LOS E or F or where there was significant queuing.

6.2. IMPROVEMENT CLASSIFICATIONS

As indicated in the results of **Section 5.5** and **5.6**, there are several corridors, intersections, and movements that will require improvements/upgrades either by the 2050 or full buildout horizon. Based on these findings, the proposed improvements were grouped into five classifications. The classifications largely reflect the relative level of effort and costs associated with implementing each type of improvement.

As shown in **Table 18**, two of the five classifications are signal timing changes for improving operations at the intersection (highlighted in orange) and signal timing changes for improving safety, i.e., adding protected left turn phases when crossing three opposing through lanes (highlighted in purple). The classifications also included new traffic signal or roundabout (highlighted in red), road reallocation (highlighted in blue), and the addition of turn bays or road widening (highlighted in green).

Table 20: Classification of Proposed Improvements

	Signal Timing Changes (for Operations)
	Signal Timing Changes (for Safety)
	New Traffic Signal/Roundabout
	Road Reallocation
	Road Addition / Widening

The order of the classifications indicated the general hierarchy of selecting improvements. For example, all signalized intersections with at least one movement operating at a LOS E or F were considered for signal optimization as the first potential improvement since it is the most cost-effective option. Improving the signal timing and/or coordination enables the signal to operate more effectively to reduce congestion and requires no additional infrastructure costs. All unsignalized intersections with movements operating at a LOS E or F were considered for a new traffic signal and/or roundabout if they experienced significant traffic volumes.

Some locations required additional improvements in the of form of either reallocation of existing traffic lanes, addition of lanes or turn bays, or road widening. Locations where one lane is shown to be underutilized and another is not provided with enough capacity, road reallocation was considered as a potential improvement. An example of such improvement is changing a right-turn lane to a shared through and right lane to provide additional capacity for the through movement. Road additions or widening was considered last because the construction, time, and cost of an additional lane or turn-bay relatively high when compared to the other improvement options.

6.3. Recommended Improvements and Corresponding Results

The forecast turning movement volumes and truck percentages that were applied to the Vistro models for the 2050 with Improvement Scenario and the Full Buildout with Road Widening + Improvement Scenario were obtained directly from the corresponding horizon year Visum model and are provided in **Appendix J**. It should be noted that when analyzing the network for the full buildout horizon, the network volumes were obtained from the Full Buildout with Road Widening Scenario to reflect the additional demand that is served.

The recommended network improvements include improvements at the roadway segment level (i.e., road widening) and at the intersection level (i.e., intersection improvements/upgrades or new traffic signal). The road widening recommendations are based on the results of the Visum model, specifically the full buildout scenario, are listed in the table below.

Table 21: Recommended Road Widening

Road	Location	Lanes / Direction	
		Current	Proposed
140 Street	105 Ave to Grosvenor Road	1	2
140 Street	Fraser Hwy to 104 Avenue (NB only)	2	3
148 Street	98 Avenue to North of 110 Avenue	1	2
152 Street	98 Avenue to 104 Avenue	2 or 3	3
156 Street	98 Avenue to 108 Avenue	1	2
100 Avenue	156 Street to 160 Street	1	2
104 Avenue	138 Street to 160 Street	2	3
108 Avenue	139 Street to 142 Street	2	3

At the intersection level, three new traffic signals are recommended to address the increased travel demand expected by the 2050 horizon year. Five additional traffic signals are recommended beyond 2050 to meet the demands of the full buildout horizon year. These locations are listed in the table below.

Table 22: Recommended New Traffic Signals

Intersction	Horizon Year	Intersection Control	
		Current	Proposed
144 Street & 103 Avenue	2050	2-Way Stop	Traffic Signal
148 Street & 102A Avenue	2050	N/A	Traffic Signal
154 Street & 105 Avenue	2050	Pedestrain Signal	Traffic Signal
142 Street & 103 Avenue	Full Buildout	2-Way Stop	Traffic Signal
148 Street & 110 Avenue	Full Buildout	2-Way Stop	Traffic Signal
148 Street & 106A Avenue	Full Buildout	2-Way Stop	Traffic Signal
150 Street & 104A Avenue	Full Buildout	N/A	Traffic Signal
156 Street & 105A Avenue	Full Buildout	2-Way Stop	Traffic Signal

Other intersection improvements are recommended at over 25 intersections, in addition to the intersections listed above. These improvements range from additional lanes/turn bays to reconfiguration of lanes and/or traffic signal operations.

A summary of all recommended network improvements is illustrated in **Figure 83**. Link level improvements are identified by the blue lines, intersection improvements by red squares, and new traffic signals with the traffic signal icon.

The recommended network improvements for the 2050 and buildout horizons are provided in detail in the following tables. The 2050 AM peak hour and 2050 PM peak hour are listed in **Table 19** and **Table 20**, while the full buildout AM peak hour and PM peak hour are listed in **Table 21** and **Table 22**. Each table lists the following information:

- Intersection and movement
- Proposed improvement along with the classification denoted by the cell fill colour
- Comments to provide details about the proposed improvements
- For each impacted movement: the 2017, before improvement, and after improvement LOS
- For each impacted intersection: the 2017, before improvement, and after improvement LOS

A summary of the intersection LOS for the four scenarios are provided after the tables. The 2050 AM peak hour and PM peak hour results are illustrated in **Figure 84** and **Figure 85**, respectively. The full buildout AM peak hour and PM peak hour results are illustrated in **Figure 86** and **Figure 87**, respectively. As shown in these figures, the proposed improvements have resulted in all intersections achieving a LOS D or better across all scenarios, indicating that the proposed improvements are necessary to accommodate the growth anticipated for the Guildford Town Centre area. Detailed results at the turn movement level, including the average delay, v/c, LOS, and queues, are provided in **Appendix K** for all improvement scenarios.

Figure 83: Recommended Network Improvements

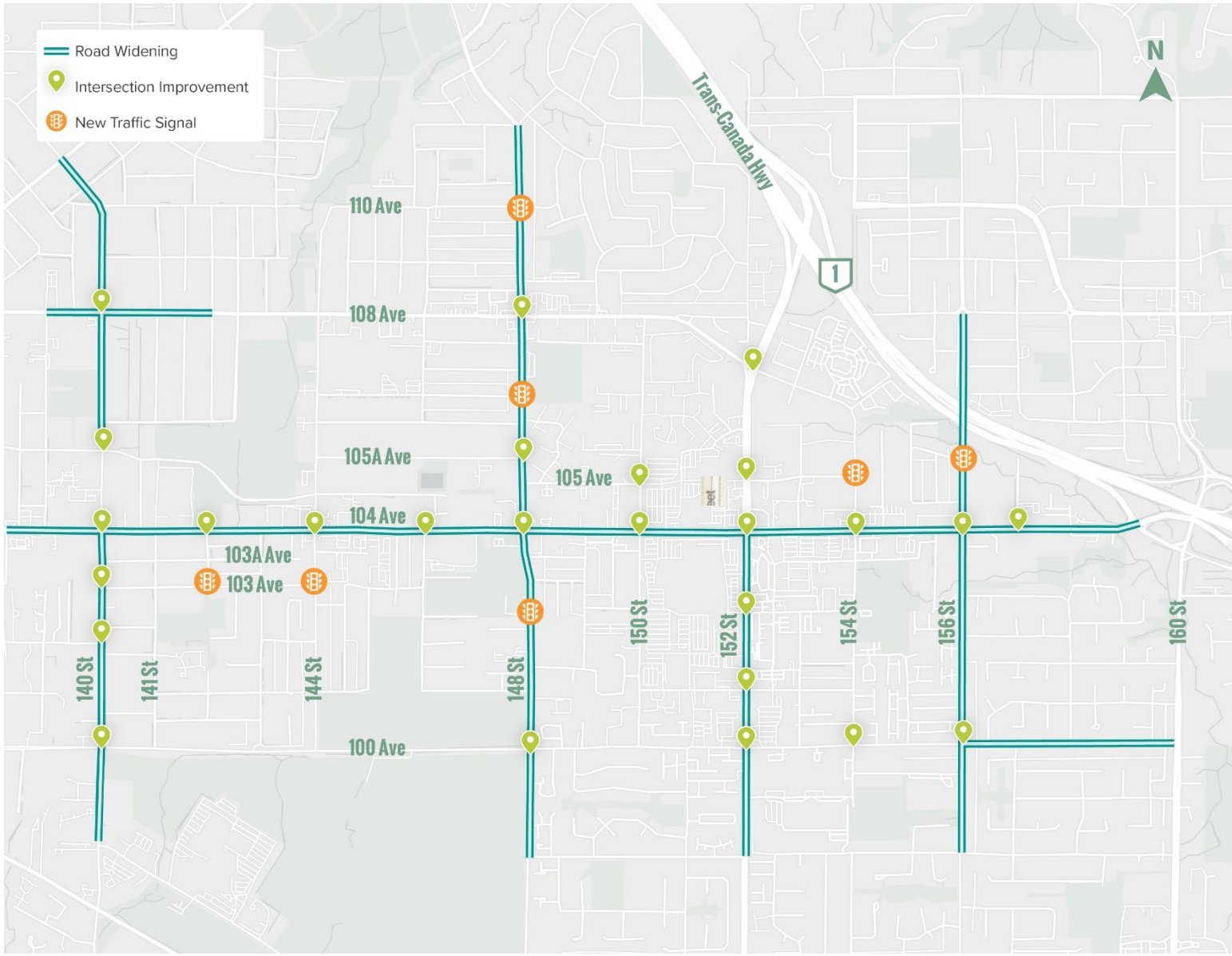


Table 23: 2050 AM Peak Hour Improvements

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	2050 Initial	**2050 Final**	2017 Base	2050 Initial	**2050 Final**
140 St / 108 Ave	NBR	Add Right Turn Bay	See 2050 PM Improvements	D	D	D	C	C	C
	EBR	Add Right Turn Bay	See 2050 PM Improvements	B	C	B			
140 St / 100 Ave	NBR	Add Right Turn Bay	See 2050 PM Improvements	D	D	C	C	D	C
		Add Overlap phase with WBL	Further reduces delay for NBR vehicles						
142 St / 104 Ave	NBL	Half Cycle Length	Large delays for NB movements due to long cycle length. Halving cycle length reduces overall delay for non-actuated coordinated movements.	D	F	D	A	A	A
	NBR			D	D	C			
144 St / 103 Ave	WBL	Upgrade To Signalized Intersection	Significant delays for all movements are observed in both the AM and PM resulting in the need for a signalized intersection.	B	D	A	B	D	A
	WBT			B	D	A			
	NBL	Add Left Turn Bay	Turn bay added to accommodate high left turn volumes, especially in PM peak hour.	A	A	B			
	EBR	Add Right Turn Bay	Turn bay added to accommodate high right turn volumes and reduce delay for EBT/R movements.	A	B	B			
148 St / 102A Ave	WBL	Upgrade to Signalized Intersection	Significant delays for all movements are observed in both the AM and PM resulting in the need for a signalized intersection.	D	E	B	D	E	B
	WBR			C	E	B			
	SBL	Add Left Turn Bay	Turn bay added to accommodate high left turn volumes.	A	A	B			
148 St / 100 Ave	EBT	Add Right Turn Bay	Turn bay added to accommodate high right turn volumes and reduce delay for EBT/R movements.	D	F	D	C	D	C
	EBR			D	F	D			
152 St / 108 Ave	SBR	Add Overlap phase with EBL	Long delays observed for SBR movement. The overlap phase increases signal time for the movement and improves LOS from F to B.	E	F	B	E	D	C
	WBR	Add Overlap phase with SBL	Long delays observed for WBR movement. The overlap phase increases signal time for the movement and improves LOS from E to D.	F	E	D			
152 St / 105 Ave	NBT	Change Right Turn Only Lane to Through/Right Lane	Large NBT queues observed due to high volumes. Reallocate lanes to make right turn only lane a through/right lane. Low right turn volumes	B	C	C	D	C	C
	NBR			A	B	C			
	WBT	Add Right Turn Bay	See 2050 PM Improvements	D	D	D			
	WBR			D	D	C			
152 St / 104 Ave	SBR	Add Right Turn Bay	Added turn bay to accommodate large right turn volumes and reduce vehicle delay.	D	E	B	D	D	D
		Add Overlap phase with EBL	Added overlap phase to further reduce movement delay						
152 St / 102A Ave	NBL	Change to Protected phase	Left turn movement crossing 3 lanes, must be protected	A	A	E	B	B	B
152 St / 101 Ave	EBL	Add Prot/Permissive phase	High EBL volumes resulting in large delays and queues. Including a protected phase reduces vehicle delay.	D	E	D	A	C	C
152 St / 100 Ave	EBL	Optimized signal timing	Balanced the NB/SB and EB/WB signal timing to reduce overall intersection delay.	D	F	D	C	D	C
154 St / 105 Ave	EBT	Upgrade to Signalized Intersection	Significant delays for all movements are observed in both the AM and PM resulting in the need for a signalized intersection.	A	E	B	C	F	A
	WBL	Add Left Turn Bay	Large WB volumes observed resulting in the need for a dedicated turn bay.	N/A	F	B			
154 St / 104 Ave	WBT	Add Right Turn Bay	Large delays observed for WBT/R movements due to large WBR volumes. Turn bay reduces WBT/R	C	F	C	C	E	C
	WBR			C	F	C			
156 St / 104 Ave	NBR	Add Right Turn Bay	See 2050 PM Improvements	C	D	C	C	D	D
	SBR	Add Overlap with EBL	Overlap phase significantly reduces movement delay.	D	F	C			
156 St / 100 Ave	SBT	Add Right Turn Bay	Added turn bay to accommodate large right turn volumes resulting in significant delay.	C	E	C	C	C	C
	SBR			C	E	C			

Table 24: 2050 PM Peak Hour Improvements

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	2050 Initial	**2050 Final**	2017 Base	2050 Initial	**2050 Final**
140 St / 108 Ave	NBT	Add Right turn bay	Large right turn volumes observed which increase movement delay. Added turn bay to reduce delay for NBT/R movements.	D	F	C	C	E	C
	NBR			D	F	D			
	EBT	Add Right turn bay	Added turn bay to reduce queuing and improve vehicle delay for EBT/R movements.	C	F	C			
	EBR			C	F	C			
140 St / 100 Ave	NBT	Add Right turn bay	Large NBR volumes were observed resulting in large delays for NBT/R movements. Adding the turn bay reduces delay and improves LOS for NBT/R movements .	D	E	C	C	D	D
	NBR			D	E	D			
144 St / 103 Ave	WBL	Upgrade To Signalized Intersection	Significant delays for all movements are observed in both the AM and PM resulting in the need for a signalized intersection.	B	F	B	B	F	B
	WBT			B	F	B			
	NBL	Add Left turn bay	Turn bay added to accommodate high left turn volumes. Note that the LOS appears to worsen due different LOS calculations for unsignalized and signalized intersections.	A	A	B			
	EBT	Add Right turn bay	Turn bay added to accommodate high right turn volumes and reduce delay for EBT/R movements.	B	F	B			
	EBR			A	F	B			
148 St / 104 Ave	SBT	Optimized signal timing	Balanced the NB/SB and EB/WB signal timing to reduce movement delay.	D	E	D	C	C	C
148 St / 102A Ave	WBL	Upgrade to Signalized Intersection	Significant delays for all movements are observed in both the AM and PM resulting in the need for a signalized intersection.	D	A	A	D	E	A
	WBR			C	D	B			
	SBL	Add Left turn bay	Turn bay added to accommodate high left turn volumes, especially in AM peak hour.	A	A	A			
		Add Prot/Permissive phase	Added Protected/Permissive turn phase to reduce delay for SBL movement when intersection becomes signalized.						
148 St / 100 Ave	EBT	Add Right turn bay	Turn bay added to decraese delay for EBT/R movements due to large right turn volumes.	D	F	C	C	E	C
	EBR			D	F	C			
152 St / 105 Ave	NBT	Change Right Turn Only Lane to Through/Right Lane	Large NBT queues observed due to high volumes. Reallocate lanes to make right turn only lane a through/right lane. Low right turn volumes observed hence right turn only lane is not needed.	B	B	C	B	D	C
	NBR			A	B	C			
	WBL	Change to Permissive phase	Low WBL volumes observed resulting in no need for a protected permissive phase. Removing the permissive phase reduces overall intersection delay. Note that WBL delay is 55.6s, just above the LOS D threshold of 55s.	D	D	E			
	WBT	Add Right turn bay	Large delays for WBT/R movements. Adding a right turn bay improves WBT/R from LOS E to LOS D	D	E	D			
	WBR			D	E	D			
152 St / 104 Ave	SBR	Add Right turn bay	Added turn bay to accommodate large right turn volumes and reduce vehicle delay.	E	E	B	D	E	D
		Add Overlap with EBL	Added overlap phase to further reduce movement delay						
152 St / 102A Ave	NBL	Change to Protected phase	Left turn movement is crossing 3 lanes. Movement must be a protected phase.	A	A	C	B	B	B
	WBL	Half Cycle Length	Large delays for WB movements due to long cycle length. Halving cycle length reduces overall delay for non-actuated coordinated movements.	E	E	C			
152 St / 101 Ave	WBL	Add Prot/Permissive phase	High WBL volumes resulting in large delays and queues. Including a protected phase reduces vehicle delay.	E	E	C	B	C	C
152 St / 100 Ave	EBL	Optimized signal timing	Balanced the NB/SB and EB/WB signal timing to reduce overall intersection delay.	C	F	D	C	D	D
	EBT			D	F	D			
154 St / 105 Ave	NBL	Add Prot/Permissive phase	High NBL volumes resulting in large delays and queues. Including a protected phase reduces vehicle delay.	A	A	A	C	F	B
	EBT	Upgrade to Signalized Intersection	Significant delays for all movements are observed in both the AM and PM resulting in the need for a signalized intersection.	N/A	E	B			
	WBL	Add Left Turn Bay	Large WB volumes observed resulting in the need for a dedicated turn bay.	N/A	F	C			
154 St / 104 Ave	WBT	Add Right turn bay	Large delays observed for WBT/R movements due to large WBR volumes. Turn bay reduces WBT/R movement delays.	C	E	C	C	D	C
	WBR			C	E	B			

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	2050 Initial	**2050 Final**	2017 Base	2050 Initial	**2050 Final**
156 St / 104 Ave	NBR	Add Right turn bay	Large NBR turn volumes observed and only one NBT/R lane. Added turn bay to reduce overall intersection delay.	D	D	C	D	D	C
	SBR	Add Overlap with EBL	Overlap phase significantly reduces movement delay.	F	F	C			
156 St / 100 Ave	SBL	Add Prot/Permissive phase	Large left turn volumes observed resulting in the need for a protected permissive phase.	C	C	C	B	D	C
	SBT	Add Right turn bay	Added turn bay to accommodate large right turn volumes resulting in significant delay.	C	F	C			
	SBR			C	F	C			
	EBL	Add Prot/Permissive phase	Large left turn volumes observed resulting in the need for a protected permissive phase	C	F	C			

Table 25: Full Buildout AM Peak Hour Improvements

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
140 St / 108 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity. Accommodate high volumes entering network.	D	C	D	C	D	D
	SBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	C	E	D			
	EBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity. Accommodate high	B	C	B			
	EBR			B	C	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	B	B	D			
		Add Dual Left Turn Bay	High left turn volumes resulting in large delays, especially in the PM peak hour						
140 St / 105A Ave	EBR	Add Right Turn Lane	Increase corridor capacity to accommodate high volume demand	A	B	B	A	B	B
140 St / 104 Ave	NBR	Add Right Turn Lane	Increase northbound link capacity from 100 Ave to accommodate high volumes	D	C	C	C	D	D
		Add overlap phase with WBL	Add overlap phase to reduce vehicle delay						
	SBL	Add Dual Left Turn Bay	Added to accommodate high volumes resulting in large delays	C	E	D			
		Change to Protected Phase	Dual left turn must be a protected phase						
	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	C	B			
	EBT	Add Through Lane and Right Turn Bay	See PM Improvements	B	D	C			
	EBR			B	D	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	E	D			
	WBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	B	D	C			
140 St / 103 Ave	NBT	Add Through Lane	Increase northbound link capacity	A	C	B	C	C	B
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	B	C			
140 St / 102 Ave	NBT	Add Through Lane	Increase northbound link capacity	A	A	A	B	C	C
	SBT	Adjust Cycle Length	Adjust cycle length to give more split to southbound phase	B	D	C			
	EBL	Add Left Turn Lane	Increase corridor capacity to accommodate high volume demand	C	B	C			
140 St / 100 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity. Accommodate high volumes entering network.	D	D	D	C	D	D
	NBR			D	B	D			
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	C	F	D			

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
142 St / 104 Ave	NBL	Double Cycle Length	High volumes result in need for longer cycle length	D	F	D	A	F	C
		Add Left Turn Bay	High left turn volumes and low storage length due to proximity of south intersection						
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	A	B	D			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	B			
	WBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	A	A	E			
142 St / 103 Ave	SBR	Upgrade to Signalized Intersection	Large volumes southbound result in large delays due to the two way stop.	A	F	B	A	F	B
	SBL	Add Right Turn Bay	High left turn volumes require dedicated lane and use right turn bay for low volumes	A	F	B			
	SBR			A	F	B			
144 St / 104 Ave	NBR	Add Right Turn Bay	High right turn volumes in PM	D	D	C	B	C	C
		Add overlap with WBL	Further reduce vehicle delay						
	EBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	A	B	E			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	B	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	A	A	D			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	C	B			
146 St / 104 Ave	NBR	Add overlap with WBL	Reduce movement delay	E	D	C	A	B	B
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	B			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	C	D			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	A			
148 St / 110 Ave	NBT	Add Through Lane	Increase corridor capacity to accommodate high demand entering network	A	A	A	B	F	A
	SBT	Add Through Lane	Increase corridor capacity to accommodate high demand entering network	A	A	A			
	EBL	Upgrade to Signalized	Large volumes eastbound result in large delays due to the two way stop. Signalized intersection is	B	F	B			
	EBR			B	F	B			
148 St / 108 Ave	NBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	C	E	D	C	D	C
	SBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	D	E	D			
148 St / 105 Ave	NBL	Add Through/Left Lane	Change left turn bay to through/left lane at roundabout to increase corridor capacity of 148 St	A	A	A	C	C	B
	NBT			A	B	A			
	SBL	Add Through/Left Lane	Change left turn bay to through/left lane at roundabout to increase corridor capacity of 148 St	A	A	A			
	SBT			A	B	B			
148 St / 106A Ave	NBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	N/A	A	A	N/A	E	A
	SBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St		A	A			
	EBL	Upgrade to Signalized	Large volumes eastbound result in large delays due to the two way stop. Signalized intersection is		E	B			
	EBR				B	B			
148 St / 104 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity	D	D	D	C	E	C
	NBR			D	C	D			
	SBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity	D	E	D			
	SBR			D	D	D			
	EBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	B	D	E			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	B	E	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	B	D	E			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	B	E	C			

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
148 St / 102A Ave	NBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	A	A	A	D	B	A
	SBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	A	B	B			
148 St / 100 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity	C	C	C	C	D	D
	NBR			C	C	C			
	SBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity	D	E	D			
	SBR			D	C	D			
	EBR	Add overlap phase with NBL	Reduce movement delay	D	E	B			
150 St / 105 Ave	EBT	Add Right Turn Bay	See PM Improvements	B	D	B	B	C	B
	EBR			B	D	B			
150 St / 104A Ave	WBL	Upgrade to Signalized Intersection	Large volumes from mall access result in the need for a signalized intersection.	N/A	F	A	N/A	F	B
150 St / 104 Ave	EBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	A	B	D	B	B	C
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	B	B	B			
	WBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	A	B	E			
	WBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity and address large queues on	B	B	C			
	WBR			A	A	C			
152 St / 105 Ave	EBL	Add Dual Left Turn Bay	High left turn volumes, especially in PM peak hour to access 152 st result large delays and queues. Additional left turn bay increases movement capacity.	D	E	D	B	D	C
		Change to Protected Phase	Protected phase required for dual left turns						
	EBT	Change to Through/Right Lane	Right turn bay not needed. To accommodate additional left turn bay, change lanes to	D	D	D			
	EBR			D	D	D			
152 St / 104 Ave	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	D	E	D	D	D	D
	EBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	D	E	F			
		Add Dual Left Turn Bay	High left turn volumes resulting in large delays, especially in the PM peak hour. Adding the additional turn bay reduces delay significantly although still operating at LOS F.						
	EBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity and address large queues on 104 Ave	D	C	C			
	EBR			D	C	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	B	C	D			
	WBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity and address large queues on 104 Ave	D	E	C			
	WBR			C	C	D			
152 St / 102A Ave	NBR	Add Right Turn Bay	See PM Improvements	A	B	B	B	B	C
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	B	E			
	WBL	Add Protected/Permissive Phase	High Left turn volumes. Protected permissive phase reduces overall intersection delay.	D	D	D			
152 St / 101 Ave	NBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	A	B	E	A	C	C
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	B	B			
	EBR	Add Right Turn Bay	Increase intersection capacity for eastbound through and right movements and reduce overall intersection delay	D	C	C			
	WBR	Add Right Turn Bay	Increase intersection capacity for eastbound through and right movements and reduce overall intersection delay	D	D	D			
		Add overlap phase with SBL	Further reduce vehicle delay						

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
152 St / 100 Ave	NBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	B	D	C	C	C	C
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	B	C	C			
154 St / 104 Ave	NBT	Add Through/Right Lane	Increase capacity of northbound movement to reduce intersection delay	D	D	D	C	D	C
	NBR			E	C	D			
	SBT	Add Through Lane	High southbound volumes observed. Adding through lane increases intersection capacity and will allow more vehicles to get through the intersection	D	B	C			
	EBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	B	C	E			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	B	E	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases resulting in larger delays per vehicle.	B	D	E			
	WBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity and address large queues on 104Ave	C	D	C			
	WBR			C	D	C			
154 St / 100 Ave	WBR	Add Right Turn Bay	High right turn volumes in PM resulting in large delays for all movements.	B	B	B	B	C	B
156 St / 105A Ave	NBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	A	A	A	C	F	A
	SBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	A	A	A			
	EBL	Upgrade to Signalized Intersection	Large volumes eastbound, especially in the PM peak hour, result in large delays due to the two way stop. Signalized intersection is needed to protect all movements.	C	F	B			
	EBR			B	D	B			
156 St / 104 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity of 156 St	C	C	D	C	C	D
	NBR			C	C	D			
	SBL	Add Protected/Permissive Phase	High left turn volumes resulting in large overall intersection delay. Helps to balance intersection delay.	D	E	D			
	SBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	D	D	D			
	SBR	Add Overlap Phase with EBL	Further reduce vehicle delay	D	C	C			
	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	C	D	D			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	C	C	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	C	D	D			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	C	C	C			
156 St / 100 Ave	NBT	Add Through Lane	Increase corridor capacity to accommodate high volume demands on 156 St	B	B	C	C	C	C
	SBT	Add Through Lane	Increase corridor capacity to accommodate high volume demands on 156 St	C	C	D			
	SBR	Add Overlap Phase with EBL	Further reduce vehicle delay	C	C	C			
	EBL	Add Protected/Permissive Phase	High left turn volumes, requires a protected phase	B	F	B			
	WBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity of 100 Ave. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	B	B	D			
	WBR			B	B	D			
157 St / 104 Ave	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	B	A	A	E	A	A
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	A			

Table 26: Full Buildout PM Peak Hour Improvements

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
140 St / 108 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity. Accommodate high volumes entering network.	D	C	D	C	D	D
	SBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	C	E	D			
	EBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity. Accommodate high volumes entering network. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	C	C	D			
	EBR			C	C	D			
	WBL	Change to Protected Phase	Movement crossing 3 lanes and dual left turn. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	B	B	D			
		Add Dual Left Turn Bay	High left turn volumes resulting in large delays, especially in the PM peak hour.						
140 St / 105A Ave	EBR	Add Right Turn Lane	Increase corridor capacity to accommodate high volume demand. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	A	B	C	A	B	B
140 St / 104 Ave	NBR	Add Right Turn Lane	Increase northbound link capacity from 100 Ave to accommodate high volumes	D	C	D	C	D	D
		Add overlap phase with WBL	Add overlap phase to reduce vehicle delay						
	SBL	Add Dual Left Turn Bay	Added to accommodate high volumes resulting in large delays	C	D	D			
		Change to Protected Phase	Dual left turn must be a protected phase						
	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	B	C	E			
	EBT	Add Through Lane and Right Turn Bay	Increase eastbound capacity and reduce delay at intersection	B	E	D			
	EBR			B	E	B			
		Add overlap phase with NBL	Further reduce vehicle delay						
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	B	C	D			
	WBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	B	C	C			
140 St / 103 Ave	NBT	Add Through Lane	Increase northbound link capacity	A	C	B	D	C	B
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	A	B	D			
140 St / 102 Ave	NBT	Add Through Lane	Increase northbound link capacity	B	B	A	C	B	B
	EBL	Add Left Turn Lane	Increase corridor capacity to accommodate high volume demand. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	B	B	C			
140 St / 100 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity. Accommodate high volumes entering the network.	D	D	D	D	D	D
	NBR			D	C	D			
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	C	C	E			
142 St / 104 Ave	NBL	Add Left Turn Bay	High left turn volumes and low storage length due to proximity of south intersection	D	E	D	A	A	A
	NBR	Add overlap phase with WBL	Add overlap phase to reduce vehicle delay	E	E	D			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	A			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	A			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	A	A	E			
142 St / 103 Ave	SBR	Upgrade to Signalized Intersection	Large volumes southbound result in large delays due to the two way stop. Signalized intersection is needed to protect all movements.	B	F	A	B	F	A
	SBL	Add Right Turn Bay	High left turn volumes require dedicated lane and use right turn bay for low volumes	A	F	A			
	SBR			B	F	A			

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
144 St / 104 Ave	NBR	Add Right Turn Bay	High right turn volumes in PM. Note that LOS appears to worsen due toleft turn protected phases causing shorter green time for other signal groups.	E	B	C	B	F	C
		Add overlap with WBL	Further reduce vehicle delay						
	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	F	E			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	B	F	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	D	D			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	F	B			
146 St / 104 Ave	NBR	Add overlap with WBL	Reduce movement delay	E	E	C	A	B	C
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	A	C	D			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	A			
148 St / 110 Ave	NBT	Add Through Lane	Increase corridor capacity to accommodate high demand entering network	A	A	A	B	C	A
	SBT	Add Through Lane	Increase corridor capacity to accommodate high demand entering network	A	A	A			
	EBL	Upgrade to Signalized Intersection	Large volumes eastbound result in large delays due to the two way stop. Signalized intersection is needed to protect all movements.	B	F	B			
	EBR			B	D	B			
148 St / 108 Ave	NBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	D	D	C	C	C	C
	SBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	D	D	D			
148 St / 105 Ave	NBL	Add Through/Left Lane	Change left turn bay to through/left lane at roundabout to increase corridor capacity of 148 St	A	A	B	A	C	C
	NBT			A	B	B			
	SBL	Add Through/Left Lane	Change left turn bay to through/left lane at roundabout to increase corridor capacity of 148 St	A	A	C			
	SBT			A	C	C			
148 St / 106A Ave	NBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	N/A	A	A	N/A	E	A
	SBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St		A	A			
	EBL	Upgrade to Signalized Intersection	Large volumes eastbound result in large delays due to the two way stop. Signalized intersection is needed to protect all movements.		E	B			
	EBR				B	B			
148 St / 104 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity	E	D	D	C	C	C
	NBR			D	D	D			
	SBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity	D	D	D			
	SBR			D	D	D			
	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	B	B	E			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	B	B	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	B	A	E			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	B	C	C			
148 St / 102A Ave	NBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	A	A	B	D	A	B
	SBT	Add Through Lane	Increase corridor capacity to address large queues on 148 St	A	A	A			

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
148 St / 100 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	C	D	D	C	C	D
	NBR			C	C	D			
	SBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase link capacity	D	C	C			
	SBR			D	C	C			
	EBR	Add overlap phase with NBL	Reduce movement delay	C	C	C			
150 St / 105 Ave	SBL	Add Protected/Permissive Phase	Large left turn volumes resulting in large delays	B	B	B	A	C	D
	EBT	Add Right Turn Bay	Large volumes in PM peak hour resulting in large delays. Turn bay increases movement EBT/EBR capacity.	B	E	D			
	EBR			B	E	B			
150 St / 104A Ave	WBL	Upgrade to Signalized Intersection	Large volumes from mall access result in the need for a signalized intersection.	N/A	F	C	N/A	F	B
150 St / 104 Ave	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	A	B	D	C	C	D
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	B	C	B			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	B	C	E			
	WBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity and address large queues on 104Ave. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	B	C	D			
	WBR			B	B	D			
152 St / 105 Ave	EBL	Add Dual Left Turn Bay	High left turn volumes, especially in PM peak hour to access 152 st result large delays and queues. Additional left turn bay increases movement capacity.	D	D	D	B	D	D
		Change to Protected Phase	Protected phase required for dual left turns						
	EBT	Change to Through/Right Lane	Right turn bay not needed. To accommodate additional left turn bay, change lanes to through/right	D	C	C			
	EBR			E	C	C			
	WBL	Add Protected/Permissive Phase	High WBL turn volumes.	D	E	C			
152 St / 104 Ave	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	D	D	E	D	D	D
	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	D	D	D			
		Add Dual Left Turn Bay	High left turn volumes resulting in large delays, especially in the PM peak hour						
	EBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity and address large queues on 104Ave	D	D	D			
	EBR			D	C	D			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	C	C	E			
	WBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity and address large queues on 104Ave	D	E	D			
	WBR			C	E	D			
152 St / 102A Ave	NBR	Add Right Turn Bay	Large right turn volumes, especially in the PM result in large delays. Right turn bay reduces movement delay	B	F	C	B	D	C
		Add overlap phase with WBL	Further reduce vehicle delay						
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	B	C	F			
	WBL	Add Protected/Permissive Phase	High Left turn volumes. Protected permissive phase reduces overall intersection delay.	E	D	B			

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
152 St / 101 Ave	NBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	A	A	E	B	B	C
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	A	B	E			
	EBL	Add Protected/Permissive Phase	Large left turn volumes resulting in large delays	D	E	D			
	EBR	Add Right Turn Bay	Increase intersection capacity for eastbound through and right movements and reduce overall intersection delay	D	E	C			
		Add overlap with NBL	Further reduce vehicle delay						
	WBR	Add Right Turn Bay	Increase intersection capacity for eastbound through and right movements and reduce overall intersection delay	D	D	C			
		Add overlap phase with SBL	Further reduce vehicle delay						
152 St / 100 Ave	NBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	B	E	E	C	D	D
	SBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected. Note that LOS appears to worsen due to protected phases causing larger delays per vehicle.	B	C	E			
	EBR	Add overlap with NBL	Further reduce vehicle delay	D	D	D			
	WBR	Add overlap phase with SBL	Further reduce vehicle delay	D	D	C			
154 St / 104 Ave	NBT	Add Through/Right Lane	Increase capacity of northbound movement to reduce intersection delay	E	D	D	C	C	D
	NBR			E	E	D			
	SBT	Add Through Lane	High southbound volumes observed. Adding through lane increases intersection capacity and will allow more vehicles to get through the intersection	D	D	C			
	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	B	B	E			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	C	B	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	B	B	E			
	WBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity and address large queues on 104Ave. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	C	C	C			
	WBR			C	A	D			
154 St / 100 Ave	SBL	Add Protected/Permissive Phase	High left turn volumes, protected phase required	C	D	C	B	B	C
	EBL	Add Protected/Permissive Phase	High left turn volumes, protected phase required	B	C	B			
	WBR	Add Right Turn Bay	High right turn volumes in PM resulting in large delays for all movements.	B	B	C			
156 St / 105A Ave	NBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	A	A	A	D	F	A
	SBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	A	A	A			
	EBL	Upgrade to Signalized Intersection	Large volumes eastbound, especially in the PM peak hour, result in large delays due to the two way stop. Signalized intersection is needed to protect all movements.	D	F	C			
	EBR			B	F	C			

Intersection		Proposed Improvement	Comments	Movement LOS			Intersection LOS		
				2017 Base	Full Buildout		2017 Base	Full Buildout	
					Initial	**Final**		Initial	**Final**
156 St / 104 Ave	NBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity of 156 St. Note that LOS appears to worsen due to increased capacity resulting in larger volumes served.	D	C	D	D	D	D
	NBR			D	C	D			
	SBL	Add Protected/Permissive Phase	High left turn volumes resulting in large overall intersection delay. Helps to balance intersection delay.	E	D	D			
	SBT	Add Through Lane	Increase corridor capacity to accommodate high volume demand entering network.	D	D	D			
	SBR	Add Overlap Phase with EBL	Further reduce vehicle delay	F	D	C			
	EBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	D	C	D			
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	C	D	C			
	WBL	Change to Protected Phase	Movement crossing 3 lanes, must be protected	B	C	D			
	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	C	F	D			
156 St / 100 Ave	NBT	Add Through Lane	Increase corridor capacity to accommodate high volume demands on 156 St	B	D	C	B	D	D
	SBT	Add Through Lane	Increase corridor capacity to accommodate high volume demands on 156 St	C	D	D			
	SBR	Add Overlap Phase with EBL	Further reduce vehicle delay	C	D	C			
	EBL	Add Protected/Permissive Phase	High left turn volumes, requires a protected phase	C	E	D			
	WBT	Add Through/Right Lane	Remove right turn bay and add through/right lane to increase capacity of 100 Ave	B	D	D			
	WBR			B	D	D			
157 St / 104 Ave	WBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	A	E	A	A
	EBT	Add Through Lane	Increase corridor capacity to address large queues on 104 Ave	A	A	A			

Figure 84: 2050 with Improvements Scenario Results (AM Peak Hour)

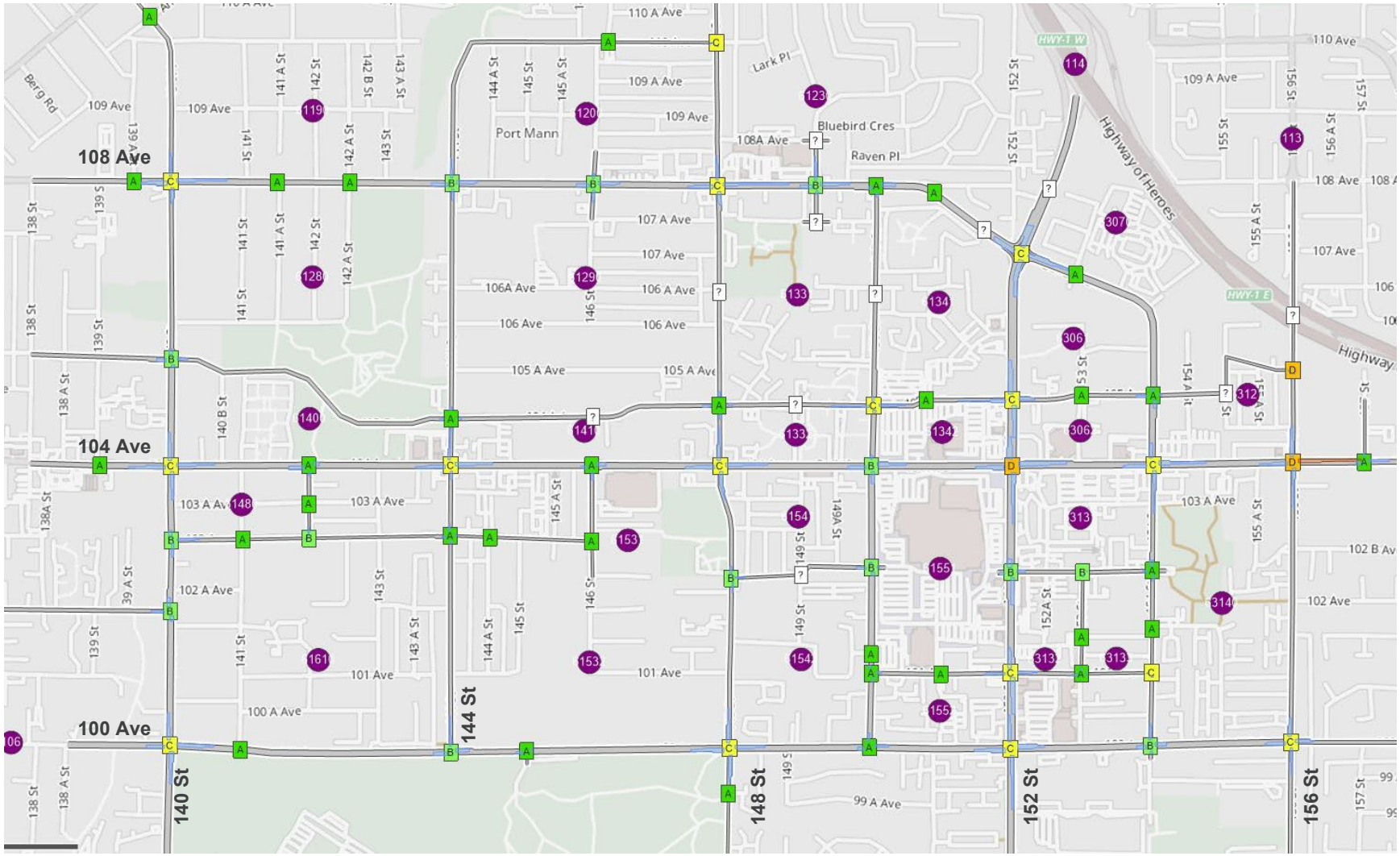


Figure 85: 2050 with Improvements Scenario Results (PM Peak Hour)

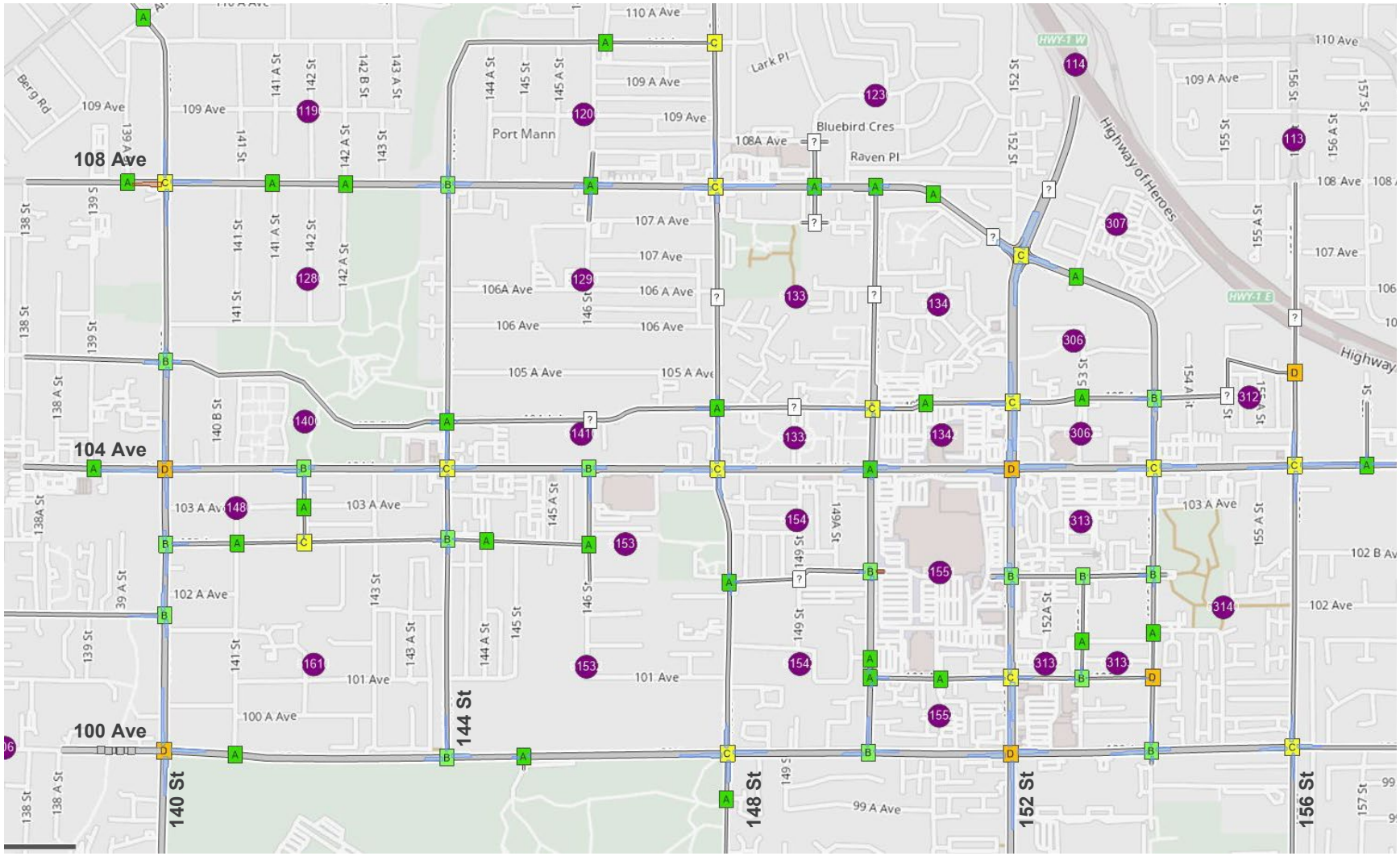


Figure 86: Full Buildout with Road Widening + Improvements Scenario Results (AM Peak Hour)

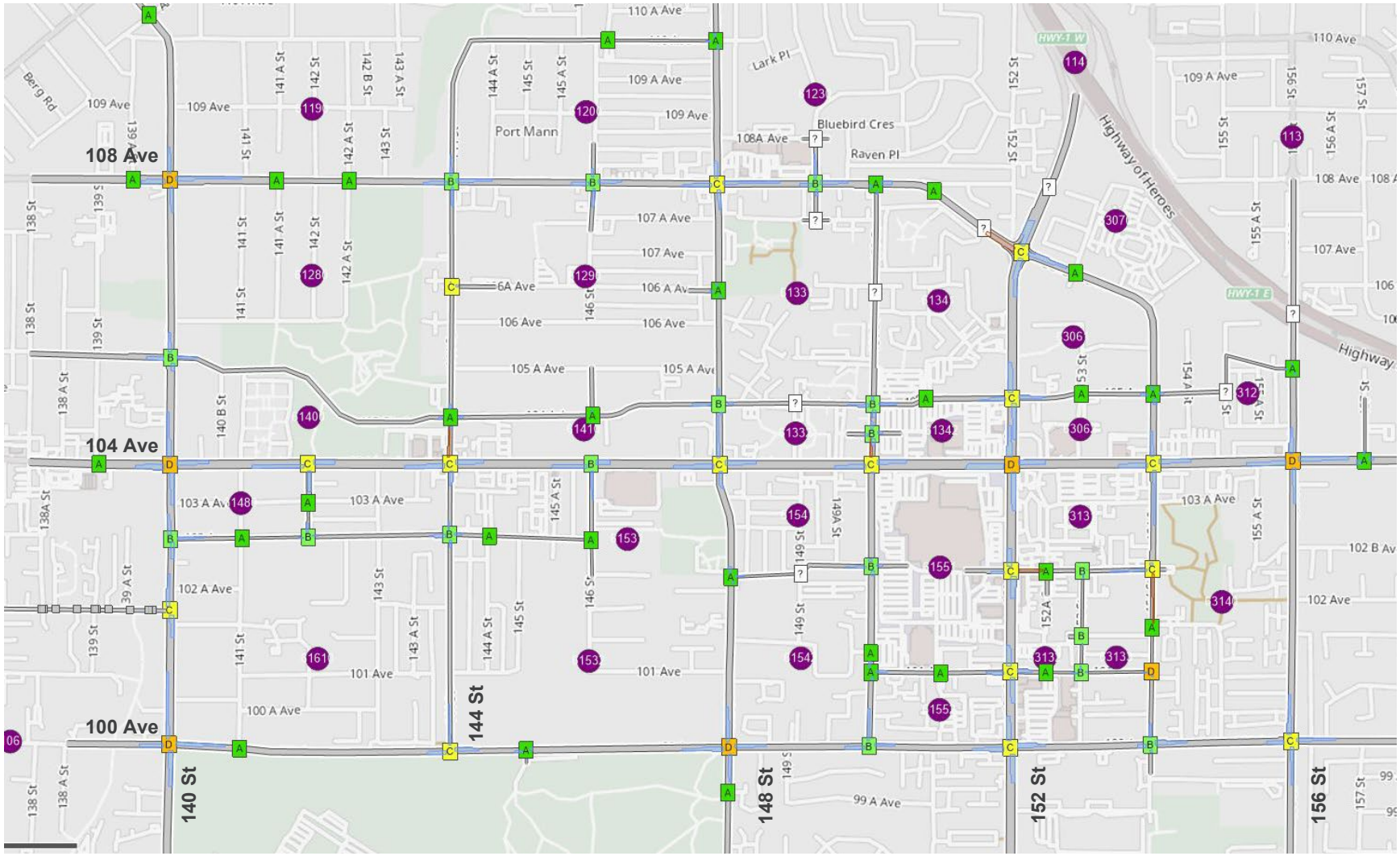
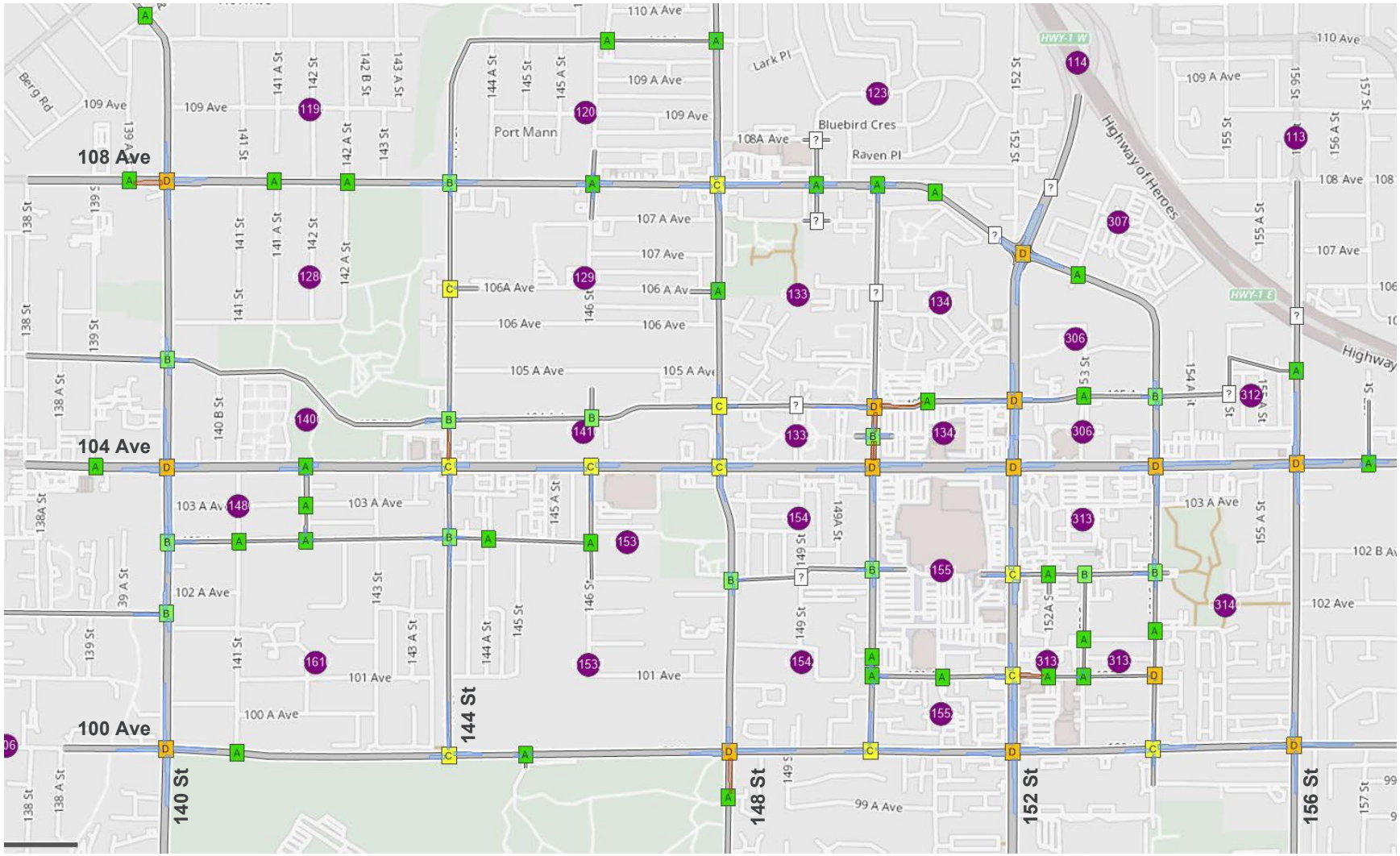


Figure 87: Full Buildout with Road Widening + Improvements Scenario Results (PM Peak Hour)



APPENDIX A

Land Use

TAZ		TOTAL POPULATION					TOTAL EMPLOYMENT					TOTAL HOUSEHOLDS				
SSAM	RTM	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout
61010	61010	10	24	0	0	11	540	806	1,206	1,656	1,660	5	3	0	0	3
61020	61020	15	18	0	0	0	689	1,129	1,944	1,930	2,226	5	4	0	0	0
61031	61030	84	105	9	10	15	79	226	504	781	1,003	27	36	3	3	4
61032	61030	1,589	1,991	2,105	2,306	3,875	67	192	673	1,044	1,217	519	678	701	765	1,126
61040	61040	41	42	0	0	16	571	904	2,009	2,533	2,893	16	15	0	0	5
61050	61050	2,646	3,343	4,410	4,517	9,055	274	292	305	305	676	875	1,063	1,323	1,351	2,647
61060	61060	1,188	1,762	2,397	3,168	5,879	124	162	232	301	377	378	566	771	1,026	1,949
61070	61070	1,535	2,024	2,654	3,230	5,651	103	167	118	118	326	452	668	794	962	1,649
61080	61080	2,050	2,210	3,045	3,531	5,772	161	139	394	554	1,175	714	700	939	1,090	1,835
61090	61090	10	0	0	0	0	395	333	453	453	875	5	0	0	0	0
61100	61100	2,019	2,432	3,269	3,468	5,456	67	201	105	113	355	674	761	1,034	1,103	1,602
61110	61110	530	432	802	930	1,003	186	33	206	206	214	214	132	256	298	87
61120	61120	964	1,268	1,594	1,916	2,449	48	95	62	65	202	324	391	472	567	774
61130	61130	82	40	13	0	1,104	235	742	1,576	2,266	5,059	49	4	4	0	421
61141	61140	5	737	1,200	1,521	2,061	314	610	723	1,058	2,049	3	174	466	598	786
61142	61140	0	0	710	901	676	0	0	310	454	894	0	0	276	354	230
61150	61150	561	1,246	1,546	2,312	2,413	18	76	89	136	143	265	471	602	913	1,282
61160	61160	1,601	1,795	4,178	5,790	8,407	1,945	2,275	2,624	2,877	3,898	876	918	2,044	2,837	5,009
61170	61170	454	426	1,148	1,660	2,554	197	208	317	317	302	97	127	389	580	1,522
61180	61180	1,728	1,666	2,241	2,526	2,580	126	116	171	196	322	606	541	696	781	1,157
61190	61190	851	1,135	1,505	1,899	3,003	61	75	71	72	159	263	340	431	545	877
61200	61200	1,050	1,061	1,564	1,867	2,623	162	229	219	242	376	337	309	439	528	835
61210	61210	5	4	0	0	725	229	255	1,994	2,785	5,308	0	1	0	0	277
61220	61220	92	474	1,537	3,297	3,953	209	108	490	599	817	41	262	814	1,767	2,332
61230	61230	1,805	1,947	2,570	2,918	3,579	304	276	336	637	661	636	693	840	942	1,233
61240	61240	918	1,215	2,165	2,608	3,253	24	83	128	189	224	382	633	1,076	1,290	1,932
61251	61250	50	123	1,218	2,258	2,631	193	147	666	760	1,169	5	9	434	817	1,568
61252	61250	27	66	1,632	3,024	2,741	314	240	963	1,097	710	4	7	581	1,094	1,633
61261	61260	1	2	800	1,530	2,025	54	53	315	417	431	0	0	339	662	1,206
61262	61260	76	180	1,032	1,972	3,546	363	351	541	714	827	23	32	437	854	2,113
61271	61270	633	1,191	493	581	920	79	112	31	32	51	299	679	227	267	548
61272	61270	168	315	932	1,098	1,234	0	0	21	21	34	39	89	428	504	708
61273	61270	1,061	1,997	1,936	2,282	3,630	105	149	170	170	290	449	1,018	890	1,048	2,163
61280	61280	1,106	1,276	1,599	1,617	3,027	18	84	71	178	280	306	397	528	541	1,060
61290	61290	1,575	1,357	1,681	1,703	10,487	380	460	421	591	595	441	387	478	482	4,456
61300	61300	117	202	327	439	618	393	675	2,368	3,036	10,274	30	42	79	107	188
61310	61310	851	1,132	1,445	1,732	3,250	109	79	123	123	178	244	348	421	505	956
61320	61320	1,851	1,922	2,224	2,679	3,742	362	614	392	393	581	496	555	585	701	1,095
61331	61330	2,866	2,656	1,312	1,361	2,891	136	288	157	378	316	1,107	1,014	507	526	1,531
61332	61330	1,228	1,138	3,704	3,842	5,930	0	0	168	403	971	474	435	1,430	1,484	3,141
61341	61340	2,218	2,486	642	652	2,392	436	435	1,096	1,317	453	876	952	258	265	1,024
61342	61340	0	0	3,347	3,401	11,217	65	65	767	922	2,310	0	0	1,345	1,382	5,941
61350	61350	1,994	2,377	3,055	3,464	3,898	121	140	141	142	152	974	1,192	1,488	1,676	2,323
61360	61360	148	269	1,940	4,439	9,598	144	135	1,152	1,253	1,400	128	170	1,079	2,495	5,691
61370	61370	20	25	1,373	2,594	3,062	453	268	682	799	997	9	8	471	904	1,824
61380	61380	82	92	734	1,397	1,661	304	112	463	535	600	31	23	293	569	989
61390	61390	362	149	1,038	1,614	2,423	121	158	275	371	476	113	48	354	559	1,444
61400	61400	729	516	938	1,064	4,226	155	156	204	358	560	285	152	298	344	1,597
61410	61410	490	642	1,668	1,772	8,428	233	139	253	581	633	152	199	532	572	4,434
61420	61420	82	76	106	127	172	464	539	1,318	1,868	4,714	30	19	35	45	52
61431	61430	242	682	1,299	1,685	1,863	13	42	40	43	34	73	236	596	776	1,110
61432	61430	1,227	3,461	4,826	6,257	6,929	145	478	562	597	664	491	1,586	2,213	2,883	4,129
61433	61430	259	731	1,348	1,748	2,372	26	85	80	85	68	100	322	618	806	1,172
61441	61440	0	558	438	705	693	2,501	1,592	3,943	4,343	4,480	0	178	190	310	413
61442	61440	0	0	879	1,415	1,480	341	217	7,274	8,011	9,118	0	0	381	622	882
61451	61450	0	0	986	1,912	1,760	719	536	905	991	894	0	0	425	837	1,049
61452	61450	0	0	411	798	1,311	54	40	432	472	589	0	0	178	350	781
61461	61460	0	0	890	1,406	2,761	310	254	406	484	679	0	0	301	481	1,645
61462	61460	352	366	646	1,021	876	59	48	110	131	138	129	124	219	350	522
61470	61470	459	588	1,234	1,687	1,862	154	130	199	218	532	185	162	393	558	1,109
61480	61480	1,249	1,677	2,178	2,191	7,459	73	106	496	766	785	333	524	729	745	2,794
61490	61490	168	172	174	159	166	824	731	1,655	1,765	3,893	58	45	47	42	48
61500	61500	1,045	1,193	1,424	1,731	2,636	61	70	98	116	313	300	341	393	479	769
61510	61510	1,840	3,136	2,910	3,243	7,059	30	200	91	111	388	813	1,245	1,066	1,167	2,210
61520	61520	2,539	2,758	2,747	2,769	5,914	85	242	101	101	368	777	800	776	777	1,733
61531	61530	278	288	1,038	1,056	4,247	907	373	416	647	1,305	83	91	291	294	2,163
61532	61530	619	641	239	243	1,200	38	16	150	234	0	176	193	67	68	370
61541	61540	646	757	2,984	3,056	4,488	441	620	405	517	1,028	256	284	1,299	1,336	2,377
61542	61540	3,153	3,698	2,282	2,337	3,524	60	85	219	280	0	1,453	1,611	993	1,022	1,775
61551	61550	0	0	315	514	1,229	3,679	1,540	1,695	2,034	2,697	0	0	184	298	651
61552	61550	586	792	650	1,061	2,915	455	190	146	175	233	388	497	380	616	1,520
61560	61560	5	0	0	0	4	1,012	2,067	2,731	2,950	4,369	3	0	0	0	1
61570	61570	826	1,677	2,536	3,121	3,505	0	99	25	35	40	474	896	1,240	1,514	1,797

TAZ		TOTAL POPULATION					TOTAL EMPLOYMENT					TOTAL HOUSEHOLDS				
SSAM	RTM	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout
61581	61580	0	0	314	630	8,477	2,772	4,340	4,868	6,738	8,768	0	0	134	274	5,051
61582	61580	0	0	135	270	2,565	0	0	2,103	2,911	4,419	0	0	58	117	1,528
61591	61590	0	0	142	227	288	36	69	322	345	367	0	0	70	112	172
61592	61590	357	620	1,819	2,912	4,265	559	1,083	1,080	1,156	1,172	180	316	894	1,444	2,541
61600	61600	1,779	2,806	2,689	2,944	3,060	97	183	168	203	206	857	1,265	1,165	1,262	1,566
61610	61610	1,326	1,528	1,681	1,847	4,509	97	161	109	110	110	465	429	483	535	1,503
61620	61620	933	1,017	1,164	1,342	2,634	42	60	53	53	91	268	310	348	400	775
61630	61630	3,589	3,690	3,842	4,405	6,479	156	243	179	179	477	1,095	1,057	1,421	1,696	1,913
61640	61640	2,819	2,967	3,428	4,092	5,938	252	282	295	295	407	782	771	879	1,055	1,741
61651	61650	1,559	1,522	2,138	2,542	3,388	0	0	53	59	136	424	410	552	657	992
61652	61650	1,383	1,349	1,157	1,376	2,197	185	231	209	237	755	376	364	298	355	639
61661	61660	912	785	1,046	1,194	2,524	0	0	73	74	74	251	212	288	330	804
61662	61660	449	386	521	595	1,598	178	103	120	120	167	130	109	143	164	509
61671	61670	792	836	2,029	2,749	4,316	323	144	34	43	2,138	399	405	1,018	1,376	2,569
61672	61670	1,293	1,364	2,189	2,965	2,398	3,262	1,458	3,297	4,132	2,560	741	753	1,098	1,485	1,422
61681	61680	620	2,032	1,511	1,683	2,454	144	271	554	614	509	305	1,094	749	833	1,462
61682	61680	757	2,484	3,692	4,111	4,331	9	17	24	27	143	344	1,234	1,830	2,036	2,579
61690	61690	1,132	1,861	1,640	1,643	1,657	61	153	106	112	119	494	870	757	749	803
61700	61700	0	14	0	0	263	121	4,350	4,565	5,350	5,400	0	4	0	0	100
61711	61710	2,256	2,399	2,504	2,628	3,607	293	366	231	231	509	879	920	964	1,015	1,193
61712	61710	1,634	1,738	1,856	1,948	2,783	36	45	128	129	193	611	640	714	752	979
61720	61720	2,289	2,912	3,261	3,703	6,750	130	197	152	152	445	754	917	974	1,104	1,969
61731	61730	0	0	881	1,498	2,774	176	680	1,721	2,156	3,462	0	0	295	524	1,653
61732	61730	311	1,324	1,704	2,900	4,421	453	1,748	2,317	2,904	4,580	40	315	571	1,015	2,375
61740	61740	622	1,063	1,351	2,049	2,060	6	63	48	68	72	217	394	492	747	1,204
61751	61750	2,478	2,203	2,815	2,846	3,842	108	221	72	72	328	583	507	711	721	1,122
61752	61750	2,381	2,116	2,243	2,267	3,132	46	95	102	102	473	713	619	566	574	970
61761	61760	470	379	1,103	1,399	2,634	255	183	191	530	1,281	142	117	367	476	1,570
61762	61760	509	410	374	474	753	0	0	91	252	108	142	117	125	162	226
61771	61770	218	477	475	641	730	5,780	4,508	6,087	7,089	7,570	45	112	129	181	332
61772	61770	73	159	177	239	356	0	0	0	0	451	9	21	48	68	106
61780	61780	1,264	1,128	1,263	1,330	2,280	85	66	289	490	531	316	296	314	329	665
61790	61790	2,931	3,532	3,488	3,940	4,647	811	716	920	921	1,300	1,069	1,198	1,226	1,395	1,559
61800	61800	1,917	1,873	2,257	2,269	3,114	115	187	144	144	306	505	485	572	576	923
61810	61810	1,698	1,575	1,792	1,824	3,112	24	93	27	27	266	446	403	460	468	910
61820	61820	133	379	356	384	478	443	547	805	1,021	1,406	62	118	97	97	137
61831	61830	2,003	2,183	2,399	2,887	4,706	125	153	284	284	563	594	631	870	1,079	1,084
61832	61830	704	767	2,304	2,771	1,716	232	285	414	414	359	243	258	835	1,036	446
61840	61840	2,809	2,915	3,069	3,132	4,470	501	308	399	772	1,763	923	853	867	881	1,389
61850	61850	15	7	0	0	0	1,527	1,050	1,648	1,660	2,141	4	2	0	0	0
61860	61860	3,681	2,971	3,862	3,885	4,834	123	183	138	139	635	939	711	929	943	1,407
61870	61870	1,152	1,244	1,405	1,426	2,537	134	95	162	162	181	325	316	363	371	741
61881	61880	1,925	1,409	1,616	1,634	2,020	0	0	117	117	283	490	341	506	536	589
61882	61880	1,925	1,409	2,230	2,255	2,413	271	335	263	263	717	511	355	698	740	711
61890	61890	3,651	3,039	3,885	3,928	4,990	235	244	265	266	655	992	721	1,206	1,285	1,464
61900	61900	3,640	3,024	3,778	3,821	4,136	73	184	92	98	396	982	804	962	974	1,195
61910	61910	2,753	2,759	3,024	3,259	4,521	292	207	330	331	436	772	732	833	906	1,313
61920	61920	1,937	2,015	2,617	3,717	4,732	125	191	696	728	816	587	572	924	1,358	1,460
61930	61930	10	7	3	0	0	916	957	1,252	1,405	1,999	2	2	1	0	0
62010	62010	10	0	0	0	0	874	1,194	2,364	2,770	3,282	5	0	0	0	0
62020	62020	515	361	460	464	479	1,376	1,241	1,786	1,967	2,775	128	100	116	117	141
62030	62030	1,728	1,425	1,747	1,952	3,319	126	112	136	136	348	471	385	719	863	976
62040	62040	2,049	1,948	2,220	2,404	3,081	380	220	418	419	521	569	520	581	632	891
62050	62050	2,870	2,569	2,855	2,898	3,976	214	213	229	230	416	773	689	741	754	1,162
62061	62060	0	0	0	0	0	214	253	0	0	0	0	0	0	0	0
62062	62060	974	2,417	3,732	4,433	4,543	79	94	331	333	514	513	995	1,575	1,897	1,337
62071	62070	2,521	2,317	2,854	2,897	2,873	262	231	267	269	482	674	575	712	728	794
62072	62070	711	653	667	677	736	0	0	65	65	113	190	162	167	170	203
62081	62080	756	868	1,649	1,671	1,487	259	236	175	225	409	192	215	567	577	408
62082	62080	1,310	1,504	1,898	1,923	1,952	294	268	249	320	605	419	469	652	664	465
62083	62080	2,972	3,413	3,644	3,692	4,158	624	569	630	810	1,521	1,134	1,271	1,253	1,276	1,152
62090	62090	46	0	31	18	24	2,255	2,459	2,713	3,216	5,413	18	0	6	3	8
62100	62100	31	11	0	0	0	4,024	3,601	3,987	4,226	5,846	10	3	0	0	0
62111	62110	1,772	1,417	2,316	2,648	3,473	71	108	166	176	324	472	349	704	828	950
62112	62110	2,256	1,804	2,621	2,997	5,354	167	251	227	241	580	679	503	797	937	1,629
62120	62120	811	1,264	1,178	1,199	1,348	42	108	57	61	133	222	314	291	291	397
62130	62130	2,942	2,393	2,931	2,965	3,183	212	189	226	227	405	767	611	723	733	943
62140	62140	2,416	2,384	2,401	2,454	2,538	61	167	61	61	272	735	707	668	675	748
62150	62150	2,570	2,554	3,736	3,821	3,957	366	505	449	471	1,119	827	796	1,189	1,223	1,050
62160	62160	3,227	2,738	3,364	3,388	3,436	253	266	281	282	448	790	660	885	905	927
62170	62170	1,127	952	1,280	1,301	1,546	547	542	653	673	1,122	296	211	300	310	429
62180	62180	0	0	0	0	0	1,456	929	1,274	1,580	1,681	0	0	0	0	0
62190	62190	1,800	1,413	1,856	2,059	2,197	110	98	118	118	682	490	348	568	658	601

TAZ		TOTAL POPULATION					TOTAL EMPLOYMENT					TOTAL HOUSEHOLDS				
SSAM	RTM	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout
62200	62200	1,096	1,042	2,889	4,201	4,257	36	66	60	76	95	463	443	1,218	1,785	1,183
62210	62210	1,203	1,127	1,774	2,385	2,971	345	230	375	376	385	300	292	539	744	520
62220	62220	2,544	2,532	2,699	2,711	3,043	97	149	112	113	323	687	735	729	728	890
62230	62230	2,712	2,679	2,896	2,908	2,986	172	167	198	199	402	714	668	720	728	910
62241	62240	0	0	0	0	0	2,966	2,032	3,324	3,326	4,244	0	0	0	0	0
62242	62240	5	29	0	11	12	1,528	1,047	1,613	1,615	2,171	2	6	0	4	2
62250	62250	15	85	36	46	46	1,862	1,906	2,047	2,447	4,151	4	17	6	8	3
62261	62260	1,888	1,855	1,894	2,023	2,522	1,513	996	1,009	1,150	1,231	659	670	582	623	828
62262	62260	1,742	1,712	2,401	2,565	2,100	0	0	460	525	469	422	428	738	790	569
62271	62270	0	0	300	480	0	1,753	745	1,352	1,356	1,983	0	0	57	94	0
62272	62270	0	0	200	320	826	1,554	661	1,205	1,210	1,754	0	0	38	62	208
62280	62280	2,519	2,375	2,794	3,114	4,700	115	140	131	132	137	819	777	913	1,017	1,899
62291	62290	1,461	1,484	1,465	1,477	1,746	0	0	100	101	215	402	376	382	387	499
62292	62290	2,383	2,420	2,767	2,790	2,963	272	286	214	214	468	685	641	722	732	931
62300	62300	3,350	2,582	3,350	3,383	3,425	123	187	129	130	379	875	657	880	897	859
62310	62310	3,227	2,758	3,204	3,227	3,405	103	192	118	126	460	833	676	830	847	913
62320	62320	46	10	0	0	0	891	1,327	1,325	1,585	1,917	14	2	0	0	0
62331	62330	732	1,223	1,883	1,956	2,300	549	496	693	865	1,332	384	666	918	952	762
62332	62330	624	1,041	1,215	1,262	1,134	1,738	1,569	1,831	2,286	3,790	278	482	592	614	362
62340	62340	3,650	3,568	4,089	4,194	4,424	334	265	122	123	503	979	903	1,016	1,047	1,318
62350	62350	1,835	1,861	1,958	2,019	2,154	140	125	155	156	571	512	526	529	545	632
62361	62360	2,524	2,600	2,501	2,525	2,410	677	491	364	538	612	921	908	757	759	756
62362	62360	1,188	1,224	1,762	1,778	1,992	159	115	269	396	342	324	319	533	535	550
62370	62370	4,069	2,683	4,090	4,196	4,617	322	262	361	365	891	1,020	655	972	1,004	1,011
62380	62380	229	129	133	113	337	1,107	291	1,244	1,246	1,271	65	37	25	21	93
62391	62390	1,429	1,245	1,394	1,439	1,585	282	197	196	197	436	367	295	349	364	434
62392	62390	1,747	1,522	2,027	2,092	2,256	222	155	363	363	709	448	361	507	530	617
62400	62400	1,422	1,687	1,520	1,526	1,779	124	152	135	135	163	483	577	523	525	586
62410	62410	1,264	1,713	2,522	2,592	3,667	524	572	1,236	1,350	2,091	411	620	957	995	1,220
62420	62420	102	127	2,798	3,994	5,596	675	542	1,762	2,151	2,662	51	35	1,155	1,671	2,088
62430	62430	2,162	3,066	2,985	3,045	3,087	91	219	112	113	118	994	1,329	1,266	1,276	1,243
62440	62440	3,263	2,875	3,529	3,572	4,231	154	222	181	182	501	899	733	902	917	1,277
62450	62450	3,034	3,354	3,742	3,776	3,915	274	266	350	351	617	811	931	969	973	1,305
62461	62460	2,204	2,260	3,007	3,032	2,937	0	0	102	102	425	553	589	727	732	896
62462	62460	1,803	1,849	2,170	2,189	2,586	194	298	176	177	754	452	482	525	529	797
62470	62470	82	196	714	1,206	2,180	618	459	703	705	1,120	38	94	357	609	1,051
62481	62480	3,092	3,427	3,144	3,197	3,171	225	340	180	200	376	1,054	1,188	968	984	1,013
62482	62480	2,430	2,693	3,114	3,167	3,227	56	85	238	264	406	619	698	959	975	893
62491	62490	2,672	2,328	3,412	3,466	3,380	0	0	231	232	414	652	542	842	859	926
62492	62490	2,370	2,065	2,105	2,137	2,400	320	355	141	141	262	678	564	519	530	593
62501	62500	1,768	1,619	1,695	1,710	1,865	74	102	94	95	201	440	393	447	458	497
62502	62500	1,699	1,555	2,042	2,060	2,060	150	207	158	158	339	423	378	538	552	552
62511	62510	1,861	1,853	1,319	1,361	2,082	0	0	71	72	176	497	454	390	412	550
62512	62510	1,463	1,456	1,992	2,056	2,615	187	272	128	128	329	423	387	589	623	722
62520	62520	1,871	1,931	2,201	2,421	2,793	228	271	262	262	378	577	594	736	823	891
62530	62530	1,688	1,635	1,879	1,901	2,010	130	123	154	156	214	477	442	501	509	606
62540	62540	5	14	0	0	0	679	1,200	1,390	1,826	2,503	2	3	0	0	0
62550	62550	2,060	2,064	2,371	2,386	2,559	306	201	349	350	503	581	569	608	599	797
62560	62560	1,147	1,211	1,495	1,607	1,708	67	76	83	83	108	309	304	372	402	527
62570	62570	178	146	390	519	569	1,027	1,050	1,321	1,430	1,799	39	34	86	116	136
62581	62580	1,526	1,625	1,574	1,616	1,813	0	0	90	90	255	385	406	402	413	480
62582	62580	1,721	1,832	2,088	2,144	2,497	153	245	97	98	317	490	517	533	548	709
62590	62590	2,906	2,993	3,089	3,112	3,691	146	368	235	236	699	746	765	761	769	997
62601	62600	1,277	1,306	1,337	1,343	1,910	434	290	194	360	550	355	340	371	377	525
62602	62600	1,277	1,306	1,310	1,316	1,666	95	64	160	295	436	355	340	363	370	447
62610	62610	719	1,485	2,453	2,892	3,331	132	89	176	176	251	212	385	722	869	982
62620	62620	831	1,901	2,143	2,227	2,735	91	191	251	251	295	228	560	604	626	882
62630	62630	1,438	2,817	3,161	3,335	4,034	216	309	320	320	420	366	795	925	985	1,216
62641	62640	936	1,665	2,012	2,071	2,114	138	139	152	152	167	319	578	639	652	676
62642	62640	1,527	2,716	2,812	2,893	2,956	169	169	279	280	269	499	903	894	911	939
62651	62650	361	460	418	421	479	699	428	365	591	956	170	220	144	144	162
62652	62650	2,922	3,723	3,916	3,944	4,028	29	18	122	197	202	1,043	1,353	1,352	1,345	1,091
62660	62660	275	1,599	2,203	2,453	3,235	12	94	71	72	166	73	466	715	812	1,029
62670	62670	82	1,857	2,473	2,881	2,983	109	110	230	231	331	35	549	764	900	968
62680	62680	953	1,315	3,141	4,192	4,223	24	100	138	200	210	246	384	772	1,037	1,165
62690	62690	755	2,717	2,442	2,507	3,044	73	174	189	198	335	187	746	646	665	823
62700	62700	1,244	1,340	1,325	1,346	1,790	79	98	88	89	188	354	335	343	351	485
62710	62710	1,688	1,628	1,723	2,008	3,047	138	106	151	152	177	487	453	492	577	864
62721	62720	316	1,046	2,059	2,492	2,566	0	0	342	393	714	78	213	457	558	1,206
62722	62720	0	0	0	0	0	3,188	3,731	3,428	3,947	5,320	0	0	0	0	0
62730	62730	1,703	2,524	2,950	3,105	3,597	156	149	227	228	329	502	705	818	865	1,064
62741	62740	1,732	2,731	2,934	3,112	3,184	86	80	253	253	314	534	844	906	955	1,000
62742	62740	1,664	2,623	2,599	2,758	2,830	634	584	610	612	1,026	578	915	803	846	1,039

TAZ		TOTAL POPULATION					TOTAL EMPLOYMENT					TOTAL HOUSEHOLDS				
SSAM	RTM	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout
63010	63010	1,111	1,078	1,410	1,635	3,348	85	72	485	756	791	291	305	385	449	951
63020	63020	3,670	3,831	4,245	4,638	5,468	420	291	463	464	504	934	1,042	1,077	1,178	1,531
63030	63030	3,222	3,345	3,411	3,518	3,845	402	236	439	441	605	795	915	921	948	1,058
63040	63040	1,876	1,728	1,873	1,905	2,080	79	102	82	82	262	471	465	462	471	580
63050	63050	51	4	31	15	16	657	792	1,123	1,253	2,271	16	1	7	3	5
63061	63060	925	1,704	1,483	1,484	1,837	0	0	139	164	0	386	633	608	615	636
63062	63060	416	766	1,882	1,882	1,870	1,425	592	523	613	980	208	341	772	780	787
63070	63070	510	412	355	346	410	228	197	342	411	715	129	117	99	96	126
63080	63080	1,315	1,738	1,820	1,959	2,189	215	173	249	250	355	384	475	490	529	615
63090	63090	1,341	1,516	1,671	1,739	1,766	295	271	320	321	409	407	478	498	516	478
63100	63100	2,207	2,423	2,489	2,545	2,674	175	187	192	193	427	618	692	678	693	733
63110	63110	1,167	1,168	1,251	1,322	1,907	399	204	358	346	1,432	322	345	344	362	541
63121	63120	564	949	1,386	1,647	2,449	179	131	200	238	106	207	366	469	551	1,073
63122	63120	124	208	197	234	403	32	23	150	178	339	42	75	67	78	124
63131	63130	0	0	1,508	1,602	7,911	990	595	398	474	472	0	0	595	640	4,190
63132	63130	0	0	757	804	5,506	1,425	856	1,110	1,322	2,118	0	0	299	322	2,916
63133	63130	1,632	1,866	305	324	2,008	0	0	205	244	183	671	723	120	130	961
63140	63140	2,320	2,301	2,376	2,399	3,455	269	183	292	293	340	707	745	709	706	1,364
63150	63150	1,932	2,208	2,493	2,621	2,879	222	200	262	263	290	543	673	699	728	928
63160	63160	280	229	510	1,035	1,464	6	35	13	17	66	128	98	200	405	465
63170	63170	566	825	955	1,227	1,973	67	72	73	73	150	158	216	249	324	557
63181	63180	724	925	899	1,090	1,142	342	314	273	274	413	181	237	257	314	313
63182	63180	785	1,002	1,856	2,247	2,506	51	47	158	158	221	230	301	529	647	750
63191	63190	1,732	1,577	1,599	1,684	1,660	378	333	180	294	322	575	535	488	515	634
63192	63190	1,062	967	1,362	1,435	1,911	89	78	134	220	288	258	240	415	439	592
63201	63200	1,407	1,438	1,520	1,596	1,846	0	0	186	187	198	406	428	429	449	570
63202	63200	826	844	999	1,049	1,132	308	253	156	156	182	238	251	282	295	351
63210	63210	846	1,644	1,459	1,863	2,170	121	109	133	134	136	205	433	364	469	682
63220	63220	785	1,806	2,112	2,567	3,863	103	389	520	728	1,073	192	516	549	671	1,581
63230	63230	5	0	0	0	0	1,122	2,531	2,534	2,676	4,030	2	0	0	0	0
63240	63240	143	191	0	0	6	18	68	1,911	2,131	3,054	31	57	0	0	2
63250	63250	5	0	0	0	0	1,941	2,913	3,095	3,227	4,951	2	0	0	0	0
63260	63260	2,416	2,291	2,494	2,506	2,811	330	229	361	362	389	714	628	728	738	794
63270	63270	1,912	2,182	2,278	2,377	2,736	161	209	187	188	290	562	609	632	663	779
63280	63280	2,498	2,487	2,557	2,656	3,230	294	190	317	318	413	693	681	686	714	939
63291	63290	159	241	1,697	3,995	6,516	64	36	161	152	333	51	87	566	1,347	2,408
63292	63290	106	160	1,007	2,370	3,949	33	19	1,339	1,264	1,382	34	58	336	799	1,451
63300	63300	10	0	0	0	0	2,176	3,047	2,812	3,178	4,748	5	0	0	0	0
63311	63310	129	170	2,557	4,720	5,258	6	11	149	230	327	34	64	753	1,403	1,644
63312	63310	106	139	1,830	3,378	3,097	43	81	105	162	267	29	55	539	1,004	861
63320	63320	5	0	0	0	0	2,675	2,766	3,162	3,346	4,559	2	0	0	0	0
63331	63330	659	731	1,547	1,680	845	939	488	1,420	1,647	2,112	261	296	614	676	276
63332	63330	1,279	1,419	857	931	1,912	140	73	194	224	467	444	505	340	375	570
63340	63340	3,038	3,045	3,259	3,605	3,950	517	395	558	559	634	989	954	1,021	1,135	1,181
63350	63350	1,769	1,767	1,894	2,025	2,399	258	277	294	295	359	457	456	469	503	689
63360	63360	184	181	246	284	307	97	201	144	169	311	63	44	77	90	88
63370	63370	82	125	1,119	3,135	4,024	121	90	133	134	145	17	28	364	1,034	1,281
63381	63380	92	117	98	451	1,773	1	1	801	1,005	1,322	38	40	32	147	555
63382	63380	249	317	336	1,549	6,727	54	83	461	579	780	101	109	109	505	2,270
63390	63390	133	185	185	451	2,462	140	93	53	454	753	57	51	51	126	832
63401	63400	0	0	1,267	1,305	130	1,169	251	1,087	1,169	1,732	0	0	459	484	65
63402	63400	1,269	1,328	2,310	2,378	4,885	36	8	384	413	384	411	403	836	882	1,454
63410	63410	2,039	2,682	2,974	3,176	3,267	269	359	378	601	685	622	872	960	1,024	1,180
63420	63420	1,310	1,681	1,960	2,732	2,763	79	145	160	206	358	434	552	681	959	825
63431	63430	1,178	1,584	4,702	5,050	3,229	0	0	111	237	237	520	637	2,087	2,272	1,095
63432	63430	352	473	1,826	1,960	4,300	709	304	740	1,582	2,034	173	212	810	882	1,258
63440	63440	1,973	2,181	2,436	2,536	3,193	91	128	103	103	221	517	600	688	721	918
63450	63450	357	454	454	800	6,764	91	143	99	399	451	120	145	138	244	2,157
63460	63460	1,122	1,294	1,375	1,436	2,063	48	76	56	56	102	343	383	396	413	595
63470	63470	1,244	2,132	3,955	6,944	7,483	827	317	1,348	1,758	1,795	493	714	1,549	2,779	2,963
63481	63480	115	118	47	52	77	159	125	66	66	189	32	31	12	13	23
63482	63480	1,304	1,339	985	1,090	1,668	0	0	246	246	448	336	328	252	281	483
63483	63480	1,840	1,891	1,860	2,059	2,217	61	48	182	182	355	504	492	475	530	635
63484	63480	498	512	1,429	1,582	1,246	23	18	93	93	67	158	154	365	407	398
63485	63480	77	79	26	28	43	68	53	140	140	305	21	21	7	7	13
63486	63480	0	0	5	5	7	447	351	229	229	688	0	0	1	1	2
63490	63490	2,590	2,524	2,801	2,802	3,122	185	275	212	212	621	732	704	752	752	903
63501	63500	1,948	1,864	2,013	2,030	2,129	151	198	212	230	395	557	534	561	555	643
63502	63500	2,028	1,941	2,083	2,099	2,001	157	206	177	191	333	557	534	581	574	637
63511	63510	42	60	681	1,056	1,162	180	207	343	565	492	21	27	239	381	400
63512	63510	2,069	2,950	2,537	3,938	3,923	229	264	316	519	619	673	881	892	1,418	1,548
63520	63520	362	520	673	2,870	3,039	1,760	917	1,960	2,060	2,545	99	143	222	965	825
63531	63530	194	240	390	634	1,626	35	144	93	128	213	51	73	112	184	581

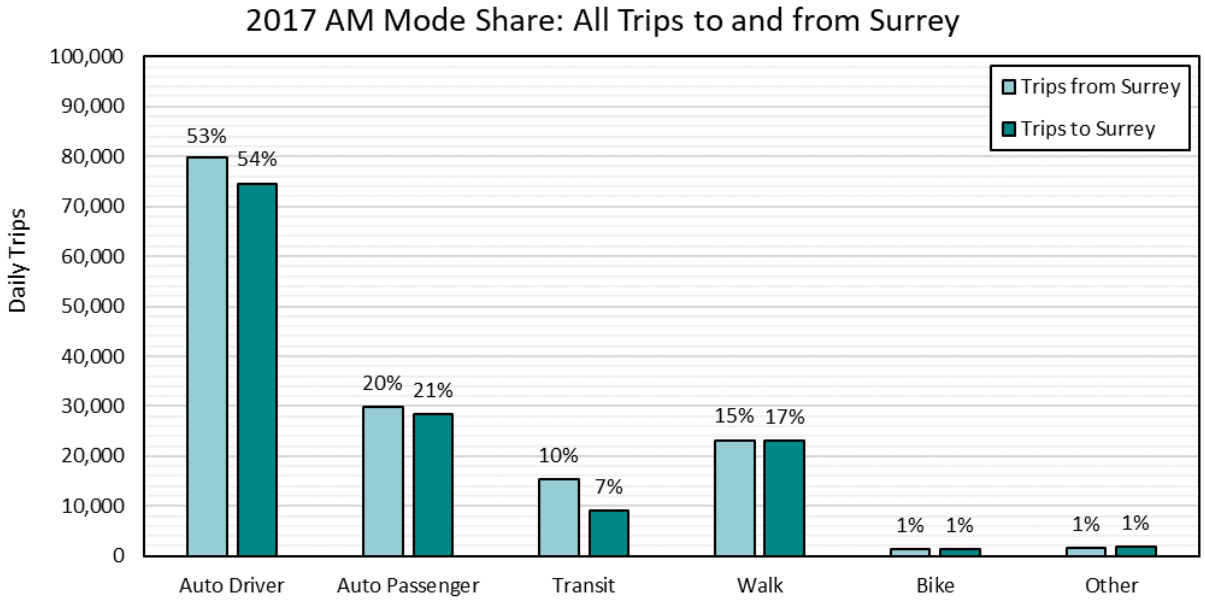
TAZ		TOTAL POPULATION					TOTAL EMPLOYMENT					TOTAL HOUSEHOLDS				
SSAM	RTM	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout
63532	63530	153	188	1,009	1,639	3,964	44	183	99	136	213	40	57	290	476	1,429
63540	63540	1,545	1,458	1,697	1,740	1,835	115	380	197	240	300	479	414	505	523	572
63550	63550	602	1,460	1,409	2,676	2,680	18	86	20	20	23	152	407	487	945	977
63560	63560	153	149	1,030	2,386	3,601	146	429	261	329	792	34	43	295	683	1,295
63571	63570	1,056	1,826	1,971	2,170	5,820	0	0	101	101	193	285	486	509	566	1,828
63572	63570	264	456	492	542	578	137	312	54	54	112	63	107	127	141	168
63581	63580	83	111	117	631	2,717	8	16	45	68	59	30	36	36	198	982
63582	63580	133	178	170	916	4,077	29	58	34	51	59	48	57	53	287	1,473
63583	63580	250	333	295	1,597	7,106	20	40	307	456	447	91	107	92	501	2,567
63584	63580	89	118	158	855	3,860	34	67	11	17	59	32	38	49	268	1,392
63591	63590	76	88	2,691	5,637	4,799	8	53	126	127	185	24	26	812	1,722	1,576
63592	63590	123	143	1,134	2,376	2,326	0	0	68	69	140	41	46	342	726	764
63593	63590	117	135	1,123	2,353	3,316	29	201	166	168	303	38	42	339	719	987
63601	63600	493	672	415	460	801	0	0	59	59	91	138	200	121	134	223
63602	63600	1,653	2,253	3,257	3,609	3,458	51	78	186	186	318	446	647	946	1,052	1,054
63603	63600	754	1,028	915	1,013	1,235	234	357	144	144	477	227	329	266	295	367
63611	63610	553	1,316	2,501	2,655	3,410	59	140	81	81	169	223	488	806	845	1,189
63612	63610	1,074	2,554	2,348	2,492	3,196	93	219	210	210	482	396	867	757	794	1,099
63621	63620	202	175	2,642	3,652	4,513	0	0	3	4	28	55	60	901	1,259	1,621
63622	63620	99	86	3,155	4,360	3,522	18	70	470	576	594	29	31	1,076	1,504	1,399
63630	63630	551	637	719	741	752	36	118	58	66	120	170	214	228	233	237
63640	63640	1,790	2,419	2,631	2,656	3,163	121	149	180	180	374	602	726	850	871	1,270
63651	63650	69	193	380	671	3,283	120	79	318	319	317	41	97	152	274	1,497
63652	63650	558	1,559	2,483	4,382	1,795	426	282	355	356	446	216	508	991	1,789	721
63661	63660	1,604	1,727	1,997	2,037	2,271	273	239	89	89	281	494	543	618	631	786
63662	63660	2,215	2,386	2,710	2,766	2,575	106	93	154	156	421	655	720	838	856	851
63671	63670	772	1,610	2,724	3,159	3,666	0	0	73	73	263	272	569	909	1,044	1,262
63672	63670	1,314	2,741	2,473	2,868	2,723	91	309	149	150	331	484	1,012	825	948	916
63680	63680	76	88	32	0	0	97	377	1,914	2,046	3,068	37	22	10	0	0
63691	63690	0	0	300	351	806	378	114	0	0	0	0	0	78	91	265
63692	63690	0	0	0	0	0	0	0	20	24	22	0	0	0	0	0
63693	63690	225	257	75	88	197	662	199	944	1,137	1,519	47	118	20	23	56
63694	63690	25	29	8	10	29	11	3	25	31	34	5	13	2	3	9
63700	63700	1,137	1,792	2,103	2,244	2,269	109	106	211	212	265	352	556	659	706	620
63711	63710	756	811	2,078	2,481	1,833	438	270	663	754	561	248	269	603	725	460
63712	63710	1,850	1,984	1,553	1,854	2,755	77	48	77	88	336	504	546	451	542	610
63720	63720	898	1,407	2,298	4,500	5,362	24	83	1,167	1,253	1,255	371	585	976	1,924	2,411
63730	63730	2,855	3,509	4,394	4,578	5,085	144	231	196	197	267	988	1,228	1,526	1,588	1,601
63740	63740	51	31	0	0	12	2,083	2,622	2,972	4,030	6,424	20	7	0	0	4
63750	63750	2,003	2,320	2,461	2,536	2,601	109	142	131	132	228	553	657	662	681	791
63760	63760	1,004	1,210	1,313	1,326	1,373	79	87	145	177	229	304	409	424	424	452
63770	63770	678	932	1,178	3,000	3,348	12	233	88	135	409	241	327	474	1,231	728
63781	63780	355	998	1,704	1,793	1,497	101	153	305	355	276	129	388	831	869	632
63782	63780	960	2,698	1,641	1,725	3,099	62	94	52	61	148	485	1,459	800	837	1,354
63791	63790	2,014	2,615	3,005	3,115	3,422	219	295	164	164	195	731	878	848	885	1,374
63792	63790	2,564	3,329	3,256	3,375	3,430	103	139	307	308	292	674	811	918	959	1,084
63801	63800	865	947	896	926	984	0	0	35	35	40	338	363	279	287	354
63802	63800	1,607	1,758	1,962	2,027	2,075	199	166	188	188	215	487	522	612	628	617
63811	63810	451	531	350	369	699	0	0	55	61	77	131	156	99	103	224
63812	63810	1,803	2,122	2,603	2,741	3,563	203	307	252	276	414	524	624	732	768	1,140
63820	63820	56	67	91	105	1,012	654	580	902	942	1,050	27	14	26	30	337
63830	63830	1,596	1,935	2,259	2,439	3,162	110	114	127	127	215	529	603	686	741	995
63840	63840	1,968	2,349	2,559	2,634	2,739	251	251	272	272	534	645	793	797	812	806
63851	63850	992	1,218	1,399	1,471	1,478	57	73	62	62	125	320	392	448	471	445
63852	63850	1,032	1,267	1,313	1,381	1,623	57	73	71	71	142	333	408	420	442	494
63860	63860	617	697	959	1,500	3,381	180	194	431	589	986	192	247	332	521	1,242
63870	63870	280	343	452	570	881	130	35	143	144	183	86	117	148	187	268
63880	63880	1,693	1,961	2,398	2,615	4,303	257	234	277	278	400	747	824	1,064	1,173	1,745
63890	63890	1,631	2,129	2,420	2,540	2,768	134	204	185	186	438	437	552	614	648	886
63900	63900	1,565	1,769	1,993	2,126	2,865	97	104	109	110	227	473	546	585	622	904
63910	63910	1,224	1,462	2,147	2,378	3,568	145	241	645	800	874	450	475	663	731	1,358
63920	63920	1,478	1,777	2,063	2,211	2,588	234	142	259	260	271	519	601	666	712	787
63930	63930	1,040	1,188	1,494	1,885	4,829	293	284	332	333	754	321	374	442	557	1,490
63941	63940	1,631	2,307	2,445	2,692	4,796	1,264	1,328	1,208	1,210	1,376	930	1,251	1,156	1,255	2,666
63942	63940	918	1,298	1,520	1,674	2,873	336	353	632	633	526	399	536	719	780	1,161
63950	63950	1,626	1,871	2,620	3,061	3,976	219	194	239	240	259	510	632	796	927	1,339
63960	63960	1,193	1,471	1,623	1,765	1,918	67	105	77	77	184	386	477	497	538	592
63970	63970	31	15	12	6	7	2,929	2,868	3,150	3,155	4,579	12	5	4	2	2
64020	64020	97	302	422	581	810	18	18	28	28	113	45	77	120	167	221
64030	64030	372	508	642	805	967	18	30	23	23	102	93	130	163	207	265
64040	64040	1,045	1,193	1,297	1,427	1,722	129	70	145	145	157	294	330	350	387	457
64050	64050	632	796	1,082	1,088	1,537	12	52	14	15	315	175	238	311	314	417
64060	64060	576	698	865	1,150	1,776	24	41	26	26	170	176	195	254	341	486

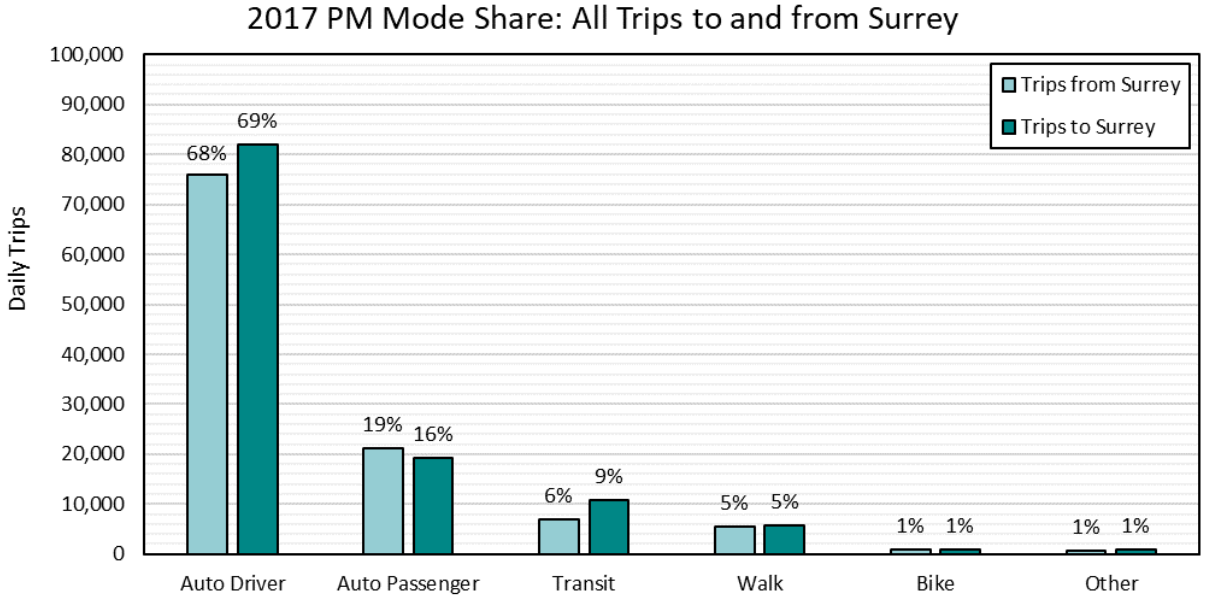
TAZ		TOTAL POPULATION					TOTAL EMPLOYMENT					TOTAL HOUSEHOLDS				
SSAM	RTM	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout
64070	64070	637	618	814	1,476	1,600	30	36	32	32	170	121	196	219	400	347
64081	64080	5	56	111	178	211	198	353	937	1,058	1,844	2	13	26	43	72
64082	64080	3	28	0	0	0	1,365	2,426	2,613	2,952	4,659	1	7	0	0	0
64083	64080	3	28	1	2	4	918	1,632	1,556	1,758	2,477	1	7	0	0	1
64090	64090	693	784	916	1,242	1,713	150	84	165	166	176	219	209	247	339	466
64100	64100	444	310	429	414	429	280	658	519	663	1,581	127	99	84	68	94
64110	64110	1,142	1,070	1,448	1,623	1,650	236	92	163	164	333	387	358	459	509	590
64120	64120	1,611	2,823	2,464	2,659	3,399	210	585	313	315	470	520	1,196	936	991	1,199
64130	64130	234	269	341	377	449	73	51	80	80	98	68	102	116	127	168
64140	64140	1,137	1,699	2,117	2,473	2,665	730	435	502	804	886	415	584	724	846	1,607
64150	64150	877	983	1,192	1,217	1,242	115	100	136	136	283	310	389	451	455	501
64160	64160	846	850	1,130	1,248	1,687	192	50	111	112	268	264	272	338	371	644
64170	64170	811	942	1,251	1,416	1,607	1,323	1,095	1,574	1,914	2,421	370	503	631	705	1,192
64180	64180	821	1,117	1,315	1,382	1,425	455	327	323	324	750	309	472	491	504	494
64190	64190	729	675	838	886	1,053	534	442	929	1,149	1,201	228	218	269	283	413
64200	64200	734	729	870	926	940	138	97	152	153	221	227	234	263	279	326
64210	64210	861	873	1,024	1,113	1,290	151	76	167	168	310	287	290	324	350	479
64220	64220	581	736	784	850	854	172	263	196	197	301	391	418	385	399	476
64230	64230	811	1,029	2,664	3,210	3,608	162	180	301	383	398	521	629	1,594	1,936	1,709
64240	64240	2,029	1,917	2,414	2,598	3,559	271	145	296	297	499	704	665	781	831	1,359
64250	64250	999	817	1,046	1,097	1,291	186	75	105	106	234	277	232	285	296	480
64260	64260	1,901	1,817	2,311	2,509	3,830	169	111	188	189	280	633	610	729	785	1,458
64270	64270	928	851	968	996	1,006	79	59	86	86	127	315	268	295	302	359
64280	64280	1,004	778	1,047	1,058	1,060	212	134	133	134	283	268	224	286	289	382
64290	64290	342	347	383	385	397	515	562	562	563	607	121	131	138	137	134
64300	64300	1,514	1,550	1,801	1,845	3,312	42	108	47	47	100	576	601	690	706	1,336
64310	64310	1,091	1,185	1,695	1,982	2,078	441	357	483	484	487	555	606	858	1,002	1,038
64320	64320	851	676	843	843	867	188	40	7	8	214	196	202	230	228	296
64330	64330	1,356	1,340	1,690	1,834	2,145	299	170	330	330	538	482	481	560	600	819
64340	64340	1,626	1,806	2,275	2,424	2,715	657	282	230	231	897	721	778	897	934	1,095
64350	64350	1,030	983	1,125	1,162	1,716	147	91	162	162	258	319	334	349	355	641
64360	64360	1,091	1,190	1,314	1,367	4,648	358	166	192	192	578	380	420	412	408	1,984
64370	64370	2,926	2,987	3,466	3,581	4,755	280	235	309	310	456	1,095	1,083	1,169	1,185	1,825
64380	64380	851	1,021	1,108	1,169	1,837	79	60	86	86	170	330	405	441	466	715
64390	64390	1,840	1,675	3,029	3,575	6,220	1,660	1,331	2,586	3,085	3,133	1,077	971	1,586	1,855	2,806
64400	64400	372	430	565	626	759	61	38	66	66	87	154	165	203	223	290
64410	64410	1,346	1,547	1,938	2,123	2,620	447	155	192	194	552	485	546	654	712	998
64420	64420	1,269	1,285	1,588	1,720	1,891	152	76	69	69	222	462	448	526	563	706
65010	65010	5	0	0	0	0	1,128	487	1,481	1,686	2,664	2	0	0	0	0
65020	65020	296	350	395	412	424	12	21	15	16	42	75	127	123	126	125
65030	65030	1,290	1,929	2,001	2,123	2,378	149	153	201	202	542	304	520	492	521	761
65040	65040	15	0	31	0	0	1,519	1,346	4,373	4,527	4,672	5	0	10	0	0
65050	65050	20	10	0	0	119	777	1,438	1,648	2,178	3,777	6	4	0	0	40
65060	65060	0	0	0	0	0	431	542	889	1,010	1,478	0	0	0	0	0
65070	65070	10	11	0	0	6	401	786	1,090	1,299	1,668	4	3	0	0	2
65080	65080	489	514	666	768	1,050	279	924	909	1,086	2,172	112	129	164	191	346
65090	65090	770	908	1,074	1,182	1,375	803	1,900	1,875	1,911	4,130	222	247	286	316	469
65100	65100	41	43	46	53	60	0	3	1,657	2,239	2,485	13	10	12	14	20
65110	65110	1,636	1,830	2,291	2,313	2,756	324	354	394	395	577	542	605	691	670	1,023
65120	65120	2,212	2,195	2,217	2,293	2,429	340	201	372	374	670	618	652	604	617	758
65130	65130	1,585	1,767	1,903	2,005	2,179	537	377	301	302	708	502	621	645	666	740
65140	65140	0	5	0	0	0	0	2,145	4,064	4,108	6,298	0	2	0	0	0
65150	65150	66	91	0	0	50	18	112	4,195	5,667	8,402	17	20	0	0	19
65160	65160	902	998	1,034	1,094	1,190	48	59	53	53	193	276	314	307	323	381
65170	65170	143	815	867	981	994	487	1,399	1,500	1,917	3,227	33	330	284	310	367
65180	65180	591	1,237	1,427	1,543	2,585	115	76	156	156	161	160	379	391	419	924
65190	65190	194	508	652	1,045	1,435	12	30	14	15	125	50	181	220	354	510
65200	65200	71	57	0	0	0	109	1,002	2,545	2,620	3,823	20	17	0	0	0
65211	65210	334	2,412	2,789	3,075	3,344	22	68	368	421	903	111	917	982	1,077	1,270
65212	65210	130	938	1,085	1,195	1,009	69	214	62	71	91	41	339	382	419	364
65220	65220	418	415	1,807	2,287	4,789	48	114	166	175	226	118	126	523	668	1,784
65230	65230	484	487	1,710	2,114	2,315	67	29	73	73	79	134	165	515	639	841
65240	65240	1,376	1,573	2,313	2,621	2,714	525	257	295	595	748	447	519	772	875	1,153
65250	65250	36	58	2,195	3,575	3,783	0	227	41	69	125	8	21	731	1,205	1,438
65261	65260	71	76	0	0	0	36	122	1,840	2,017	3,295	28	15	0	0	0
65262	65260	0	0	0	0	0	144	489	1,227	1,344	1,754	0	0	0	0	0
65270	65270	530	1,046	1,076	1,135	1,323	901	402	513	515	1,101	324	414	378	401	1,048
65280	65280	275	663	720	853	3,299	976	2,252	2,310	2,579	4,466	86	384	309	347	1,165
65290	65290	1,795	3,065	2,888	3,069	3,853	245	308	309	310	332	736	1,164	1,004	1,028	1,422
65300	65300	2,447	3,342	3,567	3,623	3,851	871	1,065	984	1,177	1,576	804	1,156	1,154	1,157	1,370
65311	65310	64	349	204	280	343	0	0	25	34	103	20	97	63	87	105
65312	65310	257	1,397	1,946	2,662	3,669	48	105	93	129	141	89	442	603	833	1,325
65320	65320	199	182	569	1,265	3,654	61	74	579	586	713	72	64	190	426	1,378

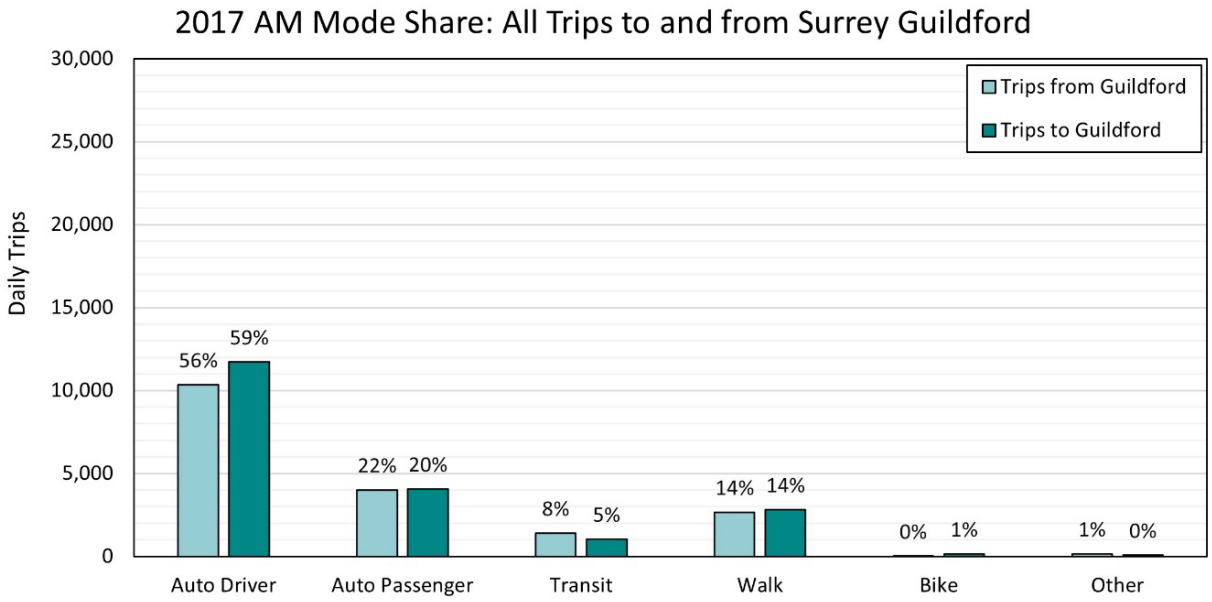
TAZ		TOTAL POPULATION					TOTAL EMPLOYMENT					TOTAL HOUSEHOLDS				
SSAM	RTM	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout	2011	2017	2035	2050	Buildout
65331	65330	46	38	1,682	3,026	3,843	6	2	312	321	498	22	11	486	885	1,363
65332	65330	51	43	441	794	1,662	6	3	16	16	0	25	13	127	232	631
65340	65340	0	0	0	0	0	1,040	2,607	3,939	3,978	7,404	0	0	0	0	0
65350	65350	484	684	865	904	919	892	505	532	558	1,092	241	355	419	438	415
65360	65360	250	330	254	246	264	103	384	221	294	570	80	108	84	82	56
65370	65370	800	1,134	2,341	3,131	3,622	513	134	281	582	594	261	343	753	1,027	1,647
65380	65380	724	740	917	996	1,643	425	232	562	611	1,239	241	253	307	333	740
65390	65390	1,208	1,095	2,605	2,913	3,649	364	257	486	532	662	640	591	1,198	1,308	1,013
65401	65400	0	0	68	113	239	661	894	1,003	1,121	1,558	0	0	16	27	120
65402	65400	41	6	144	240	199	232	314	1,292	1,442	2,203	9	1	33	57	100
65410	65410	15	1,530	2,735	3,513	3,513	30	132	83	95	101	7	503	916	1,180	1,328
65421	65420	122	893	1,188	1,627	2,057	18	391	291	310	503	41	266	370	511	736
65422	65420	113	825	2,026	2,772	2,905	0	0	9	10	6	39	256	631	870	1,046
65430	65430	357	397	397	1,418	7,281	97	26	437	1,157	1,158	137	130	123	440	2,734
65440	65440	209	265	265	1,877	7,043	12	16	345	366	378	69	103	93	663	2,654
65451	65450	72	78	1,053	1,715	3,603	105	58	113	113	50	25	26	318	525	1,323
65452	65450	127	138	292	476	833	10	6	14	15	136	41	42	88	146	309
65461	65460	36	42	983	1,459	1,660	0	16	51	85	112	12	17	333	497	625
65462	65460	173	205	117	173	243	0	0	35	59	57	55	77	40	59	76
65470	65470	158	124	175	211	1,527	957	2,855	6,641	7,840	13,591	40	30	36	41	574
65480	65480	2,111	2,821	3,706	4,221	4,263	889	619	939	1,392	1,736	1,371	1,627	1,957	2,177	3,159
65490	65490	1,091	1,325	1,586	1,768	2,173	103	494	439	439	445	436	471	544	593	1,051
65500	65500	1,672	1,549	2,157	2,403	2,893	260	171	386	486	3,173	590	573	726	796	1,194
65510	65510	805	688	1,559	1,686	2,900	30	41	44	44	52	431	340	685	722	1,173
65520	65520	143	76	72	0	399	54	14	1,467	1,590	4,112	51	28	24	0	152
65531	65530	153	1,181	2,274	3,534	3,364	4	52	49	78	81	41	232	558	880	1,243
65532	65530	10	75	619	961	1,360	2	22	0	0	0	3	15	152	239	497
65541	65540	85	98	2,048	3,549	3,451	0	0	47	304	402	33	27	572	1,004	1,295
65542	65540	22	26	515	893	1,328	12	17	14	90	27	9	8	144	253	501
65551	65550	59	80	1,663	2,686	2,934	9	16	269	307	325	23	24	478	783	1,114
65552	65550	64	87	1,645	2,657	2,590	9	16	134	154	169	25	26	473	774	984
65560	65560	163	211	244	268	340	30	12	34	34	48	55	82	89	97	127
65570	65570	632	669	833	979	979	73	108	80	80	181	222	244	276	319	405
65580	65580	760	826	1,101	1,234	1,289	124	52	138	138	222	367	315	318	325	455
65591	65590	72	51	100	116	666	0	0	452	571	586	19	16	30	35	244
65592	65590	20	14	0	0	0	18	16	443	561	2,162	5	4	0	0	0
65600	65600	1,269	1,149	1,339	1,389	1,439	216	90	237	237	270	392	401	424	432	520
65610	65610	1,178	1,588	1,850	1,973	2,116	79	191	294	430	1,155	467	580	657	698	899
65620	65620	469	535	889	1,104	1,320	48	53	56	56	289	196	190	283	345	519
65631	65630	162	153	175	198	293	167	339	302	387	760	45	53	56	62	90
65632	65630	87	82	120	136	270	27	55	69	88	133	25	30	38	43	82
65641	65640	445	503	241	245	442	706	999	1,102	1,150	3,159	205	209	87	87	162
65642	65640	126	142	592	600	948	490	694	817	853	2,050	54	55	213	213	352
65651	65650	84	115	376	9	5,443	66	123	2,341	2,804	3,187	26	43	130	3	2,043
65652	65650	206	283	22	1	257	49	93	330	396	362	64	104	8	0	79
65660	65660	112	352	373	403	584	175	149	191	192	215	59	180	195	213	203
65670	65670	240	1,340	1,552	1,632	1,659	0	127	103	104	462	124	472	550	580	558
65680	65680	199	1,432	1,896	2,229	3,065	176	215	226	227	255	53	527	629	737	877
65690	65690	556	1,217	1,470	1,596	1,650	152	355	547	772	1,008	222	393	458	489	543

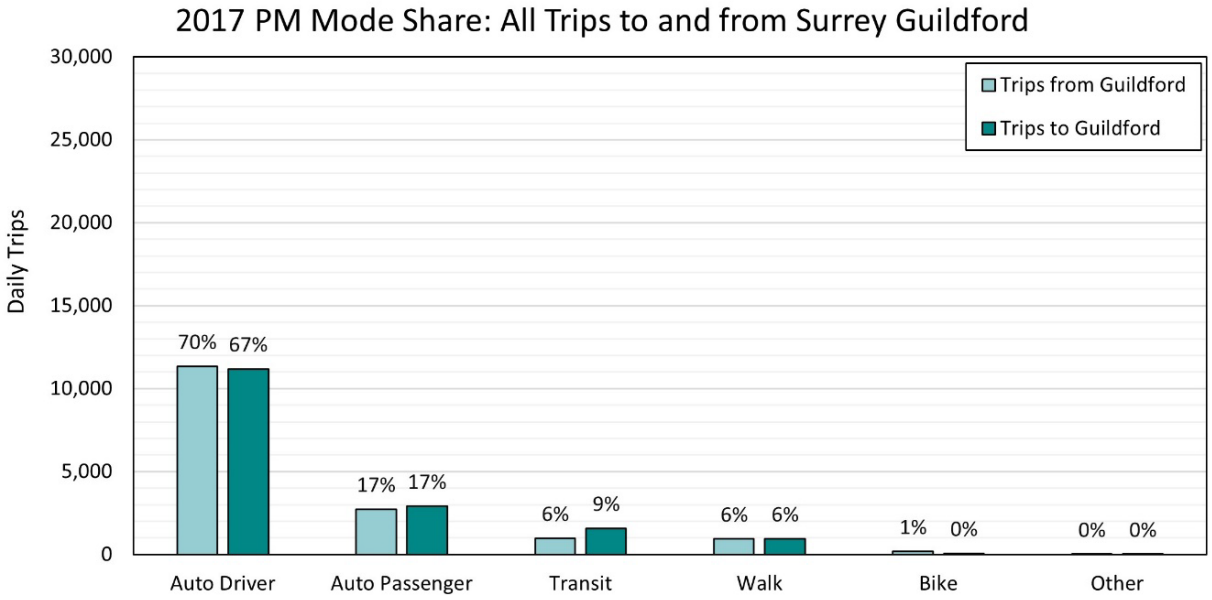
APPENDIX B

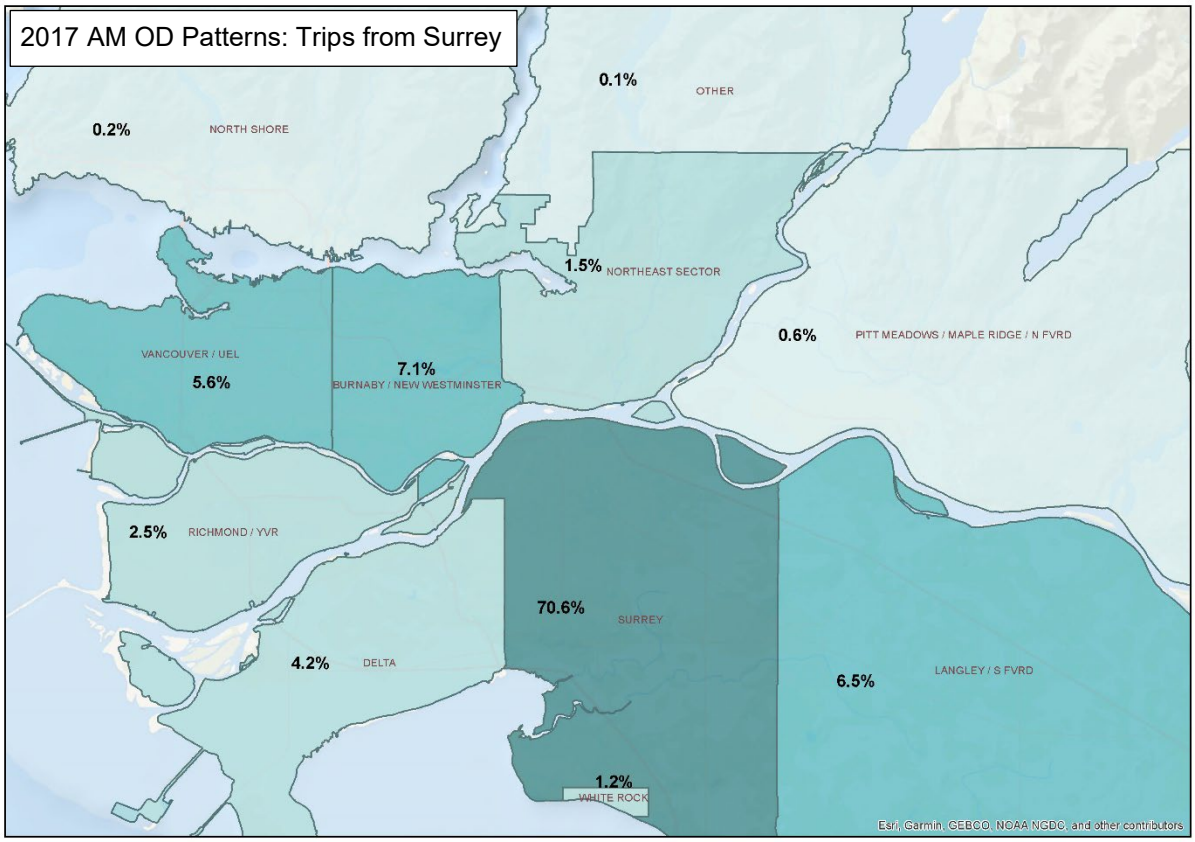
2017 Trip Diary Results

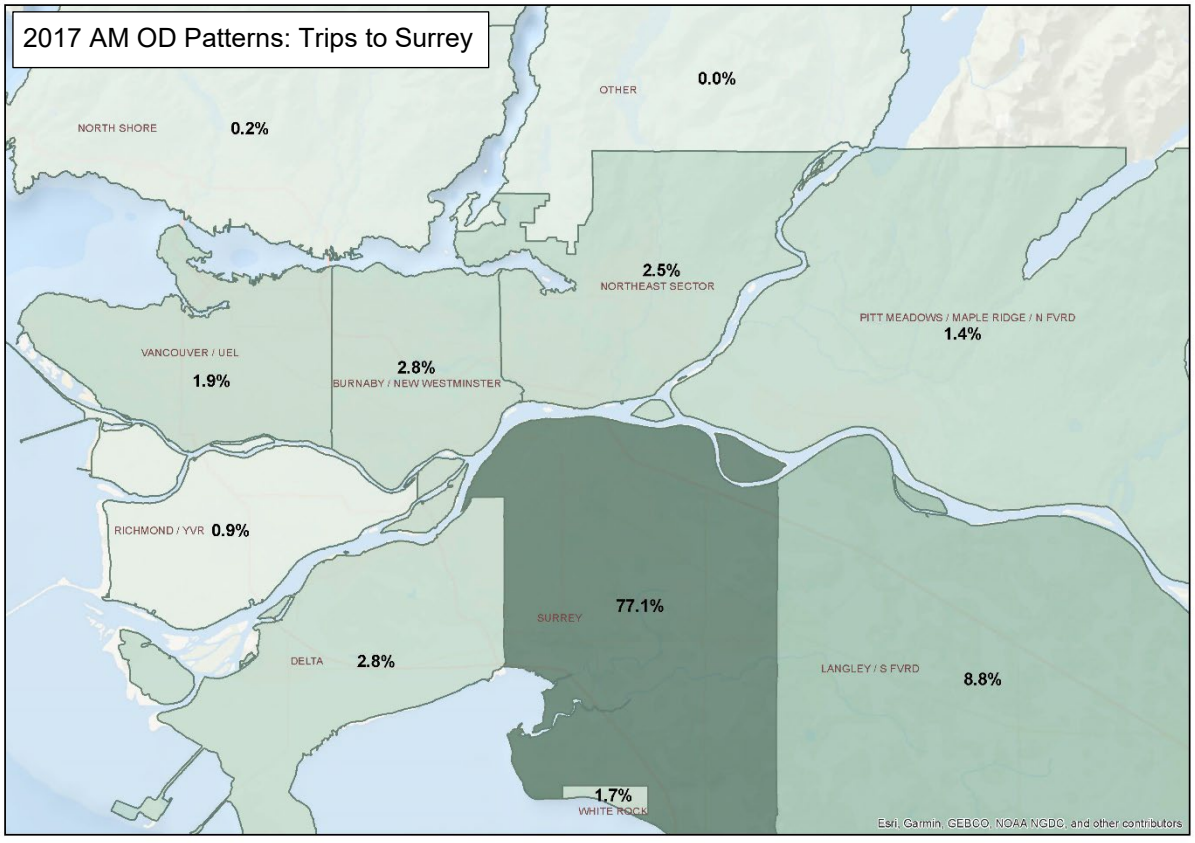

2017 AM Mode Share: All Trips to and from Surrey
Daily Trips
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Trips from Surrey
Trips to Surrey
53%
54%
20%
21%
10%
7%
15%
17%
1%
1%
1%
1%
Auto Driver
Auto Passenger
Transit
Walk
Bike
Other

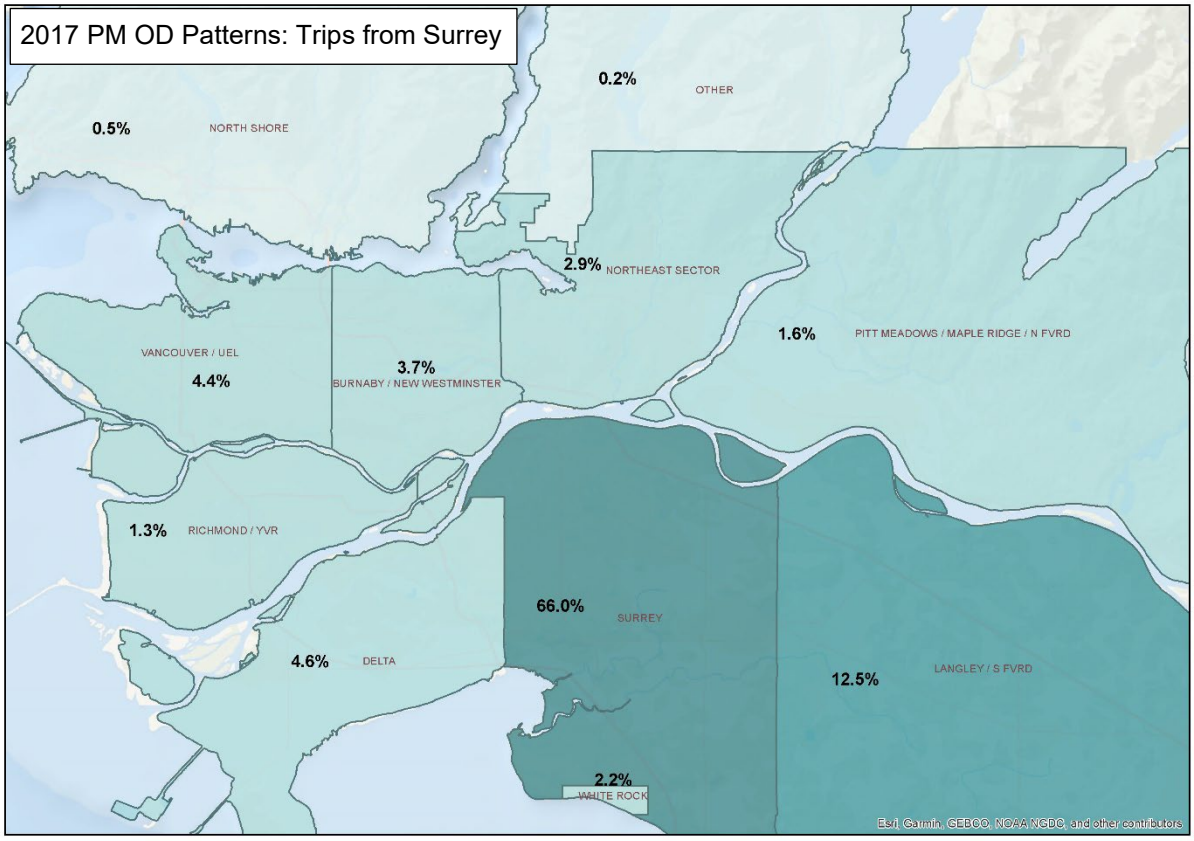

2017 PM Mode Share: All Trips to and from Surrey
Daily Trips
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Trips from Surrey
Trips to Surrey
68%
69%
19%
16%
6%
9%
5%
5%
1%
1%
1%
1%
Auto Driver
Auto Passenger
Transit
Walk
Bike
Other

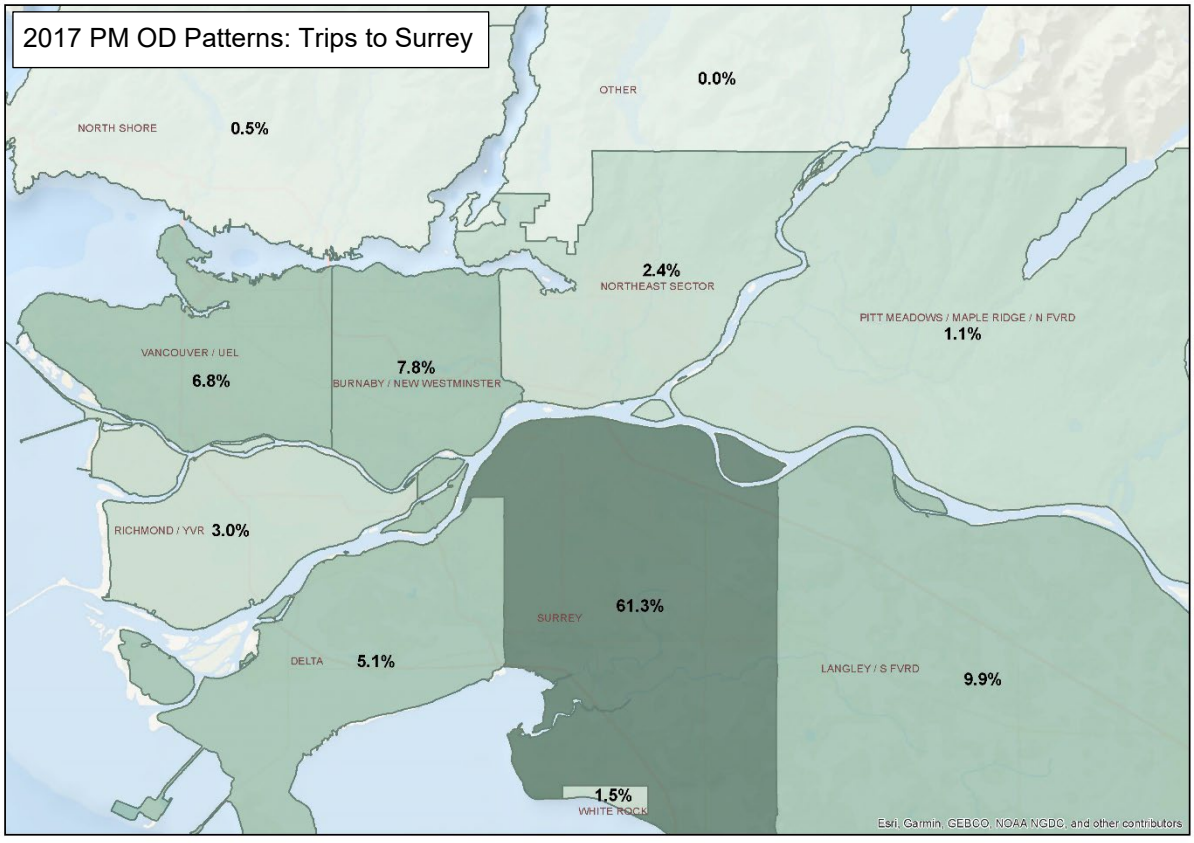

2017 AM Mode Share: All Trips to and from Surrey Guildford
Daily Trips
30,000
25,000
20,000
15,000
10,000
5,000
0
Trips from Guildford
Trips to Guildford
56%
59%
22%
20%
8%
5%
14%
14%
0%
1%
1%
0%
Auto Driver
Auto Passenger
Transit
Walk
Bike
Other


2017 PM Mode Share: All Trips to and from Surrey Guildford
Daily Trips
30,000
25,000
20,000
15,000
10,000
5,000
0
Trips from Guildford
Trips to Guildford
70%
67%
17%
17%
6%
9%
6%
6%
1%
0%
0%
0%
Auto Driver
Auto Passenger
Transit
Walk
Bike
Other


2017 AM OD Patterns: Trips from Surrey
0.1%
OTHER
0.2%
NORTH SHORE
1.5%
NORTHEAST SECTOR
0.6%
PITT MEADOWS / MAPLE RIDGE / N FVRD
VANCOUVER / UEL
5.6%
7.1%
BURNABY / NEW WESTMINSTER
2.5%
RICHMOND / YVR
70.6%
SURREY
4.2%
DELTA
6.5%
LANGLEY / S FVRD
1.2%
WHITE ROCK
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors


2017 AM OD Patterns: Trips to Surrey
OTHER
0.0%
NORTH SHORE
0.2%
2.5%
NORTHEAST SECTOR
PITT MEADOWS / MAPLE RIDGE / N FVRD
1.4%
VANCOUVER / UEL
1.9%
2.8%
BURNABY / NEW WESTMINSTER
RICHMOND / YVR
0.9%
77.1%
SURREY
DELTA
2.8%
LANGLEY / S FVRD
8.8%
1.7%
WHITE ROCK
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors


2017 PM OD Patterns: Trips from Surrey
0.2%
OTHER
0.5%
NORTH SHORE
2.9%
NORTHEAST SECTOR
1.6%
PITT MEADOWS / MAPLE RIDGE / N FVRD
VANCOUVER / UEL
4.4%
3.7%
BURNABY / NEW WESTMINSTER
1.3%
RICHMOND / YVR
66.0%
SURREY
4.6%
DELTA
12.5%
LANGLEY / S FVRD
2.2%
WHITE ROCK
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors


2017 PM OD Patterns: Trips to Surrey
OTHER
0.0%
NORTH SHORE
0.5%
2.4%
NORTHEAST SECTOR
PITT MEADOWS / MAPLE RIDGE / N FVRD
1.1%
VANCOUVER / UEL
6.8%
7.8%
BURNABY / NEW WESTMINSTER
RICHMOND / YVR
3.0%
61.3%
SURREY
DELTA
5.1%
LANGLEY / S FVRD
9.9%
1.5%
WHITE ROCK
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

APPENDIX C

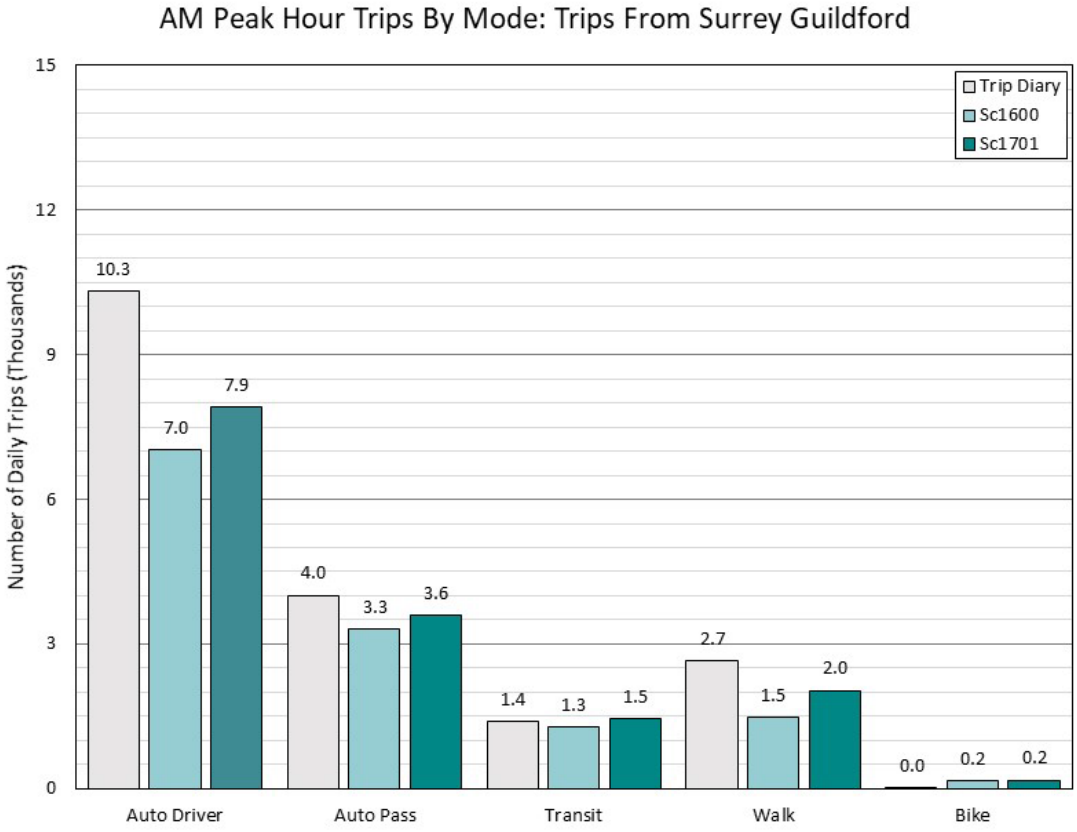
Traffic Count Data

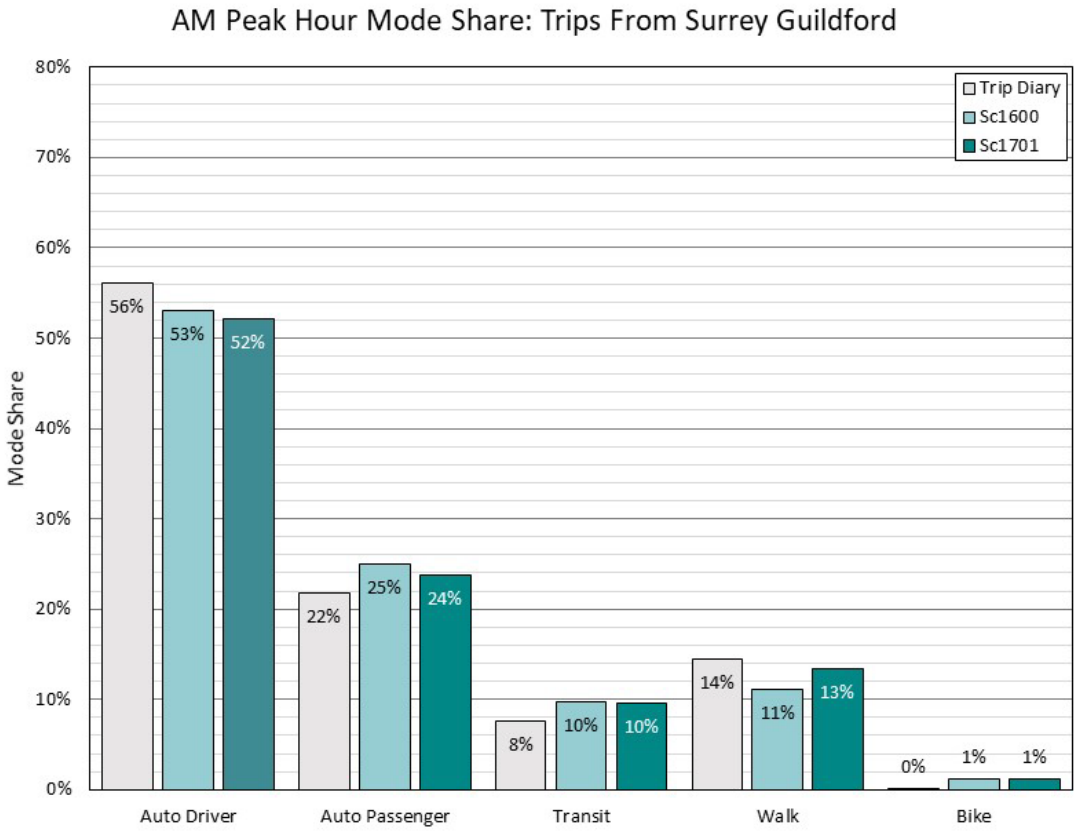
Location	Direction	AM	PM
140 St & 108 Ave	NB	456	423
140 St & 108 Ave	WB	1,298	908
140 St & 108 Ave	SB	330	450
140 St & 108 Ave	EB	810	1,179
140 St & 104 Ave	NB	592	454
140 St & 104 Ave	WB	1,221	848
140 St & 104 Ave	SB	433	424
140 St & 104 Ave	EB	742	1,319
140 St & 102 Ave	NB	671	627
140 St & 102 Ave	SB	495	627
140 St & 102 Ave	EB	202	443
140 St & 100 Ave	NB	732	864
140 St & 100 Ave	WB	363	403
140 St & 100 Ave	SB	517	720
140 St & 100 Ave	EB	197	365
144 St & 104 Ave	NB	179	189
144 St & 104 Ave	WB	1,115	1,023
144 St & 104 Ave	SB	184	259
144 St & 104 Ave	EB	692	1,414
146 St & 104 Ave	NB	69	167
146 St & 104 Ave	WB	1,138	1,099
146 St & 104 Ave	EB	750	1,507
148 St & 108 Ave	NB	305	342
148 St & 108 Ave	WB	1,360	1,226
148 St & 108 Ave	SB	376	306
148 St & 108 Ave	EB	992	1,264
148 St & 104 Ave	NB	521	450
148 St & 104 Ave	WB	837	815
148 St & 104 Ave	SB	274	369
148 St & 104 Ave	EB	802	1,537
148 St & 100 Ave	NB	704	727
148 St & 100 Ave	WB	585	893
148 St & 100 Ave	SB	288	446
148 St & 100 Ave	EB	423	599
150 St & 108 Ave	NB	119	187
150 St & 108 Ave	WB	1,150	1,311
150 St & 108 Ave	EB	1,164	1,632
150 St & 104 Ave	NB	304	615
150 St & 104 Ave	WB	1,055	1,075
150 St & 104 Ave	SB	292	460
150 St & 104 Ave	EB	856	1,437
150 St & 102A Ave	NB	298	544
150 St & 102A Ave	WB	19	261
150 St & 102A Ave	SB	177	491
150 St & 102A Ave	EB	45	144
150 St & 101 Ave	NB	286	528
150 St & 101 Ave	WB	99	381
150 St & 101 Ave	SB	201	533

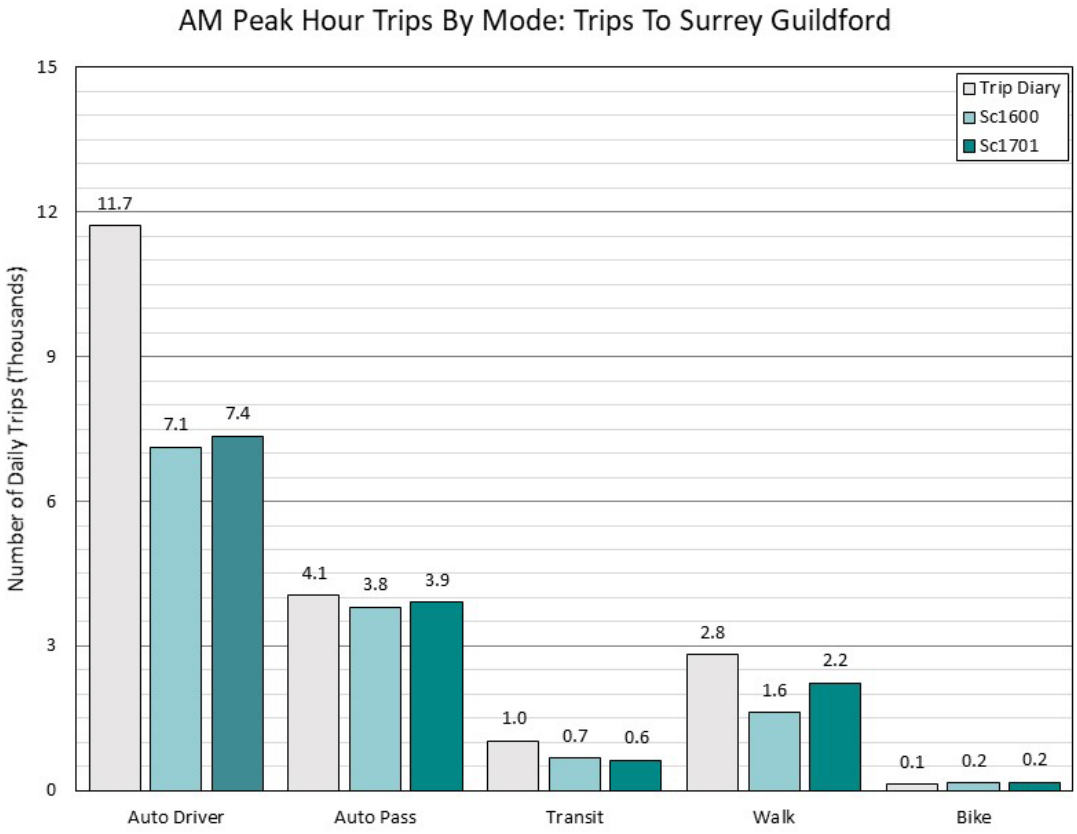
Location	Direction	AM	PM
150 St & 100 Ave	WB	509	469
150 St & 100 Ave	SB	308	401
150 St & 100 Ave	EB	368	674
152 St & 108 Ave	NB	965	1,019
152 St & 108 Ave	WB	553	462
152 St & 108 Ave	SB	1,259	1,617
152 St & 108 Ave	EB	861	1,188
152 St & 105 Ave	NB	1,133	1,269
152 St & 105 Ave	WB	167	230
152 St & 105 Ave	SB	835	859
152 St & 105 Ave	EB	151	358
152 St & 104 Ave	NB	986	1,030
152 St & 104 Ave	WB	924	913
152 St & 104 Ave	SB	1,170	1,070
152 St & 104 Ave	EB	762	1,094
152 St & 102A Ave	NB	1,134	1,342
152 St & 102A Ave	WB	164	353
152 St & 102A Ave	SB	990	1,356
152 St & 102A Ave	EB	66	414
152 St & 101 Ave	NB	1,210	1,439
152 St & 101 Ave	WB	49	246
152 St & 101 Ave	SB	948	1,489
152 St & 101 Ave	EB	74	327
152 St & 100 Ave	NB	1,290	1,422
152 St & 100 Ave	WB	537	549
152 St & 100 Ave	SB	907	1,477
152 St & 100 Ave	EB	337	649
154 St & 104 Ave	NB	554	635
154 St & 104 Ave	WB	1,232	1,235
154 St & 104 Ave	SB	593	870
154 St & 104 Ave	EB	863	1,178
154 St & 102A Ave	NB	363	303
154 St & 102A Ave	WB	7	18
154 St & 102A Ave	SB	322	620
154 St & 102A Ave	EB	157	438
154 St & 100 Ave	NB	127	83
154 St & 100 Ave	WB	698	701
154 St & 100 Ave	SB	239	607
154 St & 100 Ave	EB	290	725
156 St & 104 Ave	NB	392	320
156 St & 104 Ave	WB	1,135	960
156 St & 104 Ave	SB	259	240
156 St & 104 Ave	EB	1,026	1,550
156 St & 100 Ave	NB	480	530
156 St & 100 Ave	WB	494	466
156 St & 100 Ave	SB	375	469
156 St & 100 Ave	EB	345	769

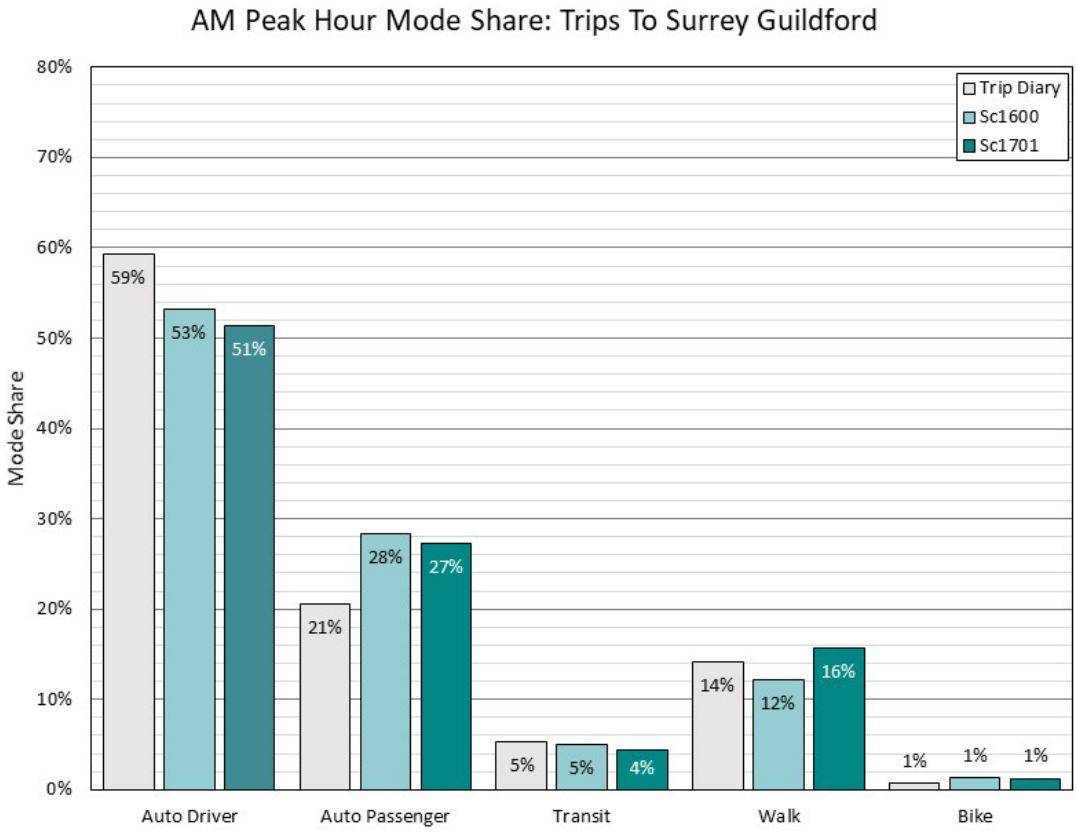
APPENDIX D

Trips by Mode and Mode Share Validation

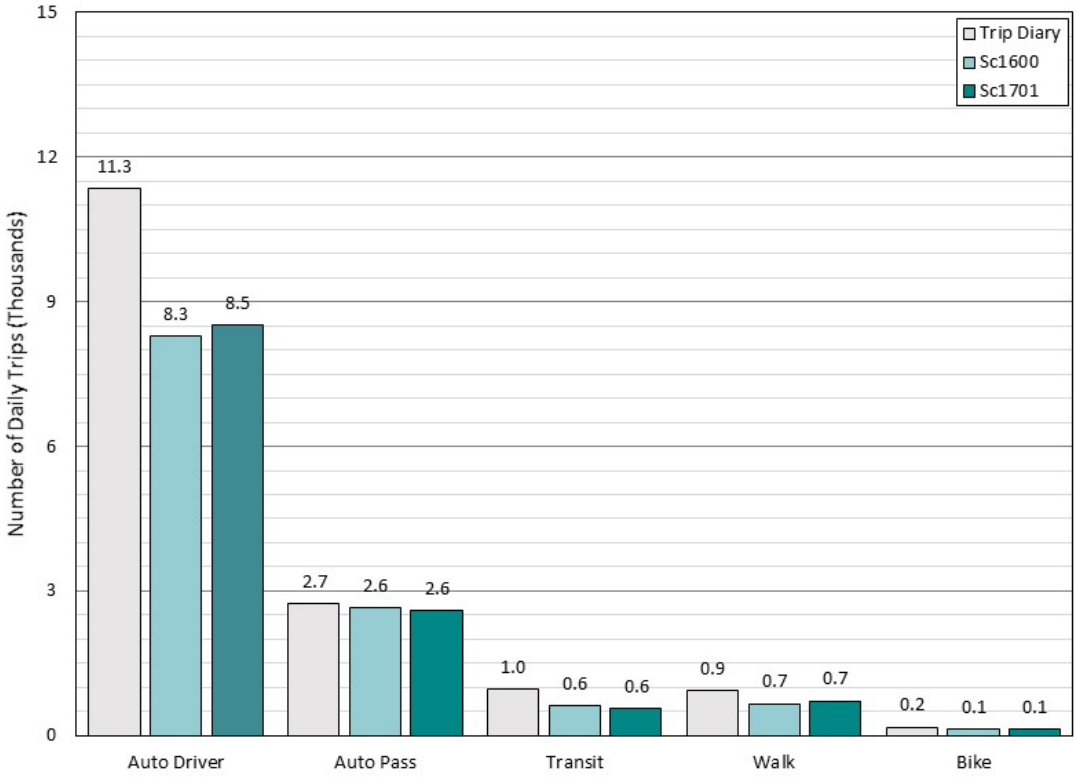

AM Peak Hour Trips By Mode: Trips From Surrey Guildford
Number of Daily Trips (Thousands)
15
12
9
6
3
0
Trip Diary
Sc1600
Sc1701
10.3
7.0
7.9
4.0
3.3
3.6
1.4
1.3
1.5
2.7
1.5
2.0
0.0
0.2
0.2
Auto Driver
Auto Pass
Transit
Walk
Bike


AM Peak Hour Mode Share: Trips From Surrey Guildford
Mode Share
80%
70%
60%
50%
40%
30%
20%
10%
0%
Trip Diary
Sc1600
Sc1701
56%
53%
52%
22%
25%
24%
8%
10%
10%
14%
11%
13%
0%
1%
1%
Auto Driver
Auto Passenger
Transit
Walk
Bike

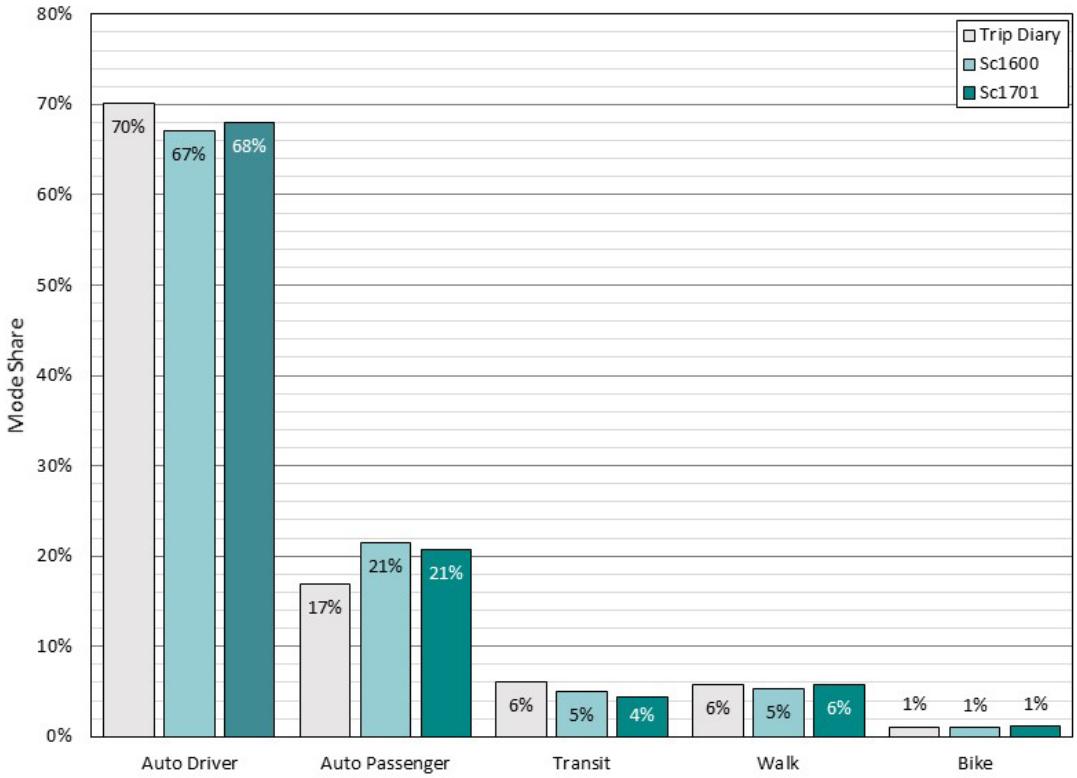

AM Peak Hour Trips By Mode: Trips To Surrey Guildford
Number of Daily Trips (Thousands)
15
12
9
6
3
0
Trip Diary
Sc1600
Sc1701
11.7
7.1
7.4
4.1
3.8
3.9
1.0
0.7
0.6
2.8
1.6
2.2
0.1
0.2
0.2
Auto Driver
Auto Pass
Transit
Walk
Bike

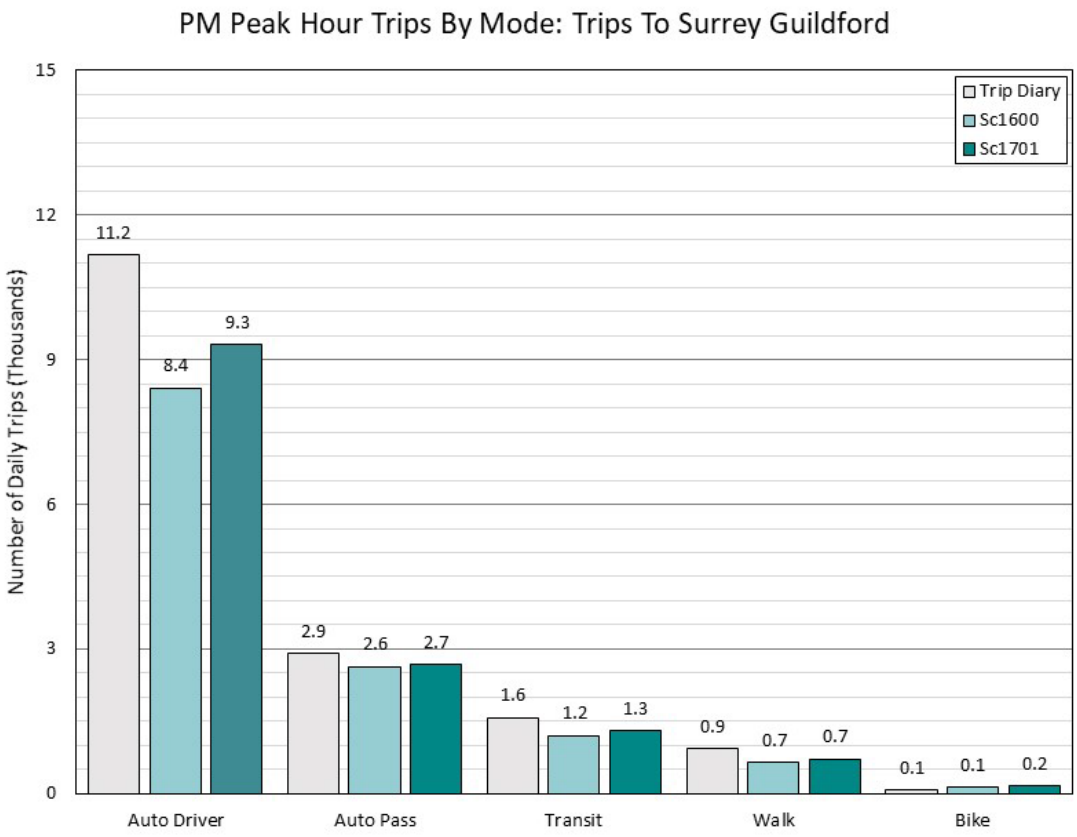

AM Peak Hour Mode Share: Trips To Surrey Guildford
Mode Share
80%
70%
60%
50%
40%
30%
20%
10%
0%
Trip Diary
Sc1600
Sc1701
59%
53%
51%
21%
28%
27%
5%
5%
4%
14%
12%
16%
1%
1%
1%
Auto Driver
Auto Passenger
Transit
Walk
Bike

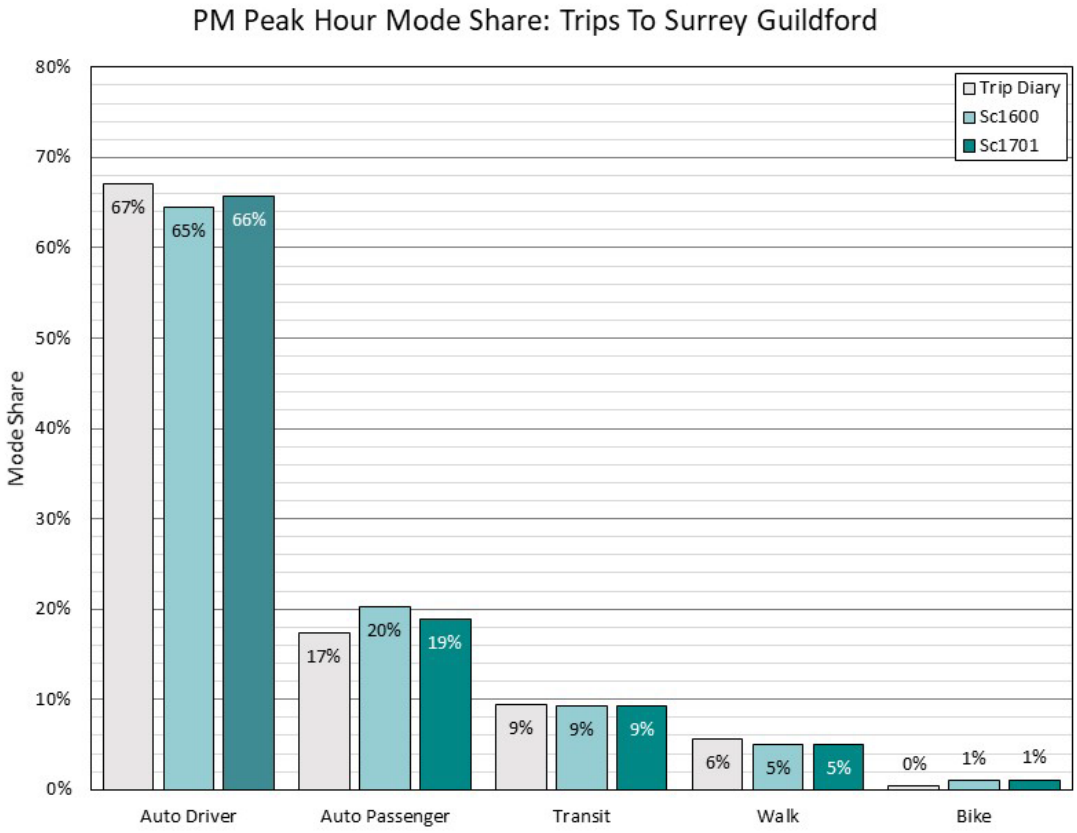
PM Peak Hour Trips By Mode: Trips From Surrey Guildford



PM Peak Hour Mode Share: Trips From Surrey Guildford

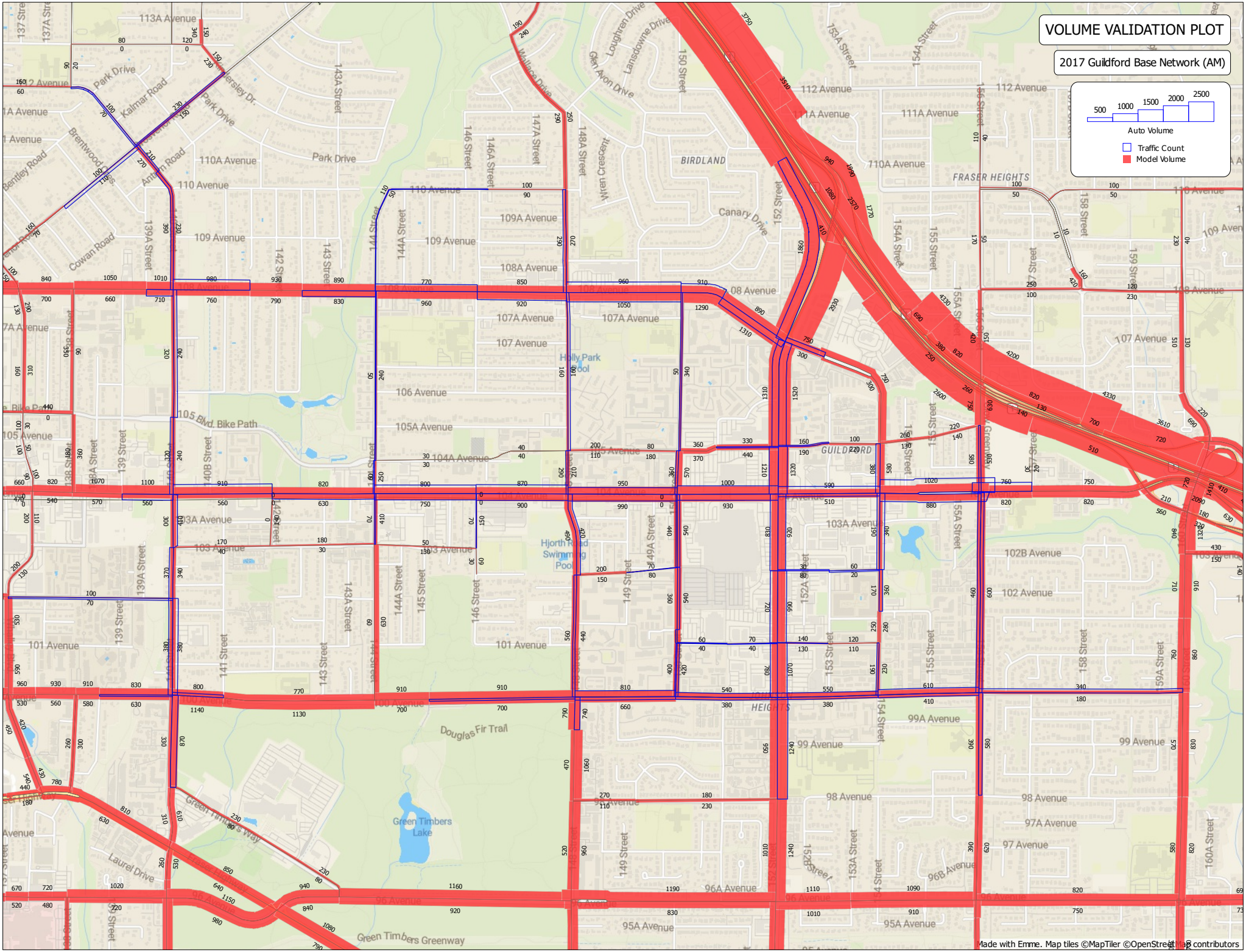


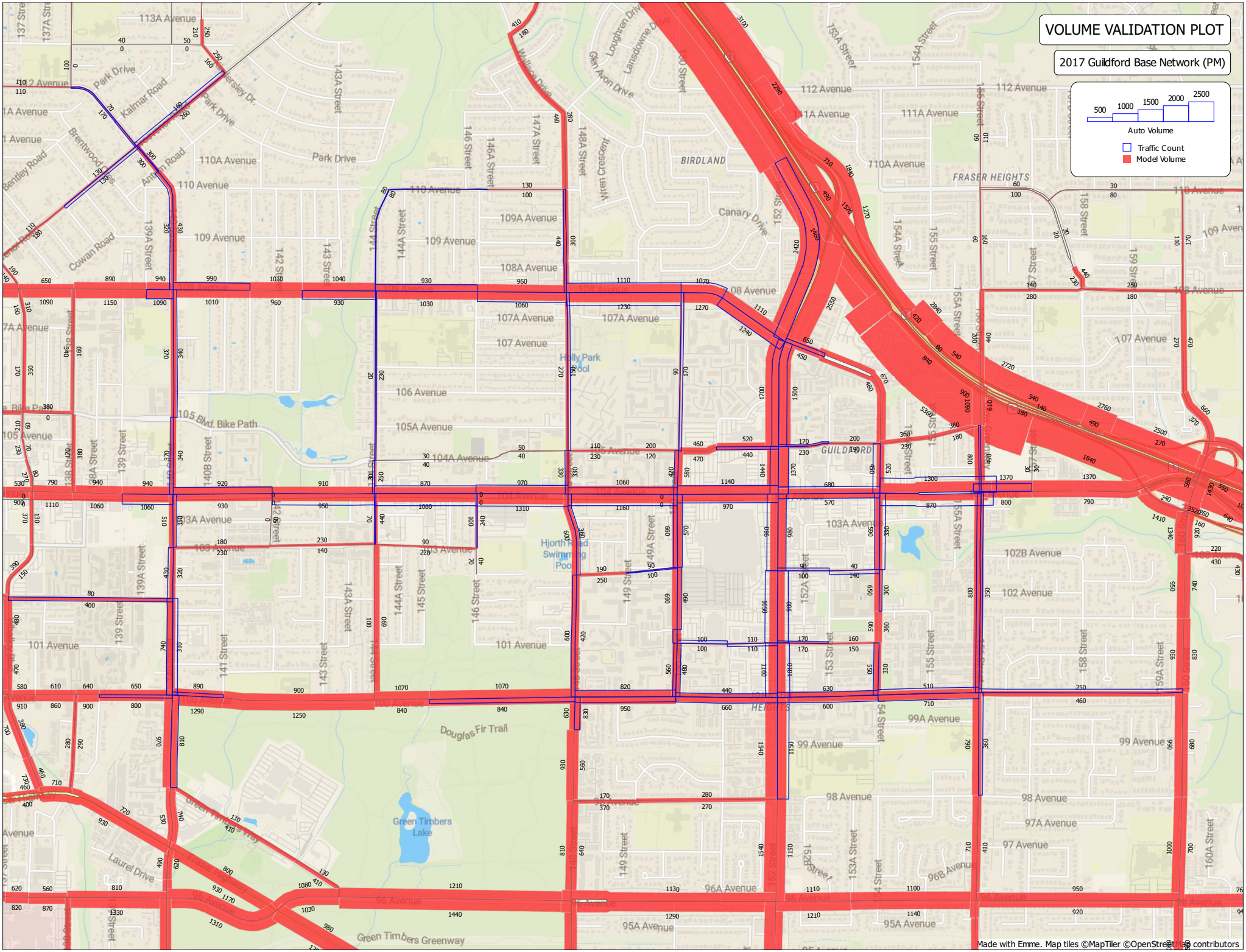

PM Peak Hour Trips By Mode: Trips To Surrey Guildford
Number of Daily Trips (Thousands)
15
12
9
6
3
0
Trip Diary
Sc1600
Sc1701
11.2
8.4
9.3
2.9
2.6
2.7
1.6
1.2
1.3
0.9
0.7
0.7
0.1
0.1
0.2
Auto Driver
Auto Pass
Transit
Walk
Bike


PM Peak Hour Mode Share: Trips To Surrey Guildford
Mode Share
80%
70%
60%
50%
40%
30%
20%
10%
0%
Trip Diary
Sc1600
Sc1701
67%
65%
66%
17%
20%
19%
9%
9%
9%
6%
5%
5%
0%
1%
1%
Auto Driver
Auto Passenger
Transit
Walk
Bike

APPENDIX E

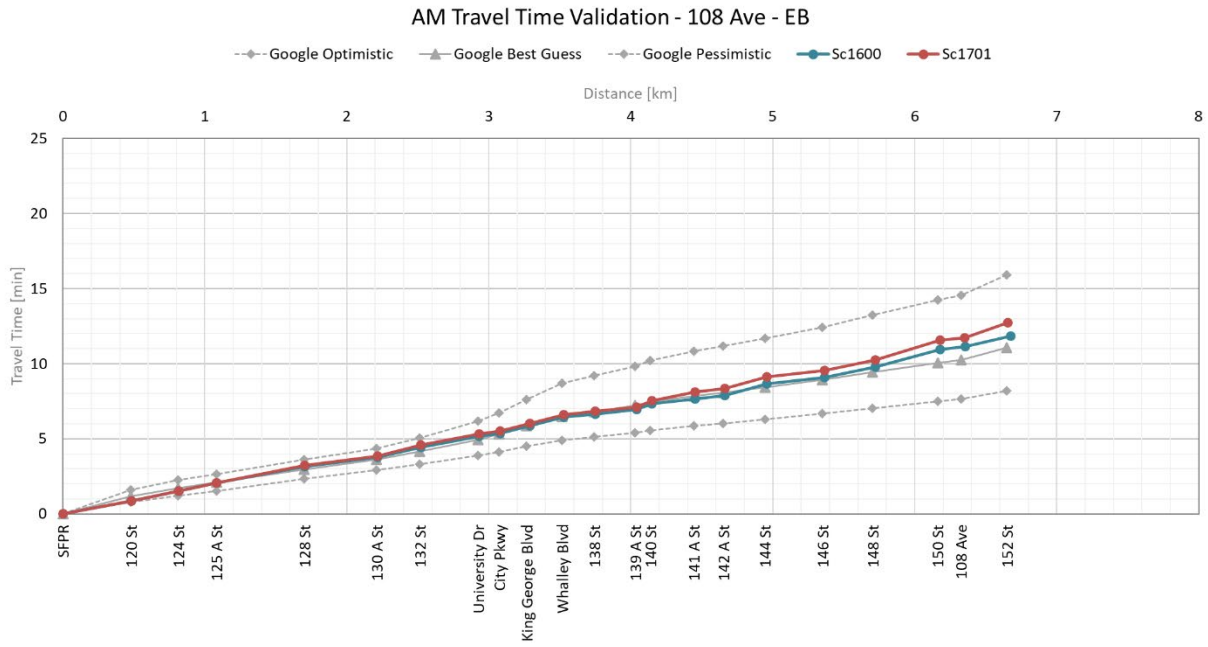
Auto Volume Validation Plots

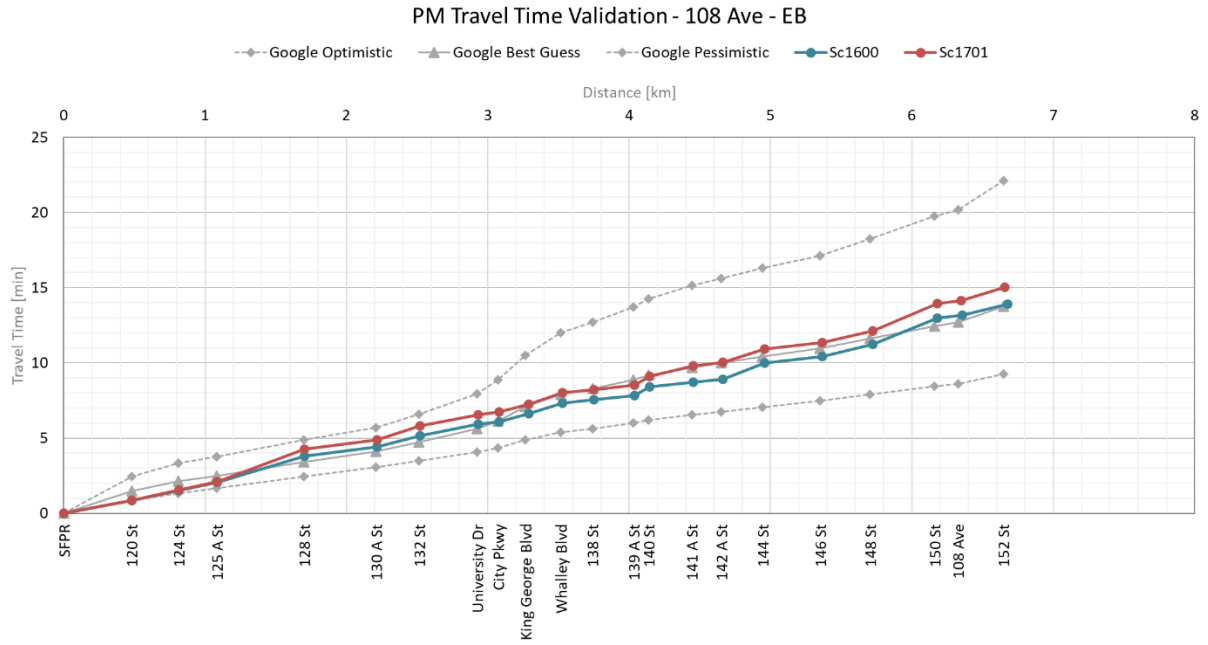

VOLUME VALIDATION PLOT
2017 Guildford Base Network (AM)
500
1000
1500
2000
2500
Auto Volume
Traffic Count
Model Volume
BIRDLAND
FRASER HEIGHTS
GUILDFORD
Holly Park Pool
Hjorth Road Swimming Pool
Green Timbers Lake
Douglas Fir Trail
Green Timbers Greenway
105 Blvd. Bike Path
Made with Emme. Map tiles ©MapTiler ©OpenStreetMap contributors

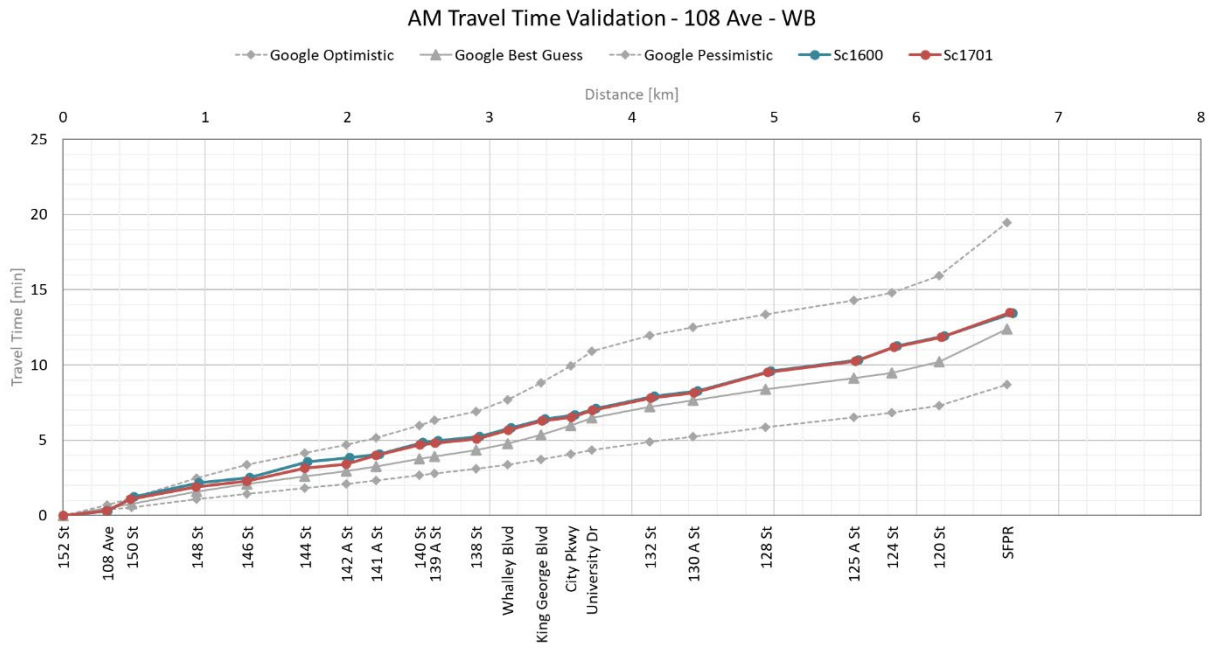

VOLUME VALIDATION PLOT
2017 Guildford Base Network (PM)
500
1000
1500
2000
2500
Auto Volume
Traffic Count
Model Volume
Made with Emme. Map tiles ©MapTiler ©OpenStreetMap contributors

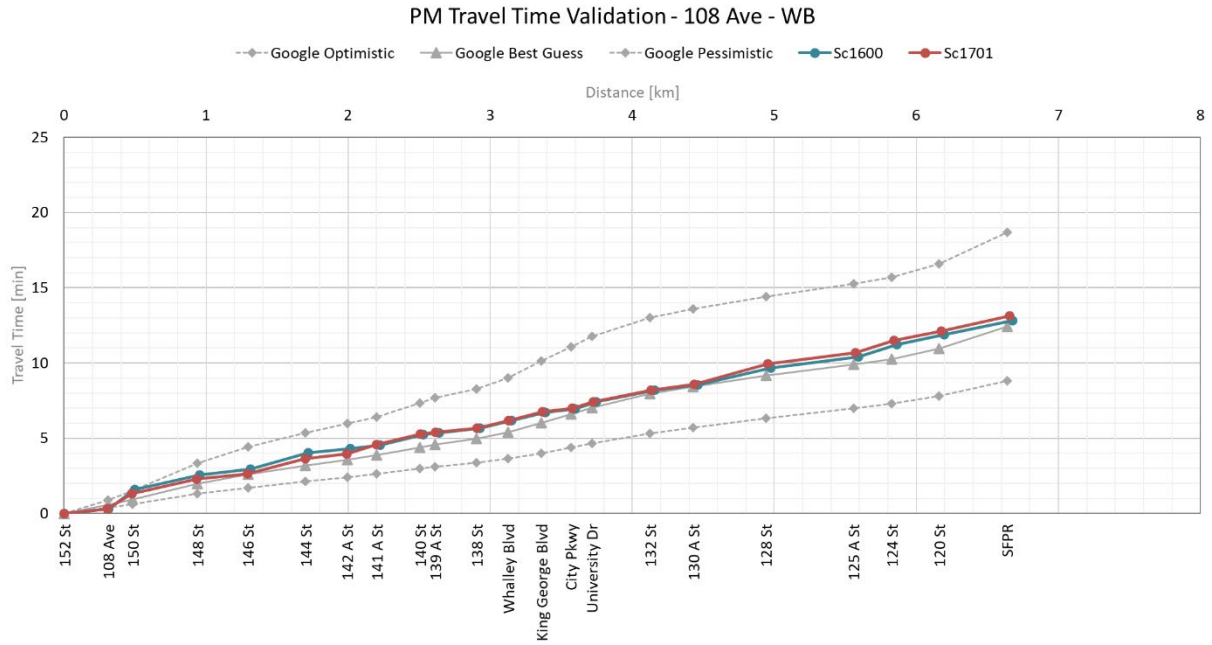
APPENDIX F

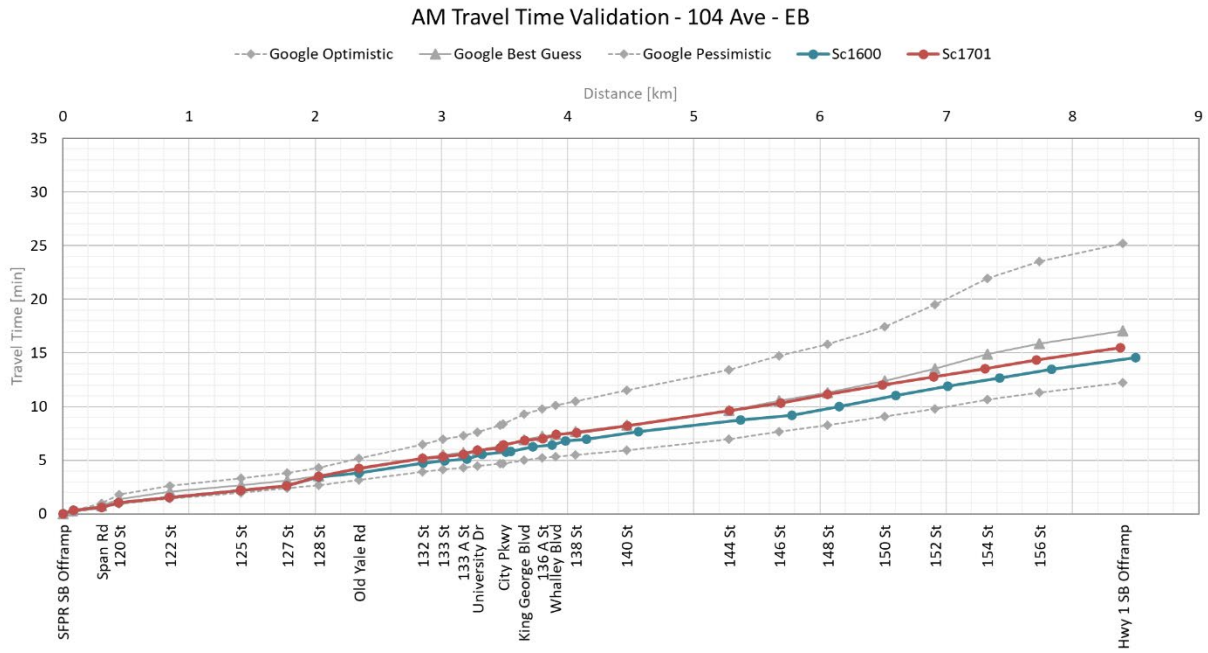
Auto Travel Time Validation (Google Maps)

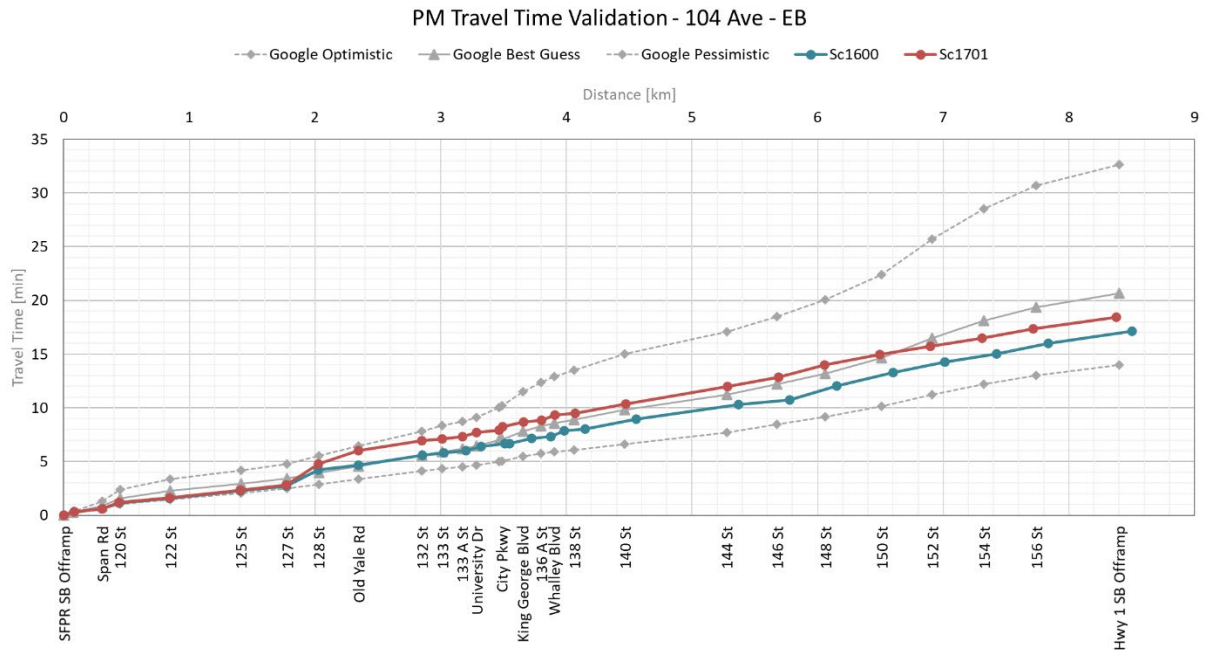

AM Travel Time Validation - 108 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
SFPR
120 St
124 St
125 A St
128 St
130 A St
132 St
University Dr
City Pkwy
King George Blvd
Whalley Blvd
138 St
139 A St
140 St
141 A St
142 A St
144 St
146 St
148 St
150 St
108 Ave
152 St

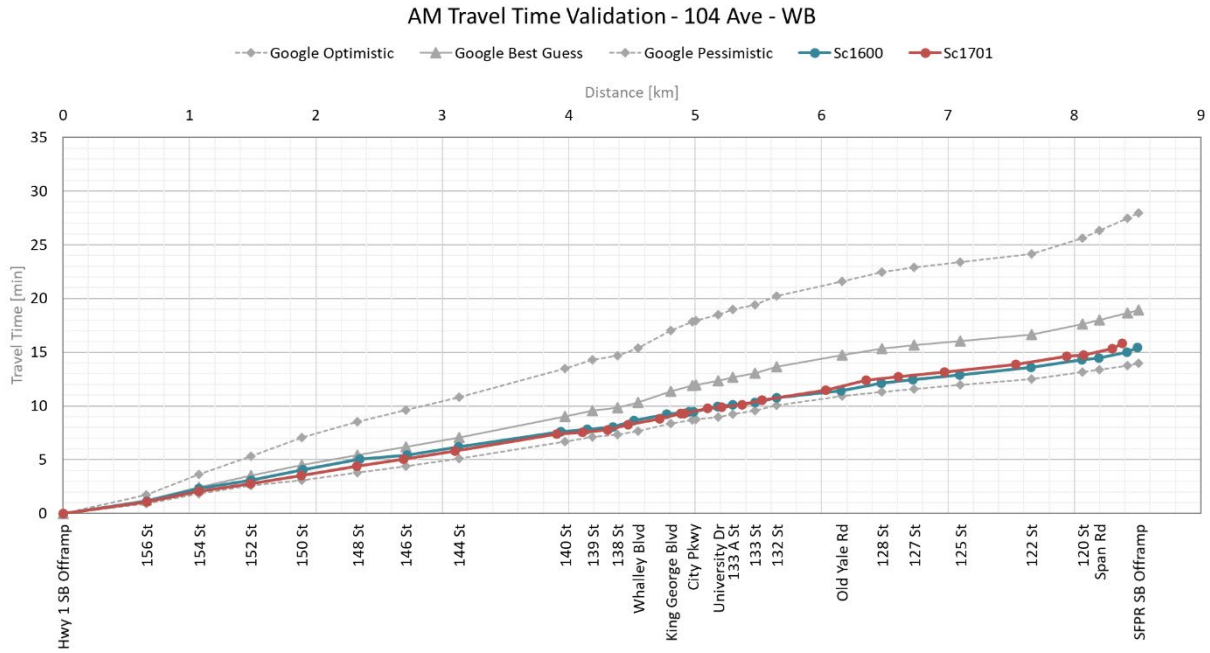

PM Travel Time Validation - 108 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
SFPR
120 St
124 St
125 A St
128 St
130 A St
132 St
University Dr
City Pkwy
King George Blvd
Whalley Blvd
138 St
139 A St
140 St
141 A St
142 A St
144 St
146 St
148 St
150 St
108 Ave
152 St

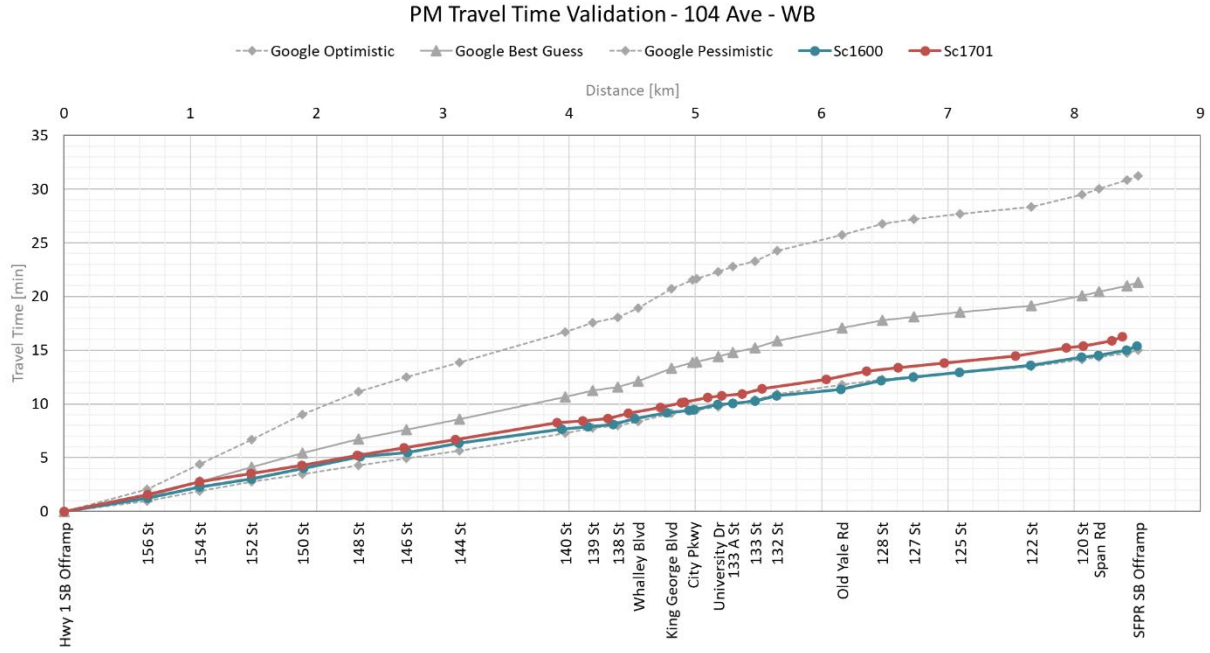

AM Travel Time Validation - 108 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
1
2
3
4
5
6
7
8
Travel Time [min]
0
5
10
15
20
25
152 St
108 Ave
150 St
148 St
146 St
144 St
142 A St
141 A St
140 St
139 A St
138 St
Whalley Blvd
King George Blvd
City Pkwy
University Dr
132 St
130 A St
128 St
125 A St
124 St
120 St
SFPR

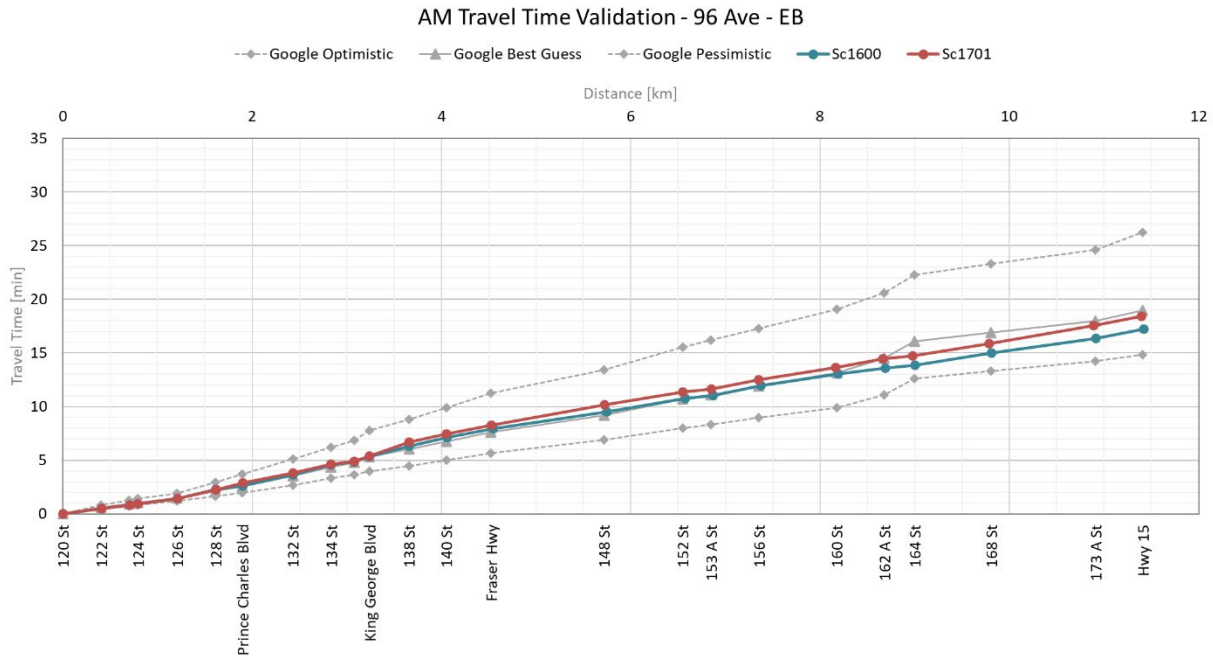

PM Travel Time Validation - 108 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
1
2
3
4
5
6
7
8
Travel Time [min]
0
5
10
15
20
25
152 St
108 Ave
150 St
148 St
146 St
144 St
142 A St
141 A St
140 St
139 A St
138 St
Whalley Blvd
King George Blvd
City Pkwy
University Dr
132 St
130 A St
128 St
125 A St
124 St
120 St
SFPR

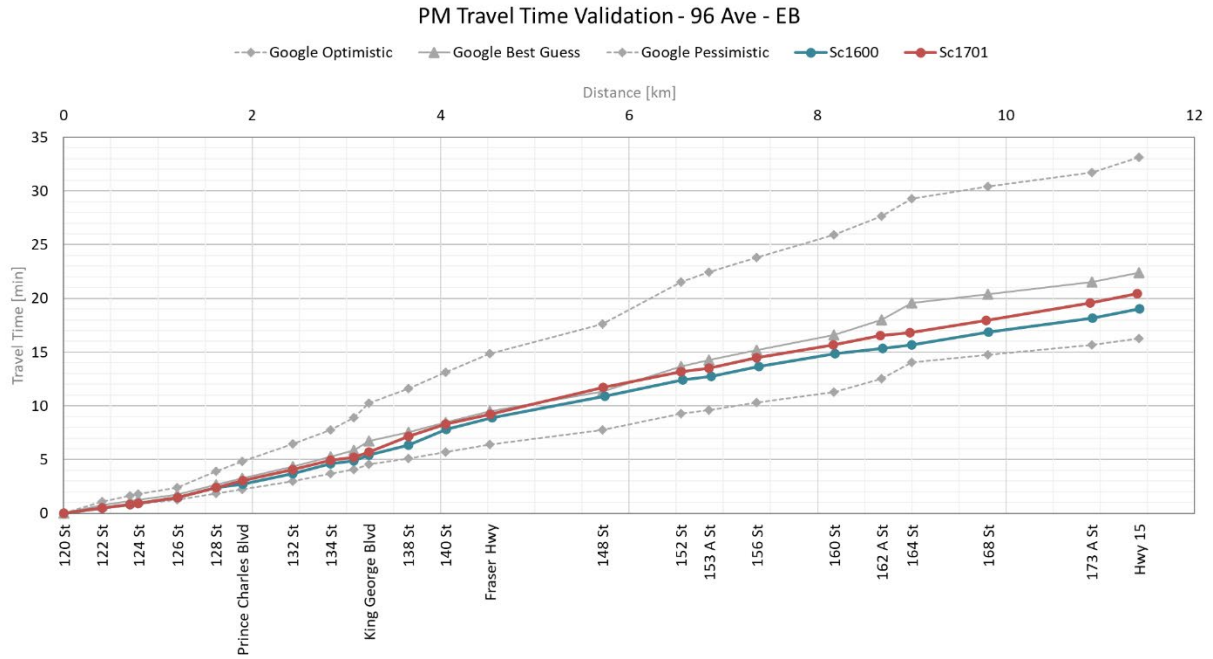

AM Travel Time Validation - 104 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
SFPR SB Offramp
Span Rd
120 St
122 St
125 St
127 St
128 St
Old Yale Rd
132 St
133 St
133 A St
University Dr
City Pkwy
King George Blvd
136 A St
Whalley Blvd
138 St
140 St
144 St
146 St
148 St
150 St
152 St
154 St
156 St
Hwy 1 SB Offramp

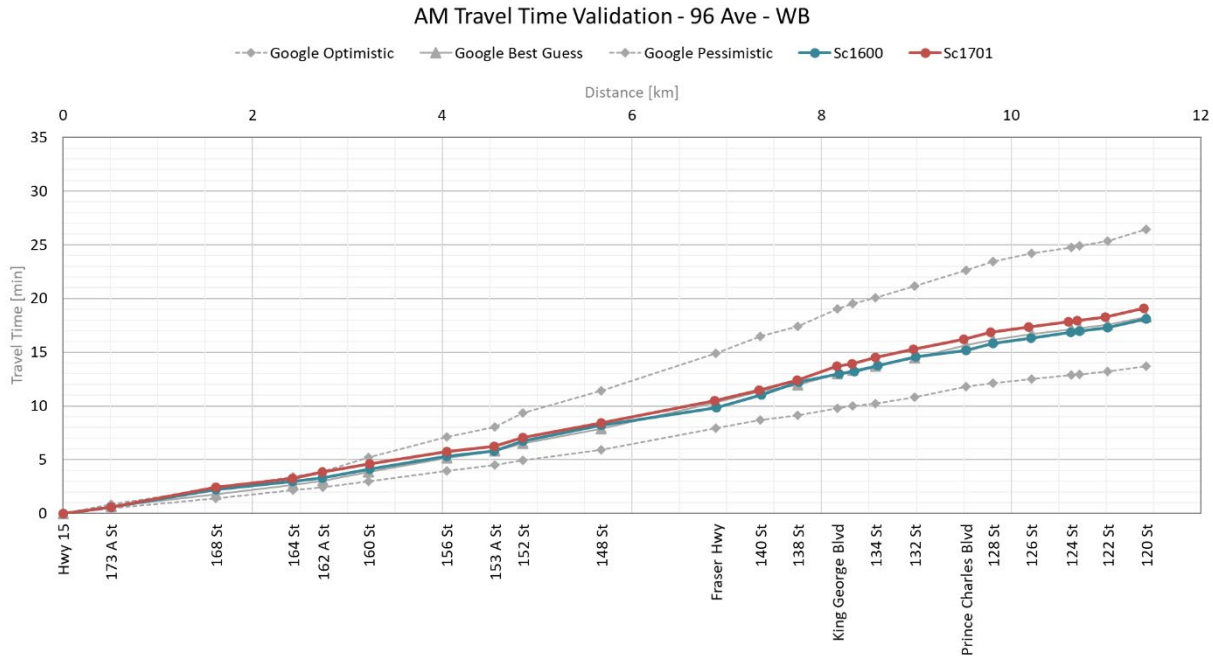

PM Travel Time Validation - 104 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
SFPR SB Offramp
Span Rd
120 St
122 St
125 St
127 St
128 St
Old Yale Rd
132 St
133 St
133 A St
University Dr
City Pkwy
King George Blvd
136 A St
Whalley Blvd
138 St
140 St
144 St
146 St
148 St
150 St
152 St
154 St
156 St
Hwy 1 SB Offramp

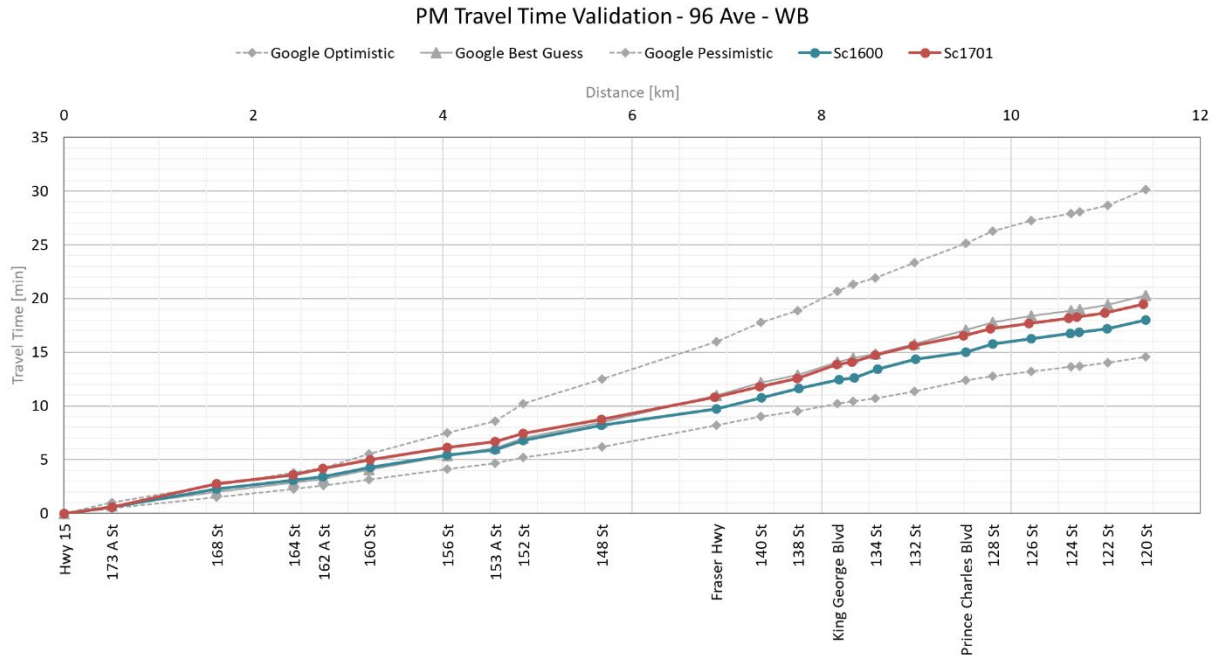

AM Travel Time Validation - 104 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
Hwy 1 SB Offramp
156 St
154 St
152 St
150 St
148 St
146 St
144 St
140 St
139 St
138 St
Whalley Blvd
King George Blvd
City Pkwy
University Dr
133 A St
133 St
132 St
Old Yale Rd
128 St
127 St
125 St
122 St
120 St
Span Rd
SFPR SB Offramp

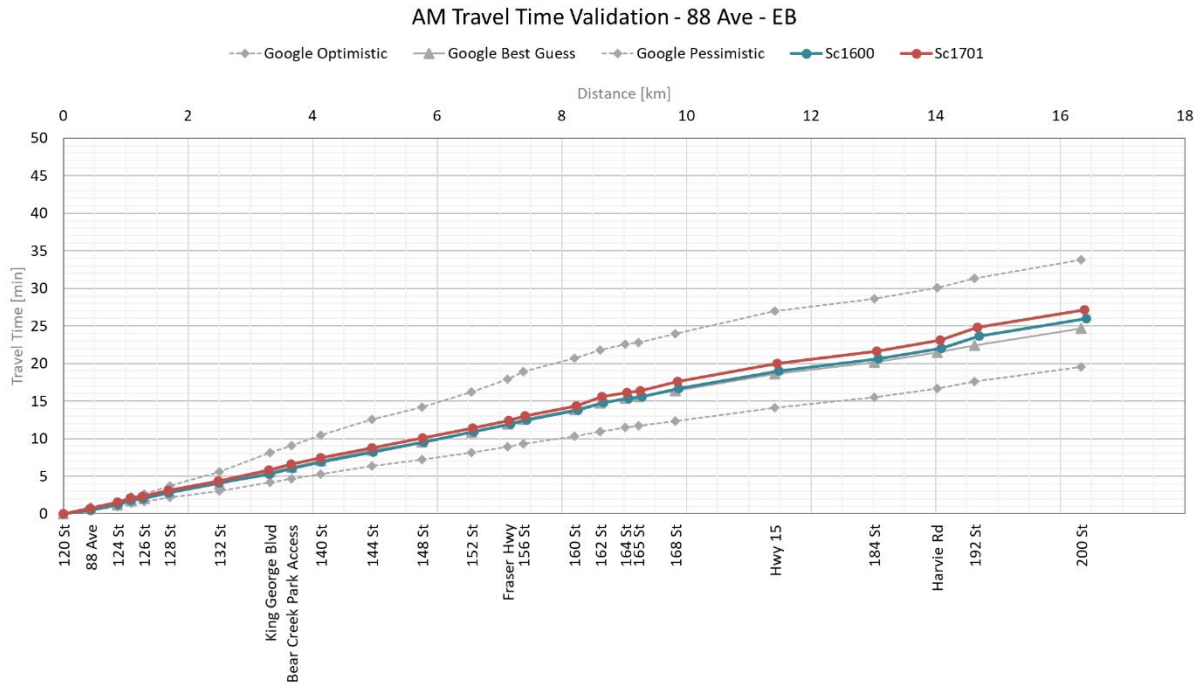

PM Travel Time Validation - 104 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
Hwy 1 SB Offramp
156 St
154 St
152 St
150 St
148 St
146 St
144 St
140 St
139 St
138 St
Whalley Blvd
King George Blvd
City Pkwy
University Dr
133 A St
133 St
132 St
Old Yale Rd
128 St
127 St
125 St
122 St
120 St
Span Rd
SFPR SB Offramp

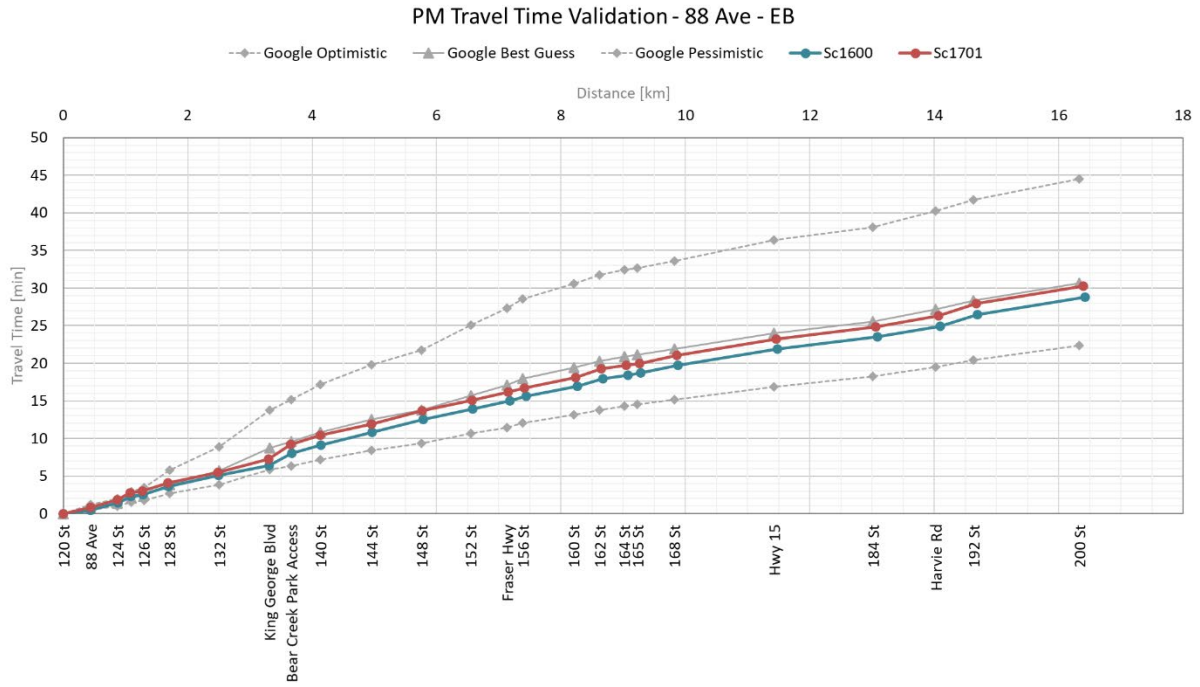

AM Travel Time Validation - 96 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
Travel Time [min]
0
5
10
15
20
25
30
35
120 St
122 St
124 St
126 St
128 St
Prince Charles Blvd
132 St
134 St
King George Blvd
138 St
140 St
Fraser Hwy
148 St
152 St
153 A St
156 St
160 St
162 A St
164 St
168 St
173 A St
Hwy 15

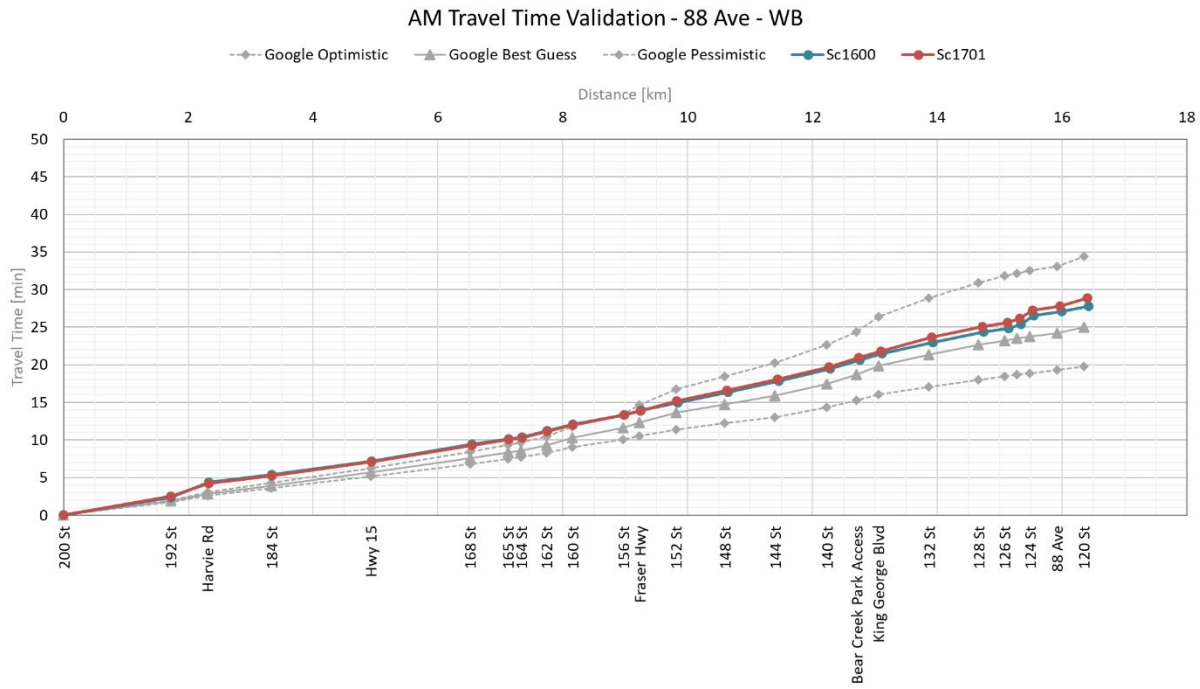

PM Travel Time Validation - 96 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
Travel Time [min]
0
5
10
15
20
25
30
35
120 St
122 St
124 St
126 St
128 St
Prince Charles Blvd
132 St
134 St
King George Blvd
138 St
140 St
Fraser Hwy
148 St
152 St
153 A St
156 St
160 St
162 A St
164 St
168 St
173 A St
Hwy 15

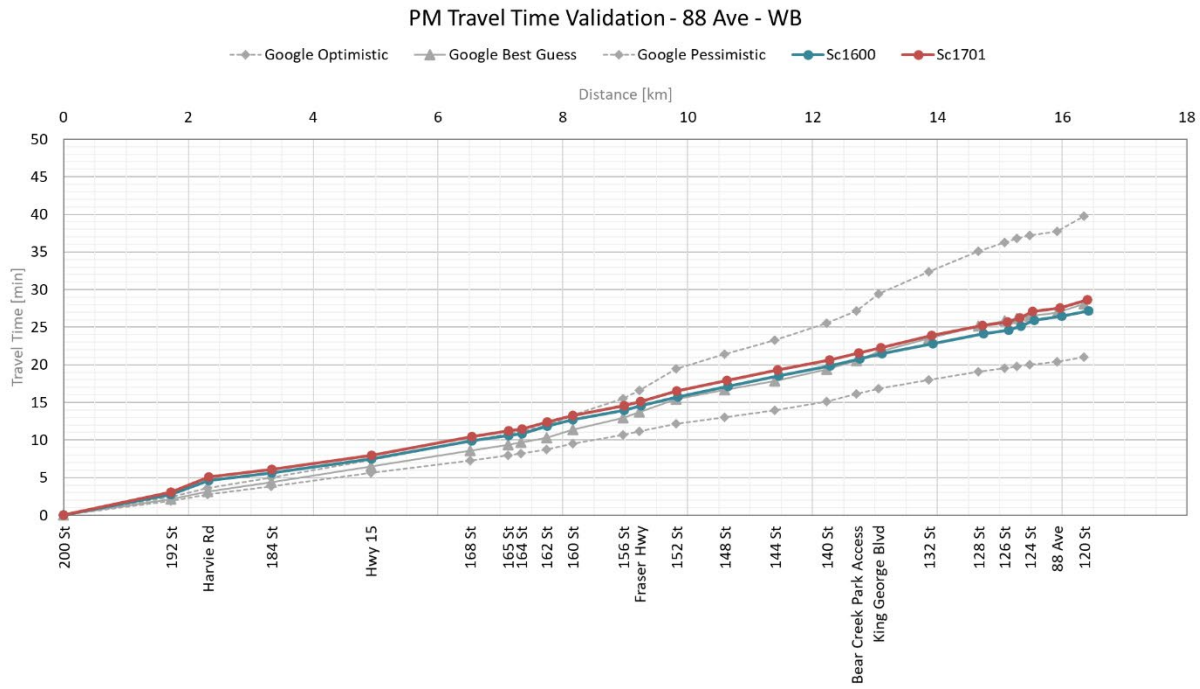

AM Travel Time Validation - 96 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
Travel Time [min]
0
5
10
15
20
25
30
35
Hwy 15
173 A St
168 St
164 St
162 A St
160 St
156 St
153 A St
152 St
148 St
Fraser Hwy
140 St
138 St
King George Blvd
134 St
132 St
Prince Charles Blvd
128 St
126 St
124 St
122 St
120 St

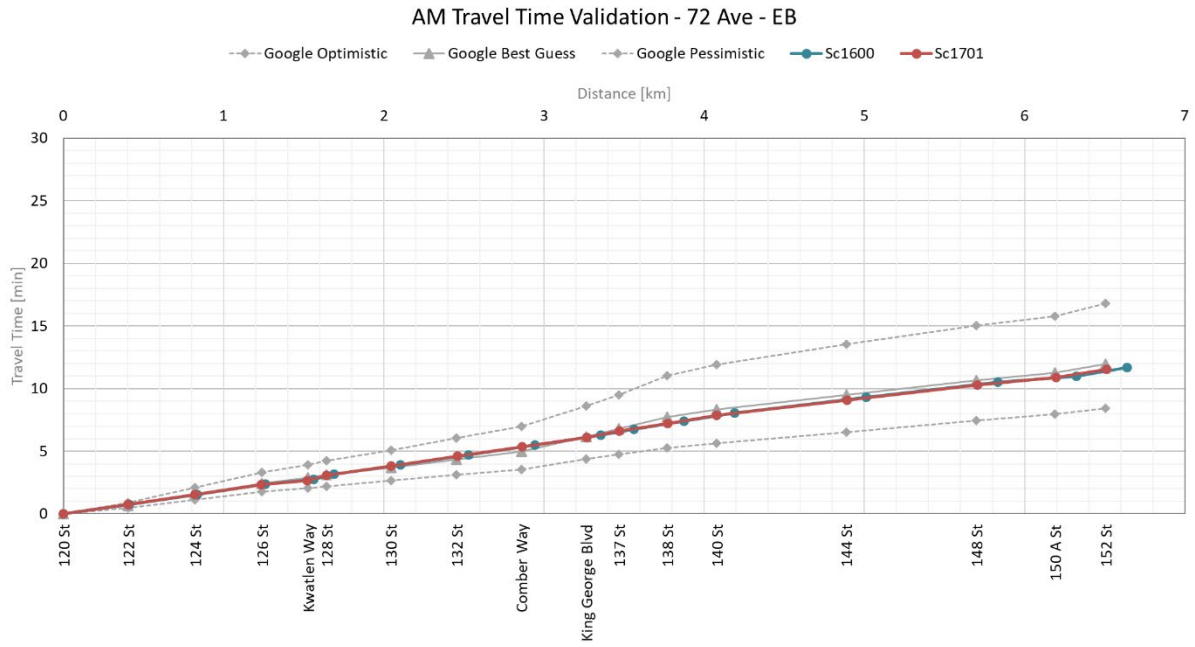

PM Travel Time Validation - 96 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
Travel Time [min]
0
5
10
15
20
25
30
35
Hwy 15
173 A St
168 St
164 St
162 A St
160 St
156 St
153 A St
152 St
148 St
Fraser Hwy
140 St
138 St
King George Blvd
134 St
132 St
Prince Charles Blvd
128 St
126 St
124 St
122 St
120 St

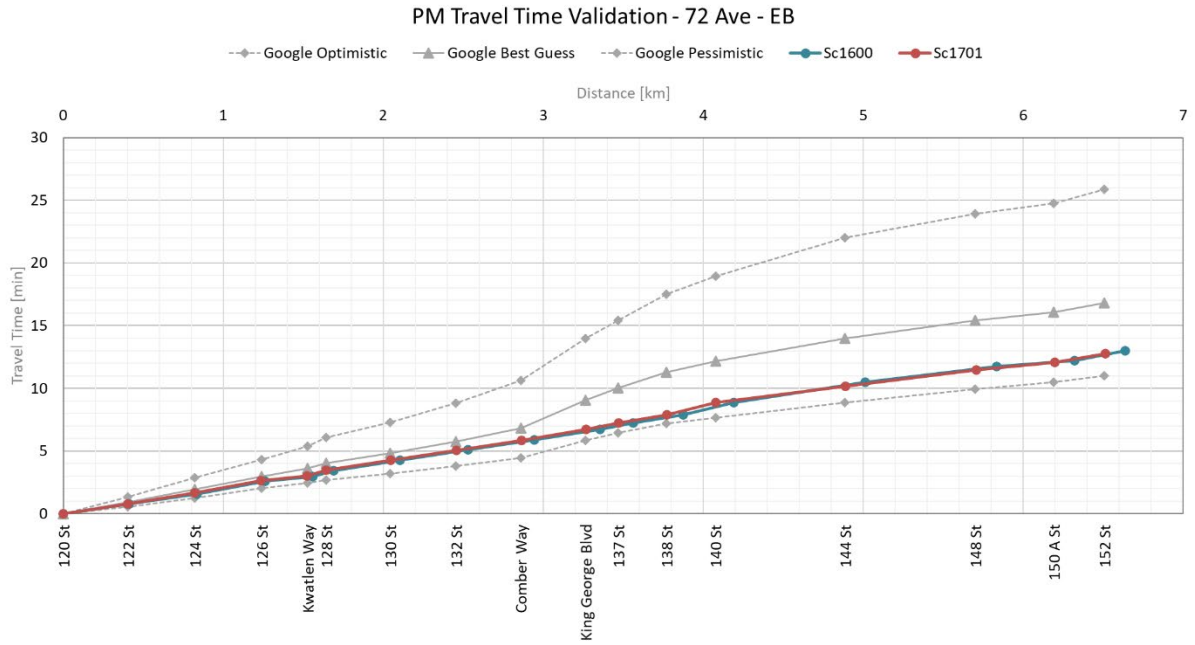

AM Travel Time Validation - 88 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
120 St
88 Ave
124 St
126 St
128 St
132 St
King George Blvd
Bear Creek Park Access
140 St
144 St
148 St
152 St
Fraser Hwy
156 St
160 St
162 St
164 St
165 St
168 St
Hwy 15
184 St
Harvie Rd
192 St
200 St

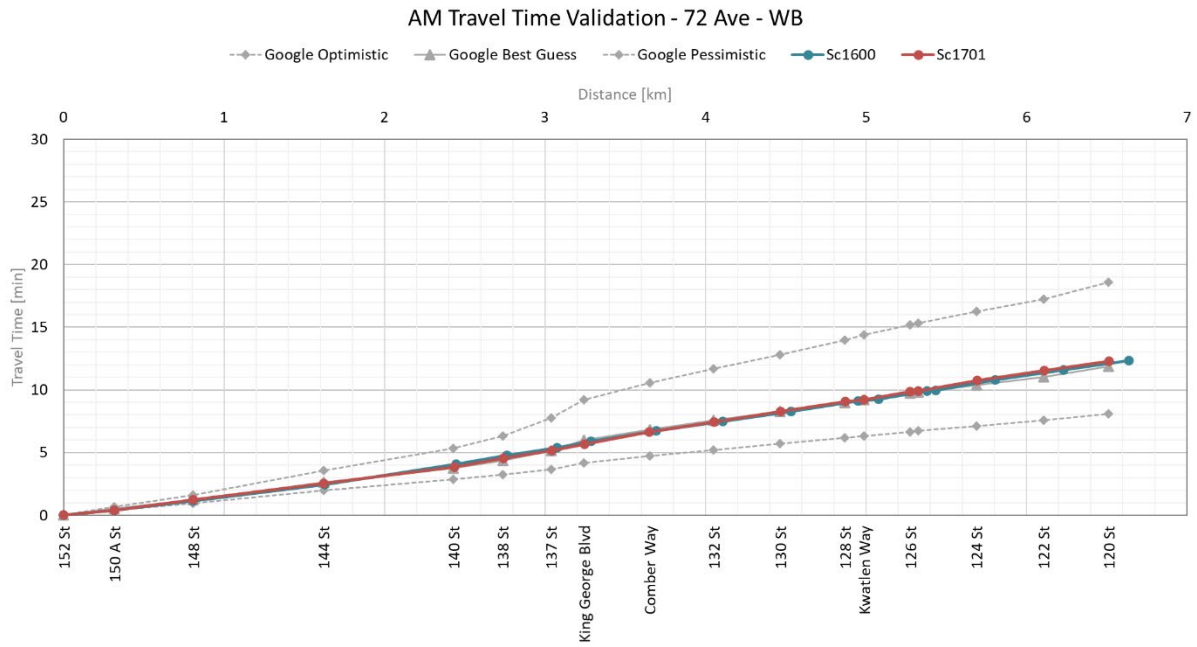

PM Travel Time Validation - 88 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
120 St
88 Ave
124 St
126 St
128 St
132 St
King George Blvd
Bear Creek Park Access
140 St
144 St
148 St
152 St
Fraser Hwy
156 St
160 St
162 St
164 St
165 St
168 St
Hwy 15
184 St
Harvie Rd
192 St
200 St


AM Travel Time Validation - 88 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
200 St
192 St
Harvie Rd
184 St
Hwy 15
168 St
165 St
164 St
162 St
160 St
156 St
Fraser Hwy
152 St
148 St
144 St
140 St
Bear Creek Park Access
King George Blvd
132 St
128 St
126 St
124 St
88 Ave
120 St


PM Travel Time Validation - 88 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
Travel Time [min]
200 St
192 St
Harvie Rd
184 St
Hwy 15
168 St
165 St
164 St
162 St
160 St
156 St
Fraser Hwy
152 St
148 St
144 St
140 St
Bear Creek Park Access
King George Blvd
132 St
128 St
126 St
124 St
88 Ave
120 St


AM Travel Time Validation - 72 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
1
2
3
4
5
6
7
Travel Time [min]
0
5
10
15
20
25
30
120 St
122 St
124 St
126 St
Kwatlen Way
128 St
130 St
132 St
Comber Way
King George Blvd
137 St
138 St
140 St
144 St
148 St
150 A St
152 St


PM Travel Time Validation - 72 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
1
2
3
4
5
6
7
Travel Time [min]
0
5
10
15
20
25
30
120 St
122 St
124 St
126 St
Kwatlen Way
128 St
130 St
132 St
Comber Way
King George Blvd
137 St
138 St
140 St
144 St
148 St
150 A St
152 St


AM Travel Time Validation - 72 Ave - WB
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Google Best Guess
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Travel Time [min]
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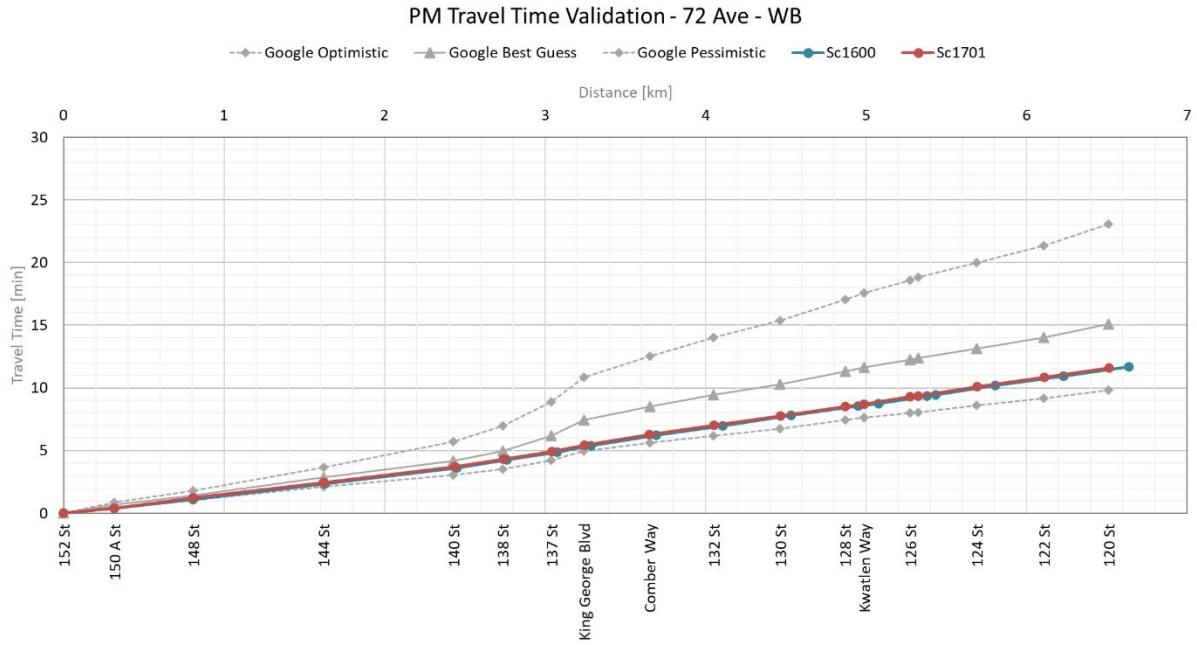
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Distance [km]
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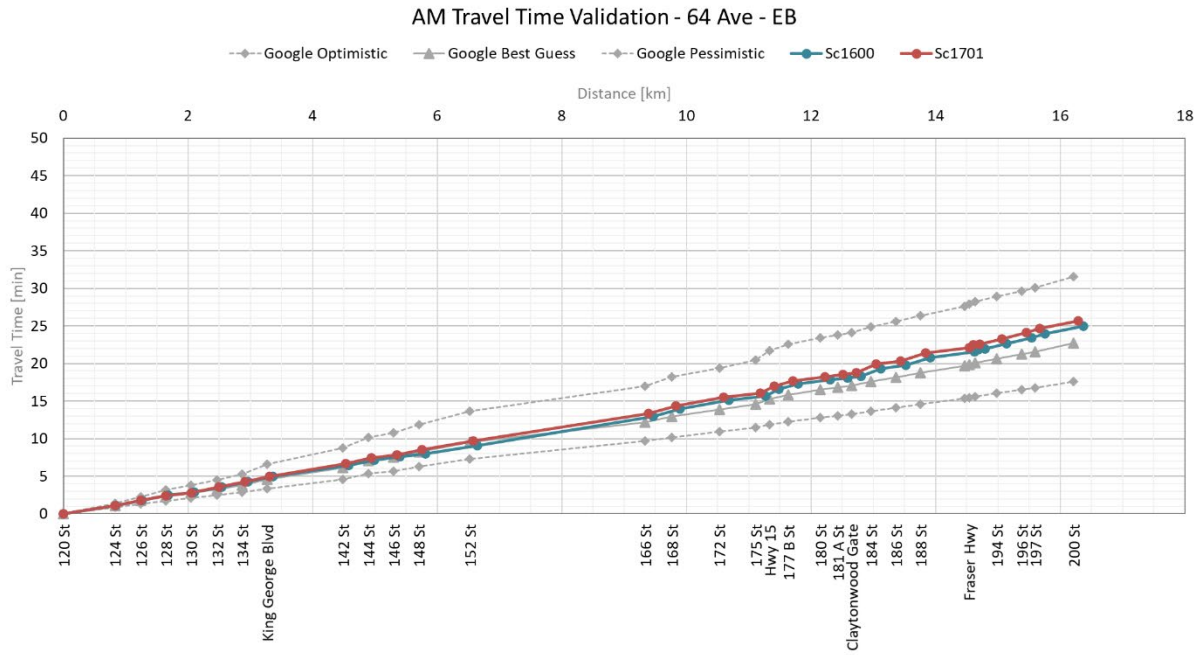
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Google Best Guess
Google Pessimistic
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Sc1701
Distance [km]
Travel Time [min]
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126 St
128 St
130 St
132 St
134 St
King George Blvd
142 St
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146 St
148 St
152 St
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168 St
172 St
175 St
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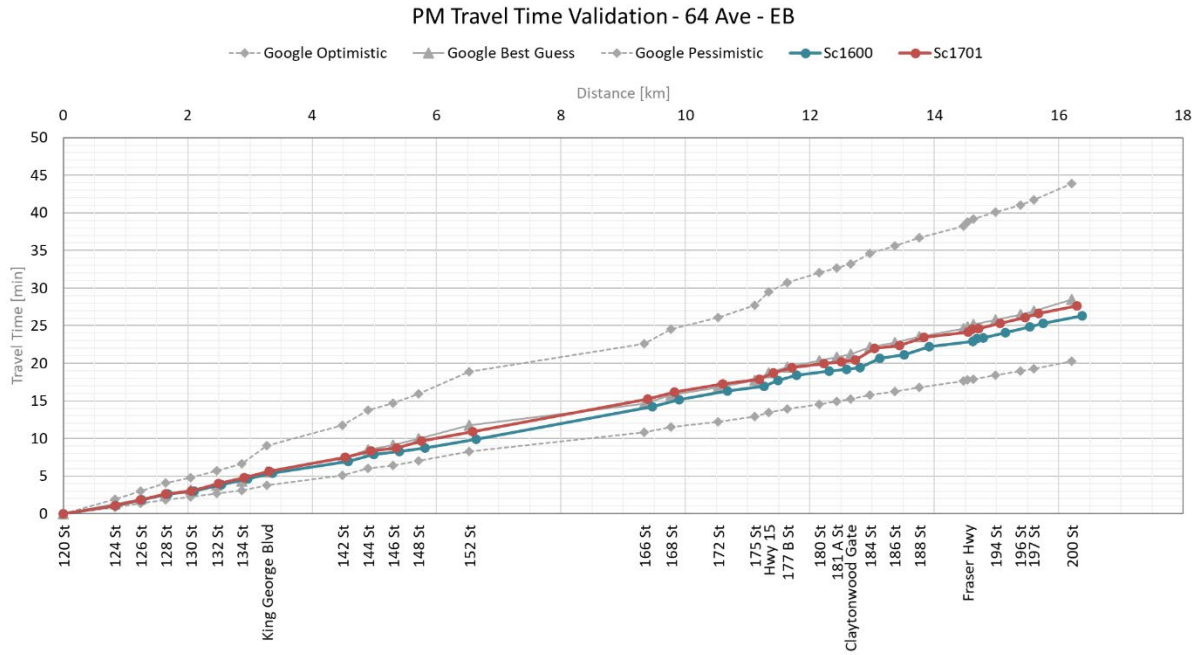
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Distance [km]
Travel Time [min]
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134 St
King George Blvd
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168 St
172 St
175 St
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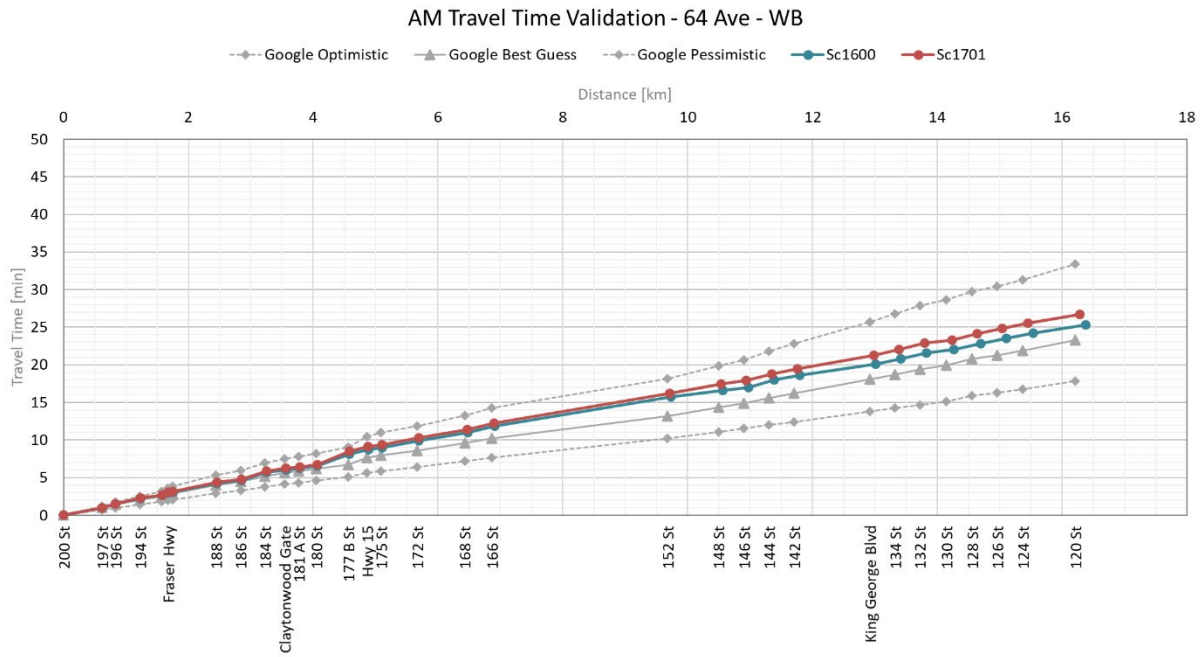
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Sc1701
Distance [km]
Travel Time [min]
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194 St
Fraser Hwy
188 St
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184 St
Claytonwood Gate
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Hwy 15
175 St
172 St
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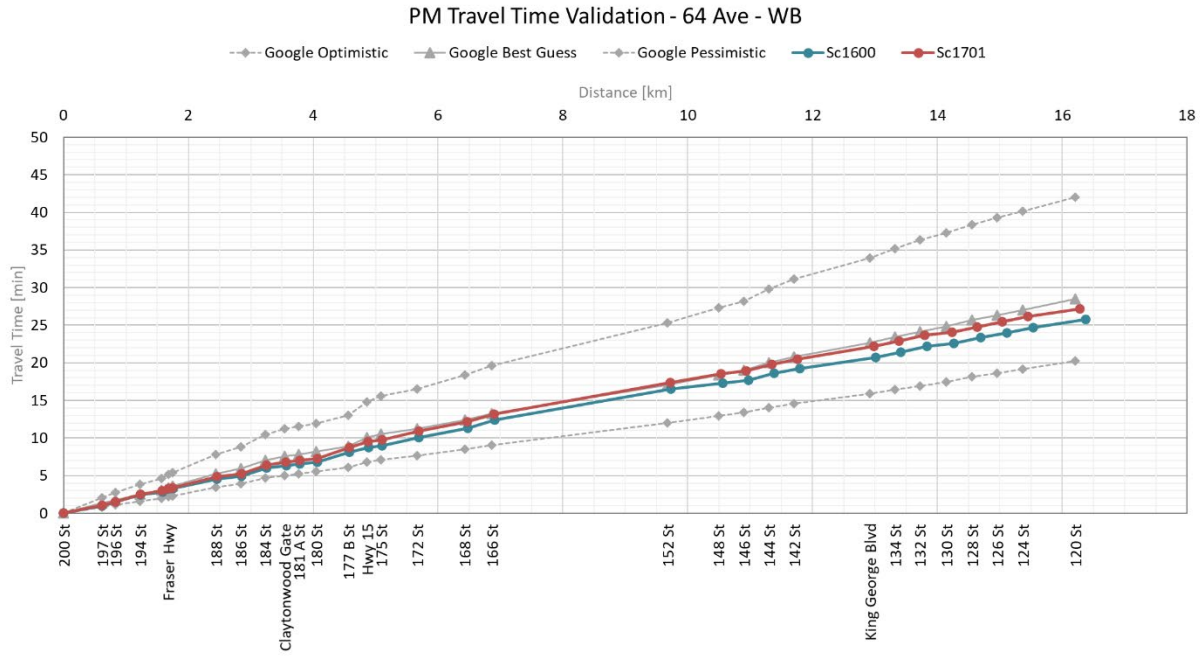
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Google Best Guess
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Distance [km]
Travel Time [min]
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196 St
194 St
Fraser Hwy
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184 St
Claytonwood Gate
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Hwy 15
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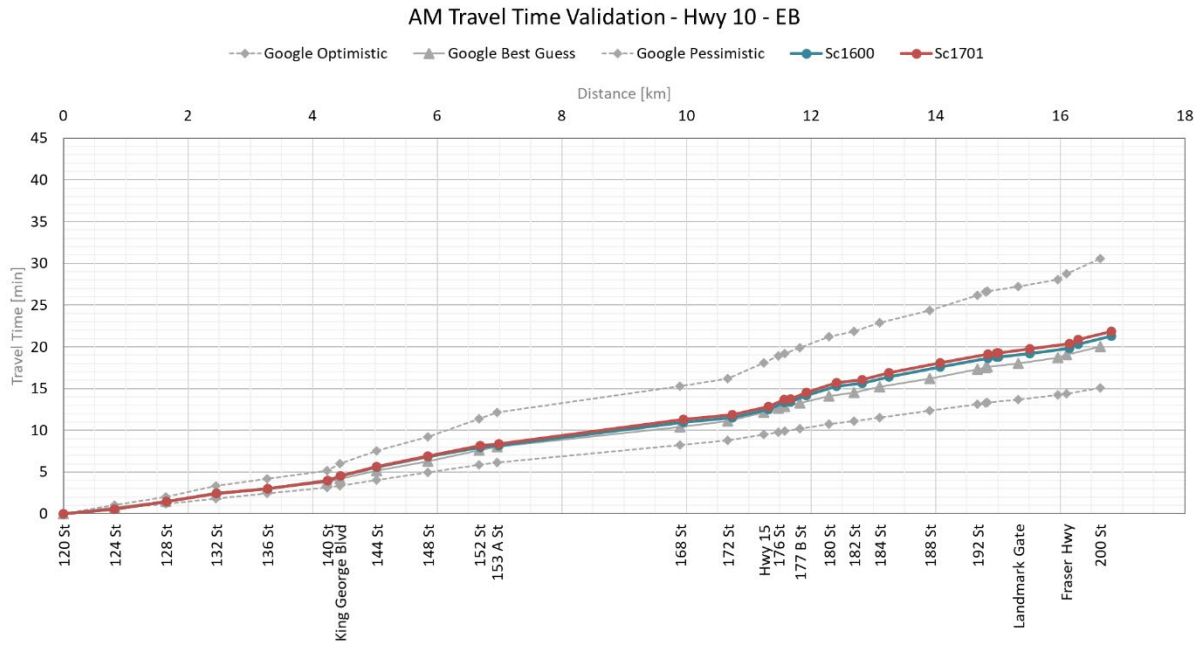
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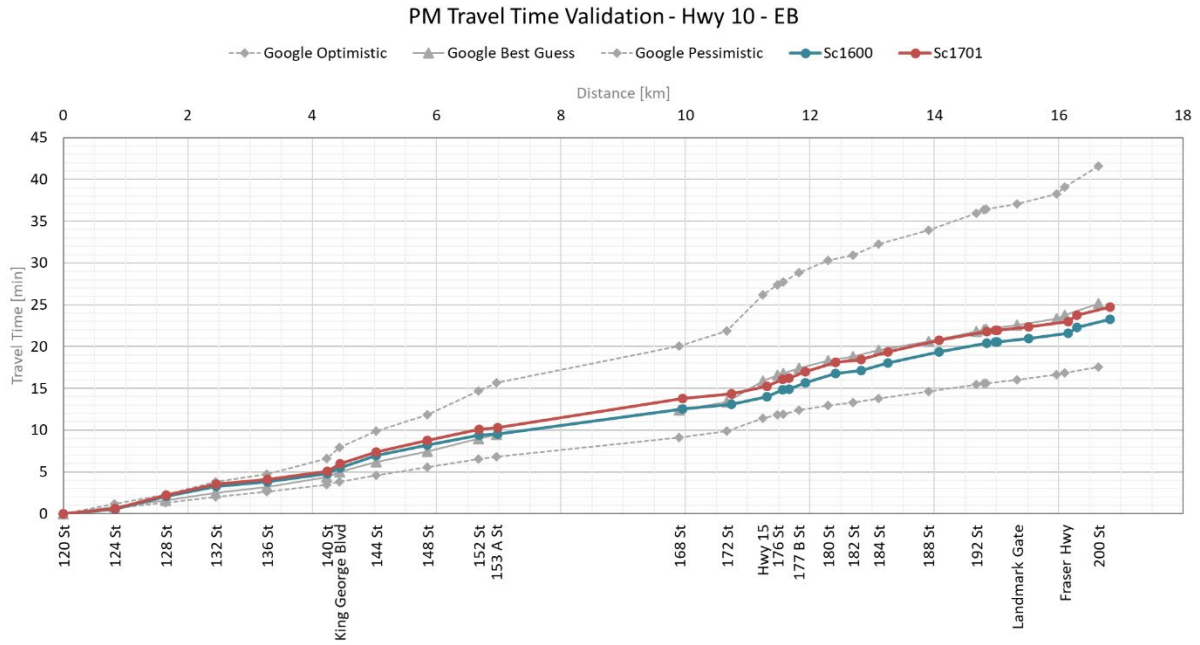
Landmark Gate
Fraser Hwy
200 St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Google Best Guess
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Sc1600
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King George Blvd
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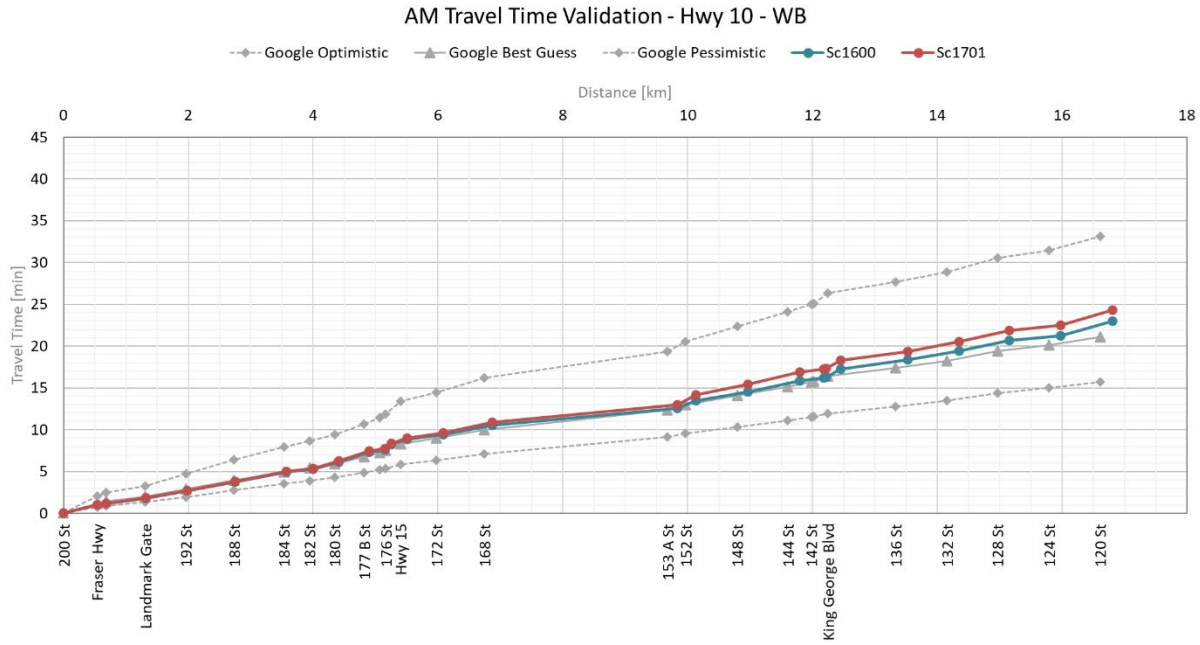
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Travel Time [min]
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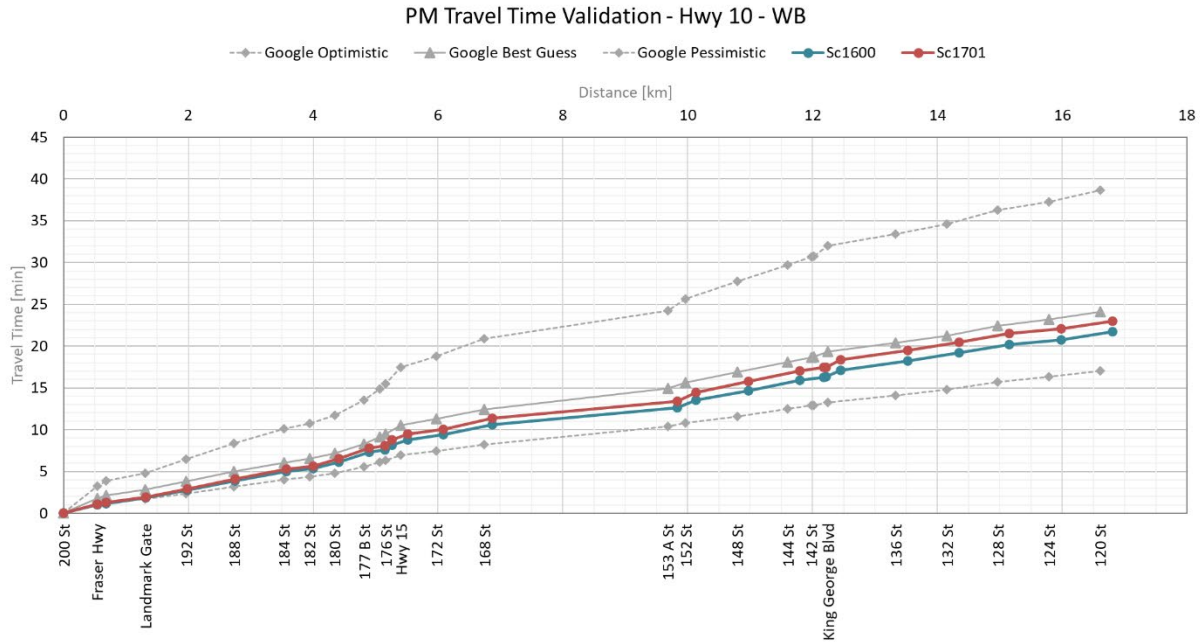
PM Travel Time Validation - Hwy 10 - WB
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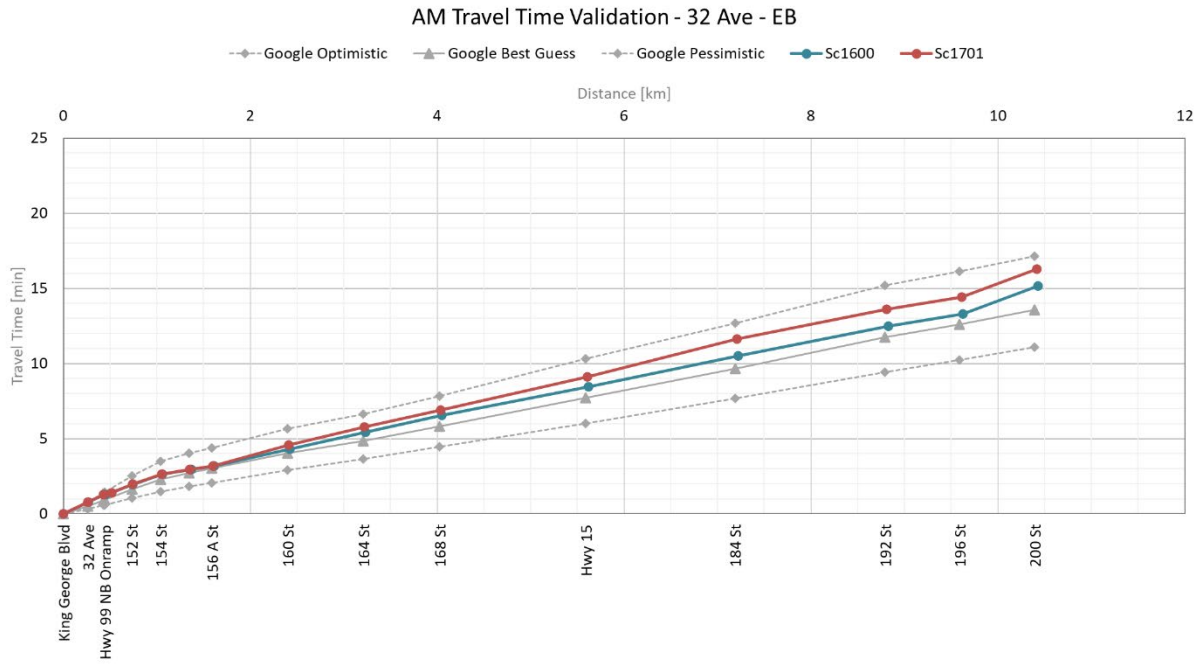
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Travel Time [min]
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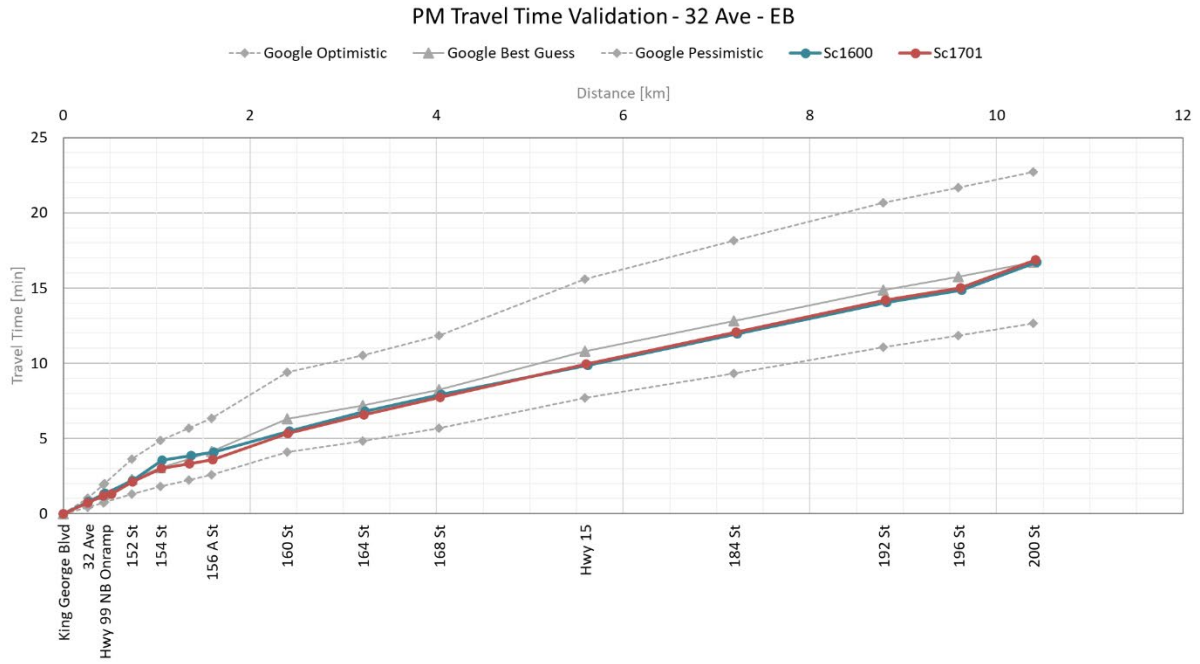
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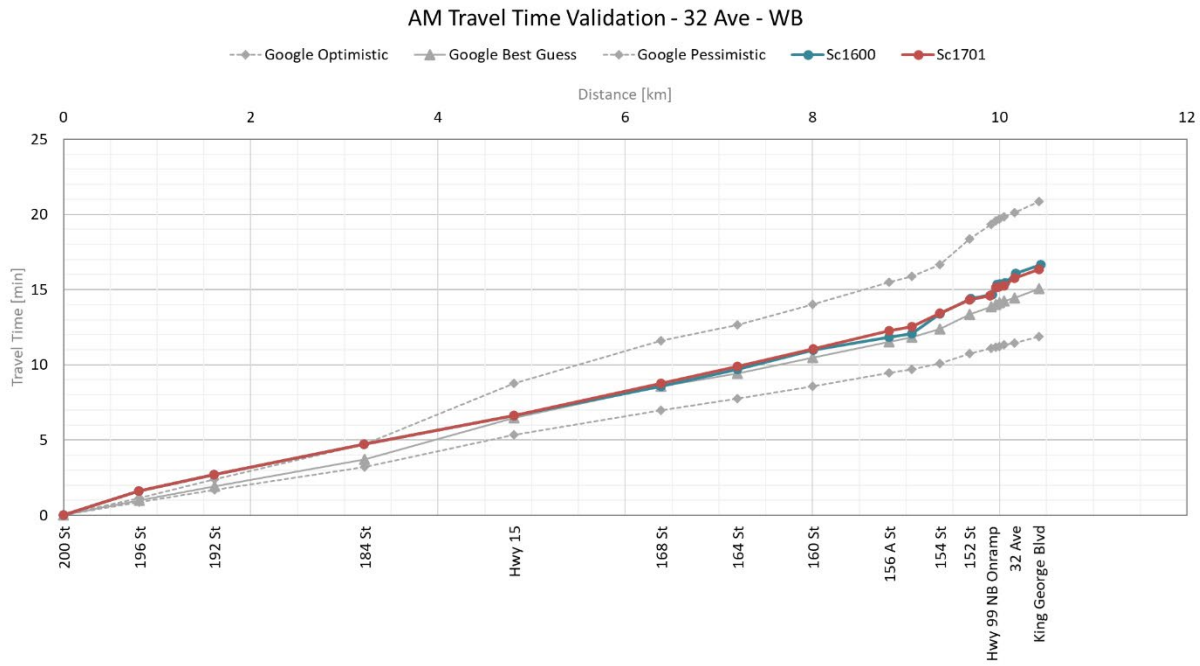
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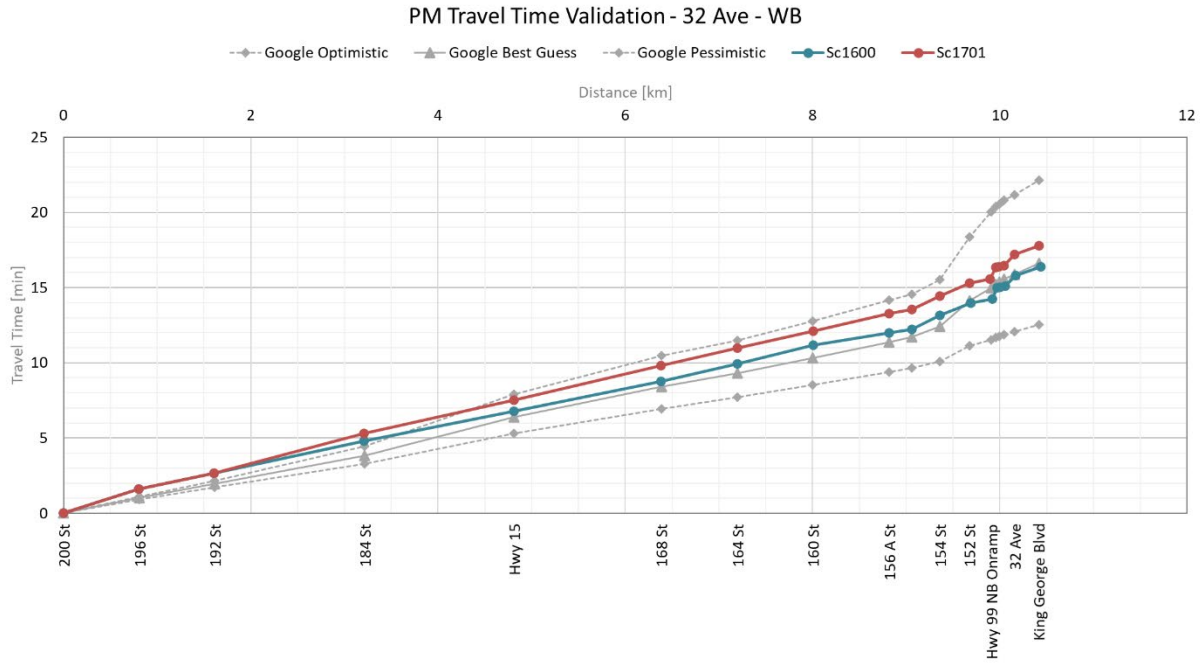
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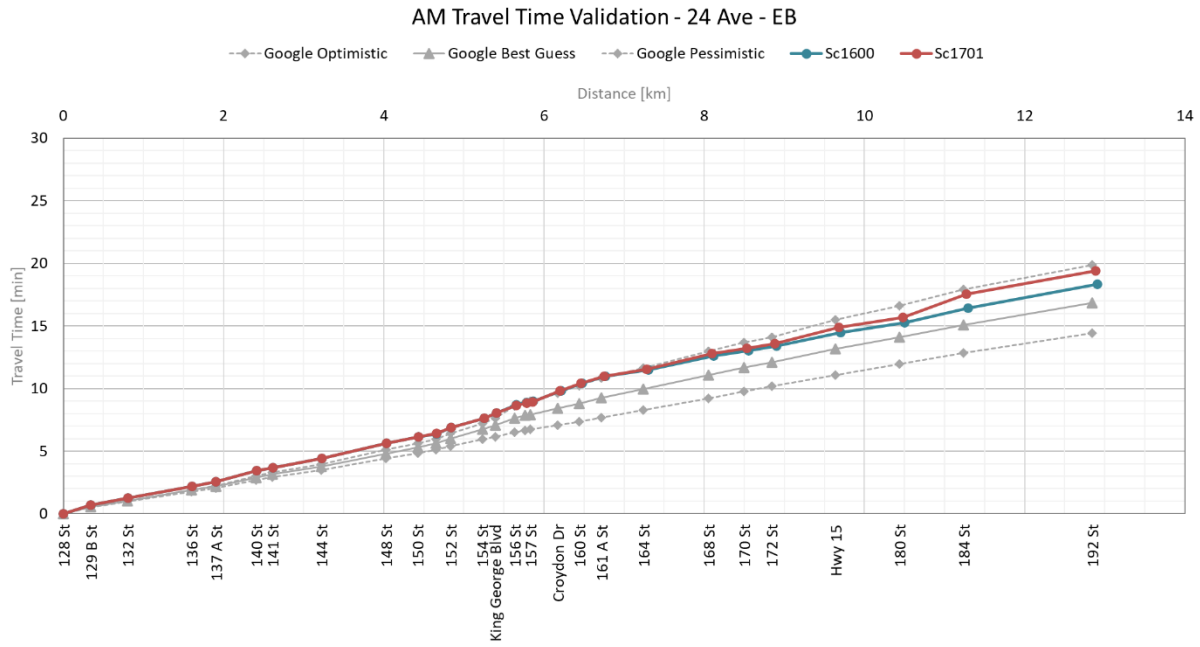
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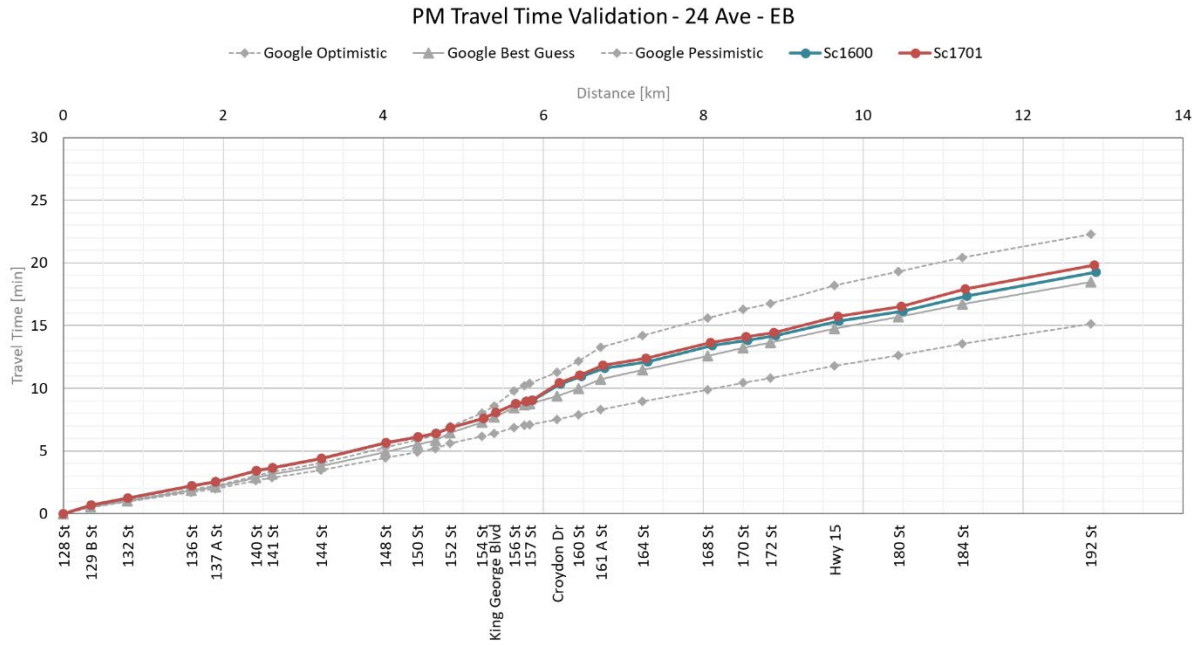
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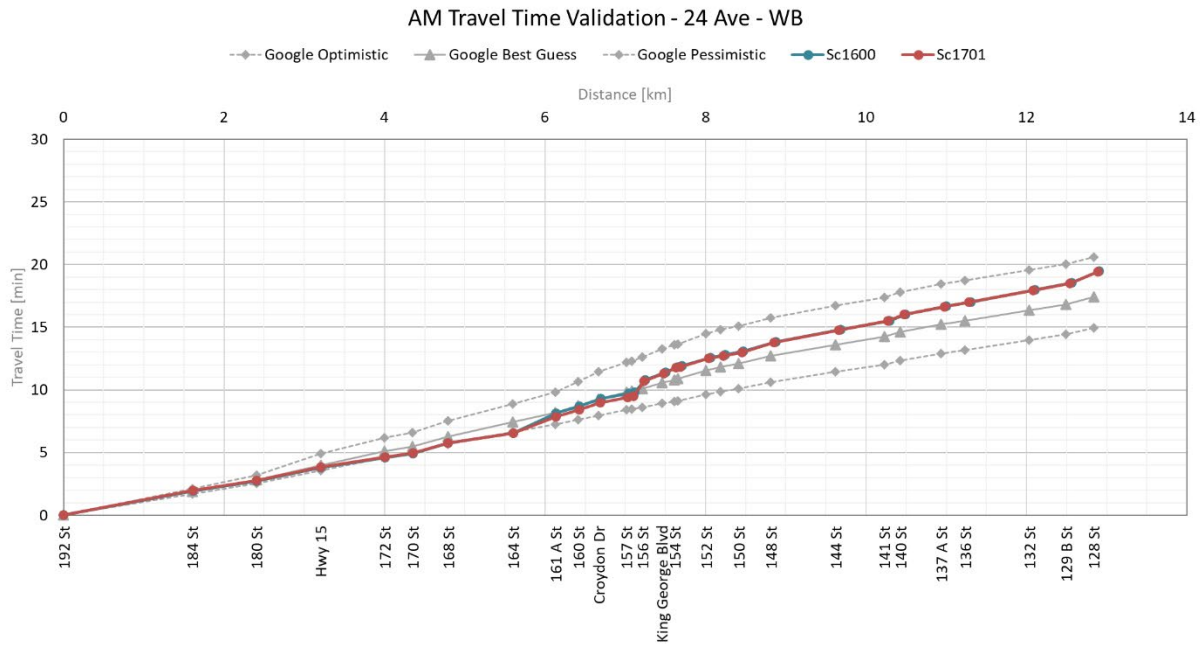
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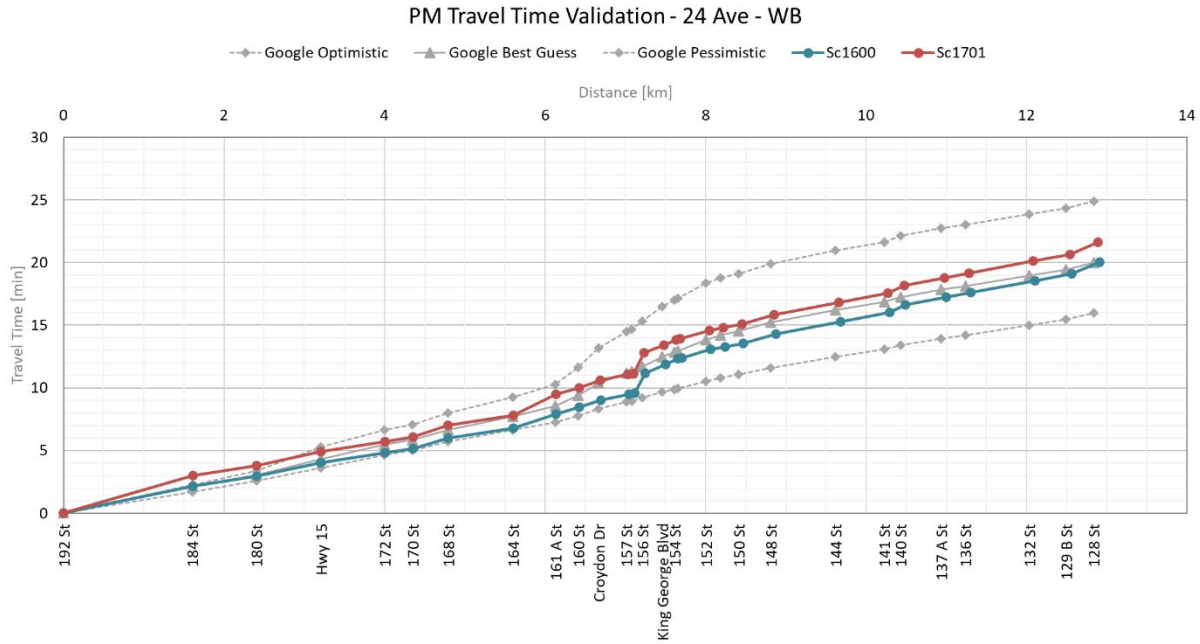
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Croydon Dr
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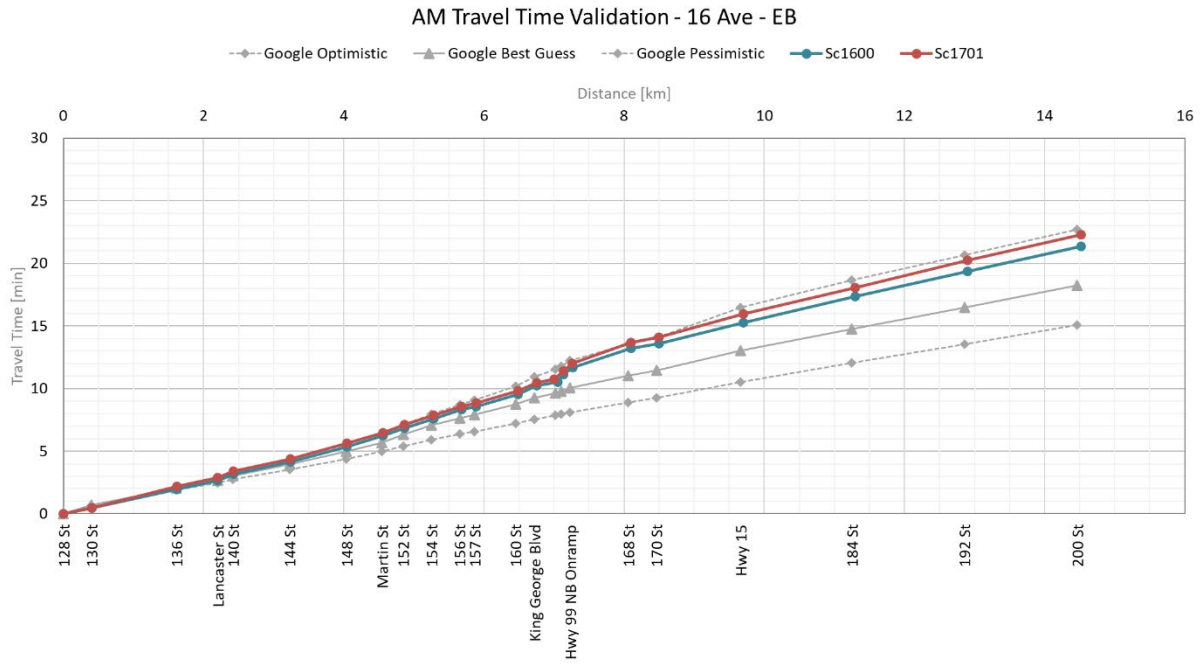
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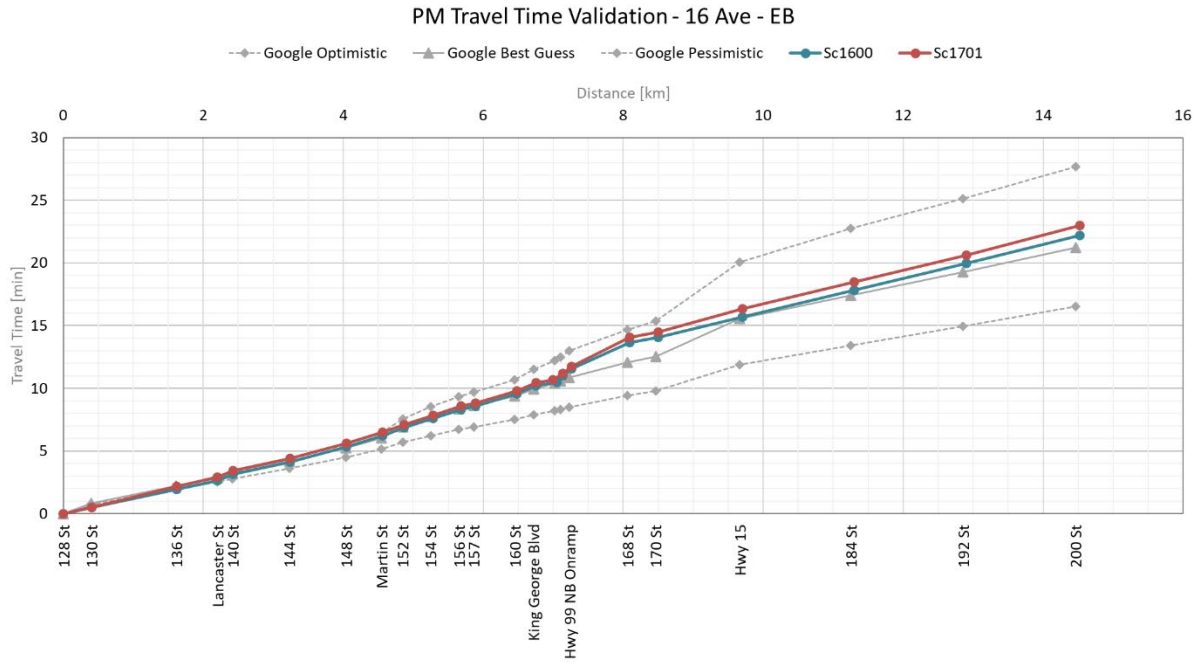
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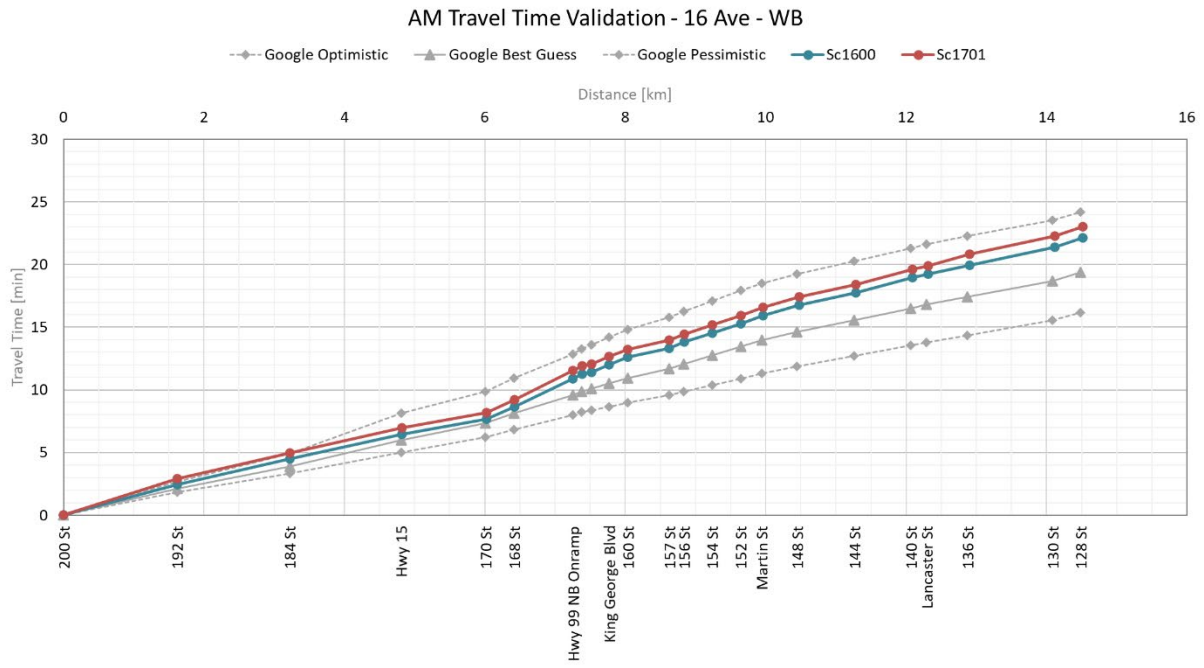
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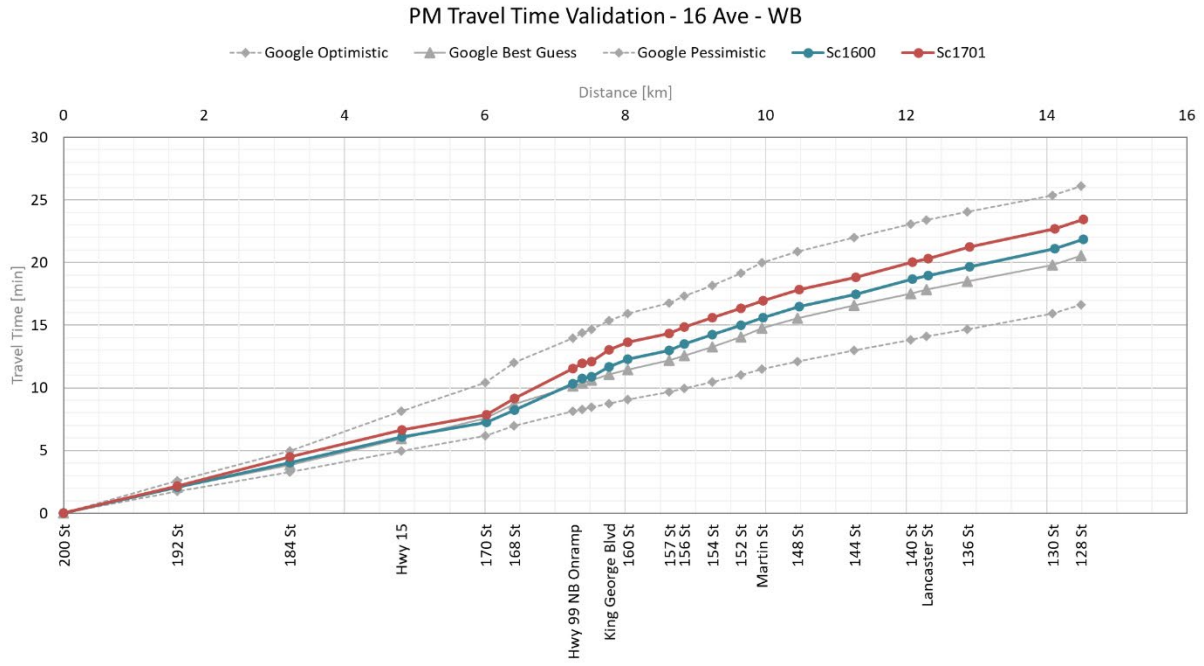
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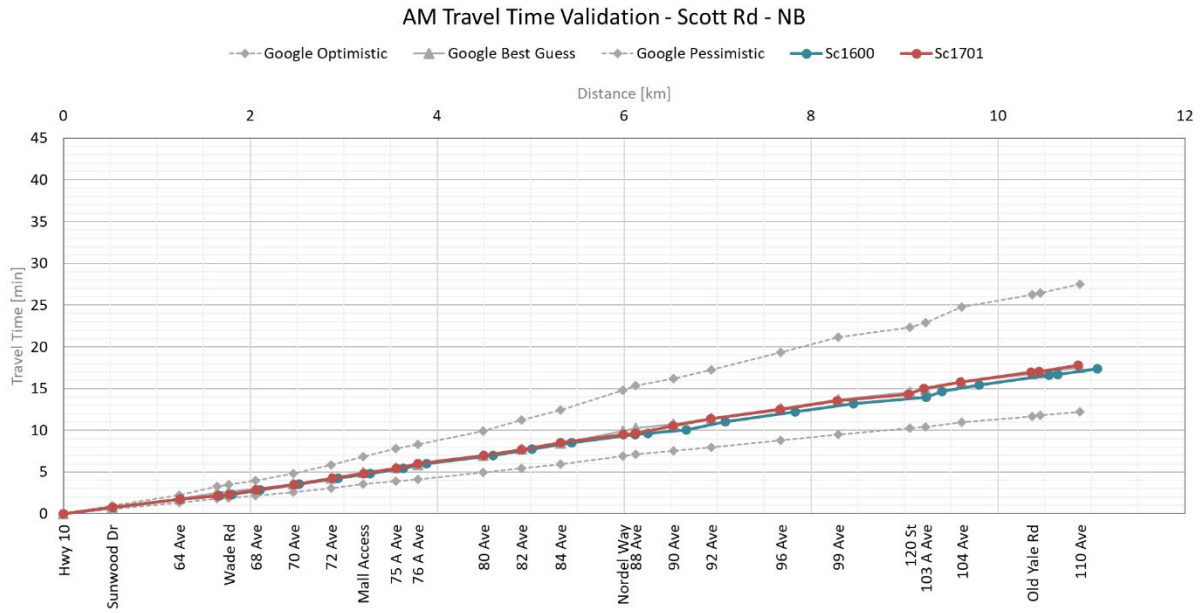
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Hwy 10
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64 Ave
Wade Rd
68 Ave
70 Ave
72 Ave
Mall Access
75 A Ave
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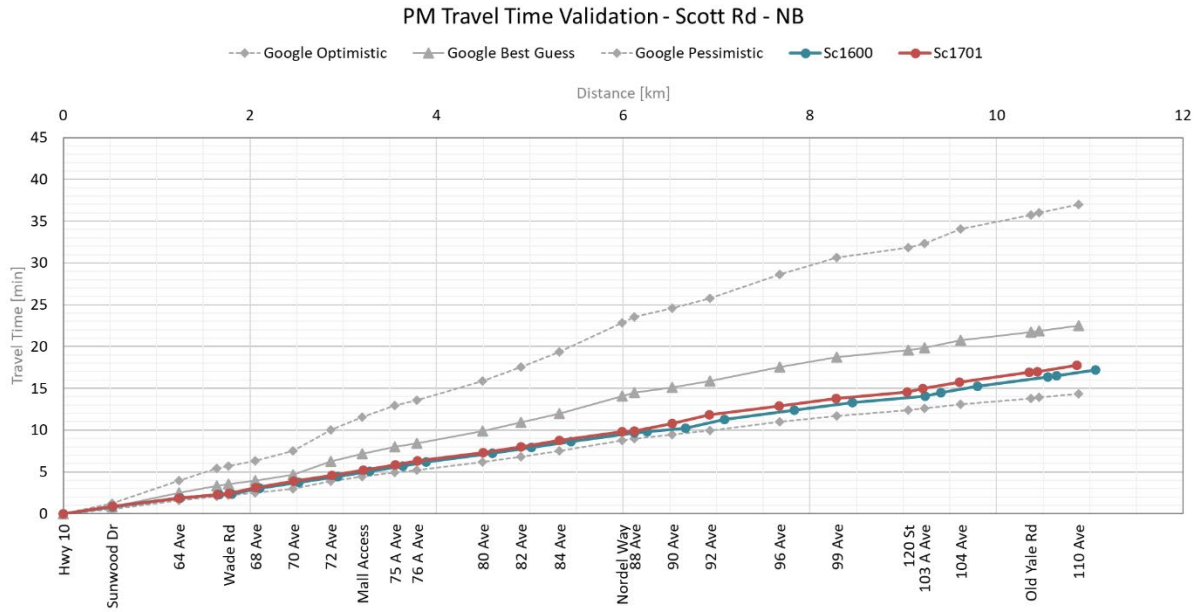
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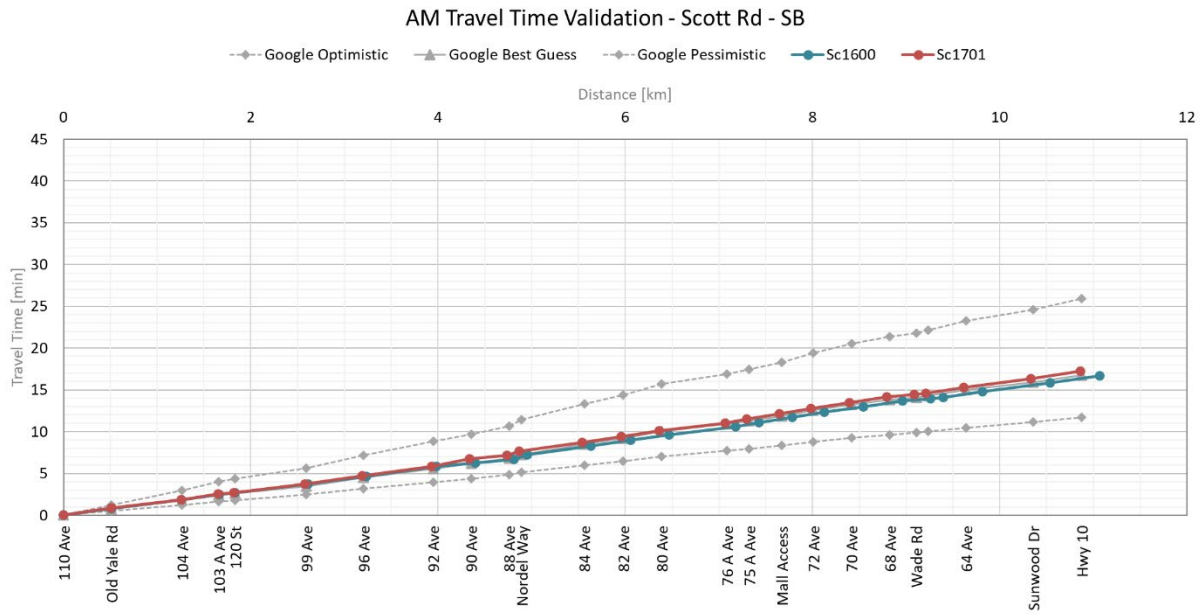
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Travel Time [min]
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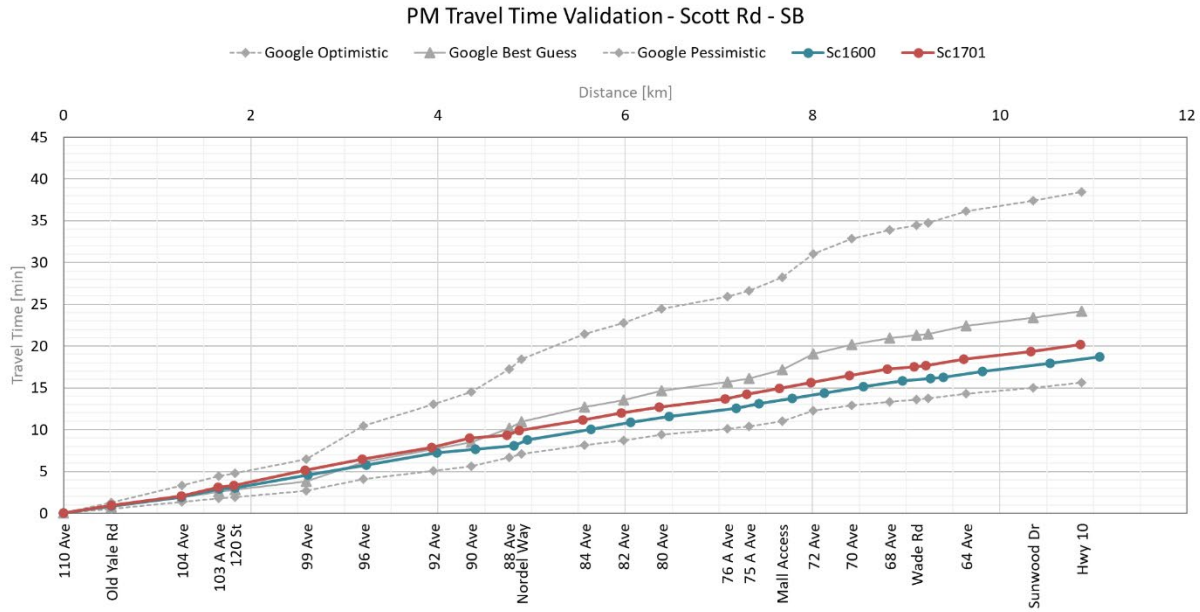
PM Travel Time Validation - Scott Rd - SB
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Google Best Guess
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Sc1701
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Travel Time [min]
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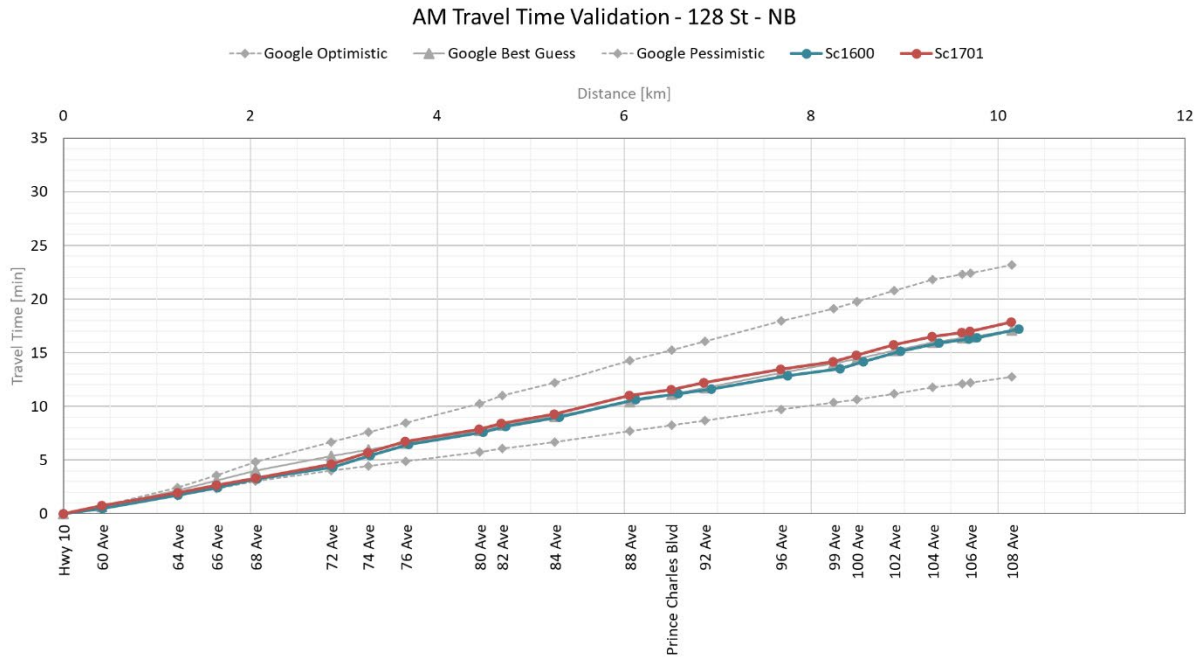
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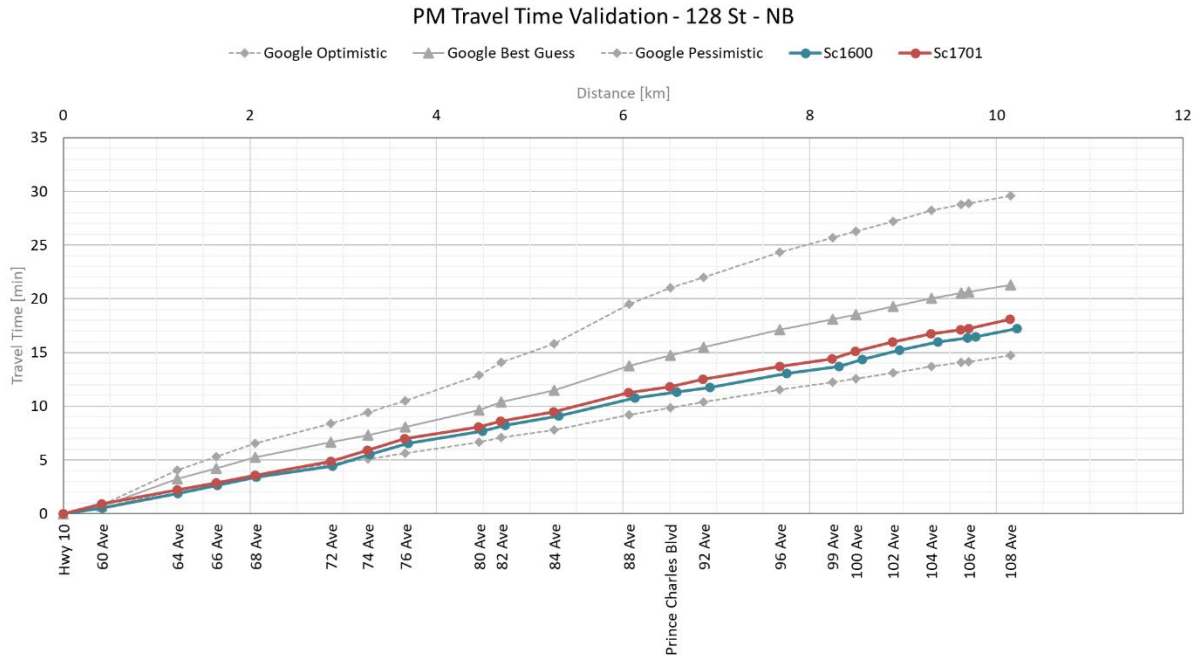
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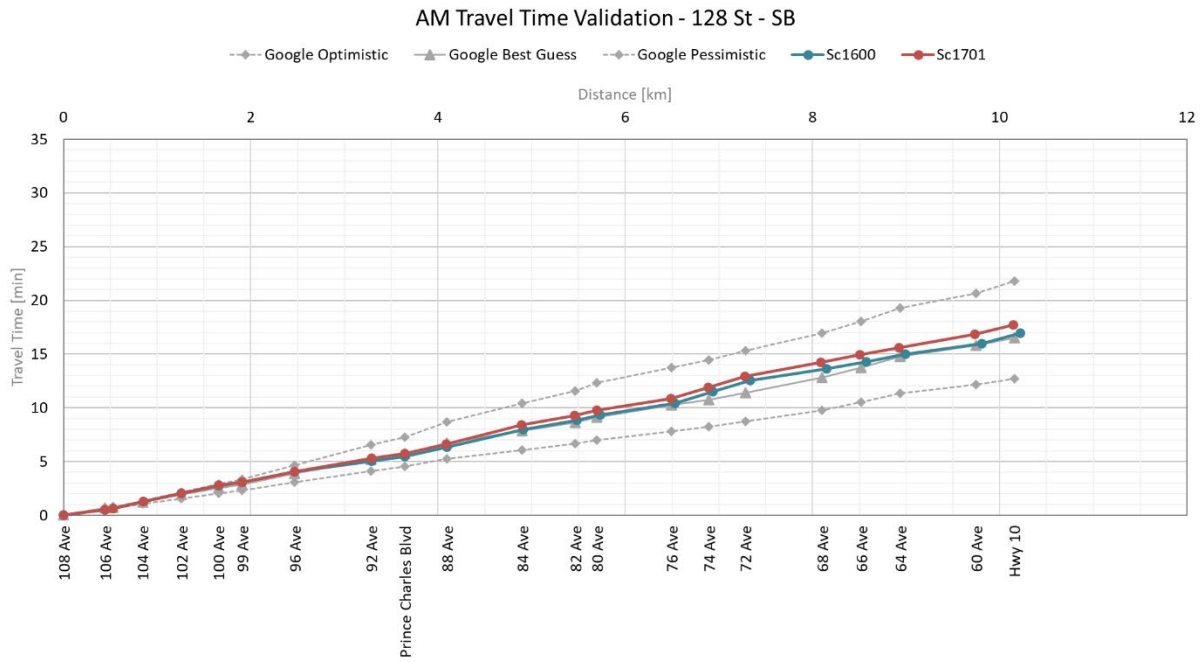
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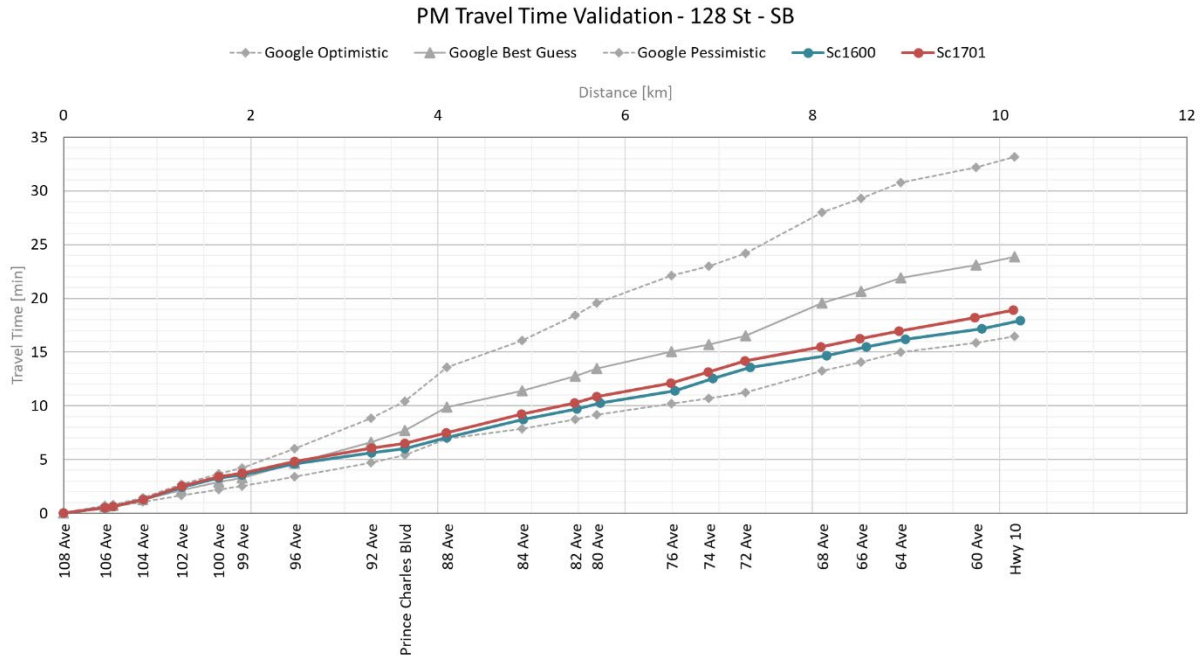
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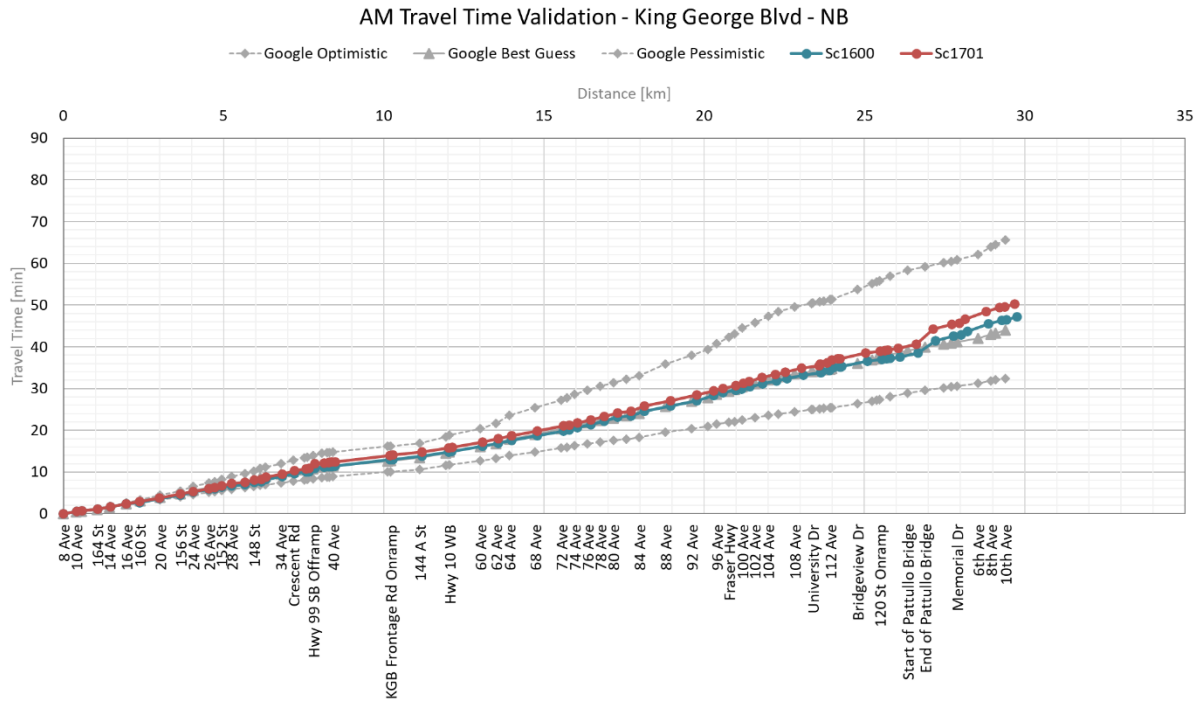
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KGB Frontage Rd Onramp
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96 Ave
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102 Ave
104 Ave
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Bridgeview Dr
120 St Onramp
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End of Pattullo Bridge
Memorial Dr
6th Ave
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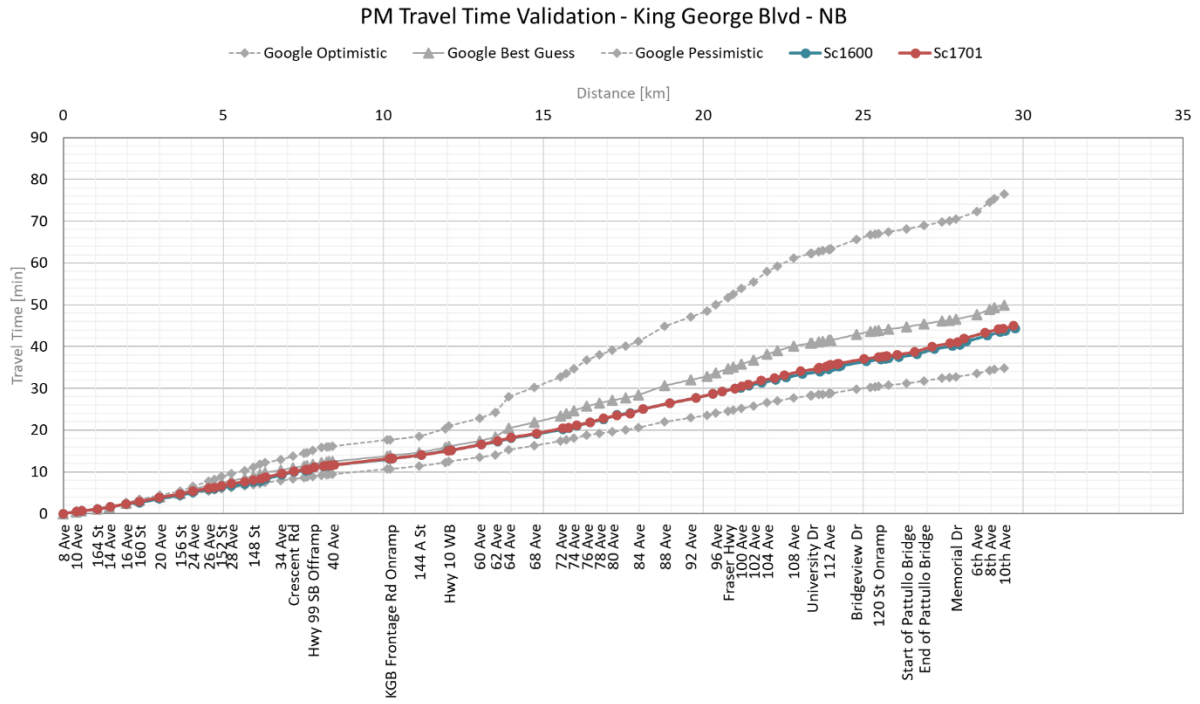
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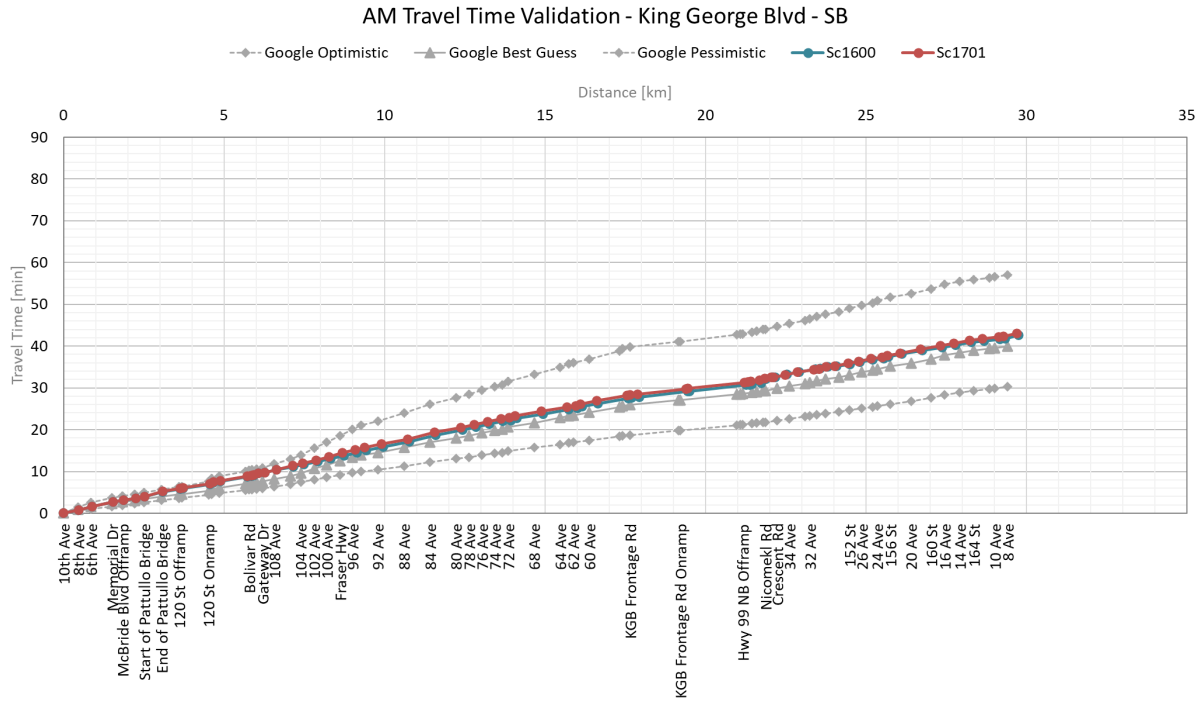
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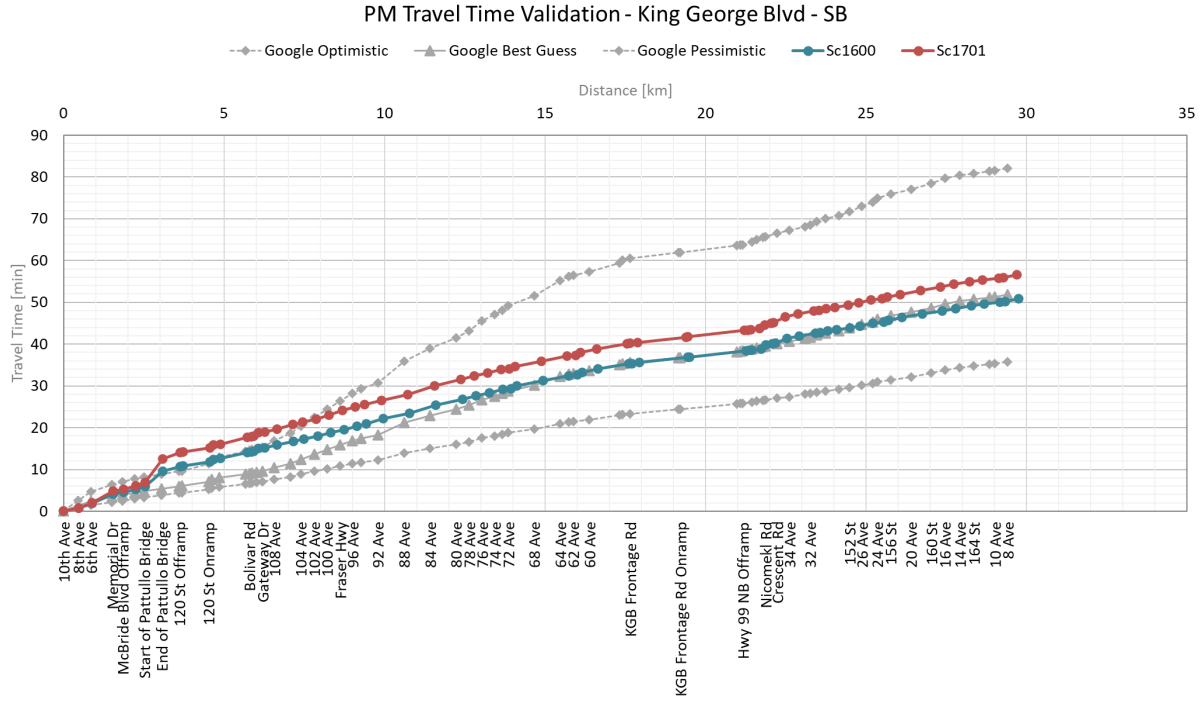
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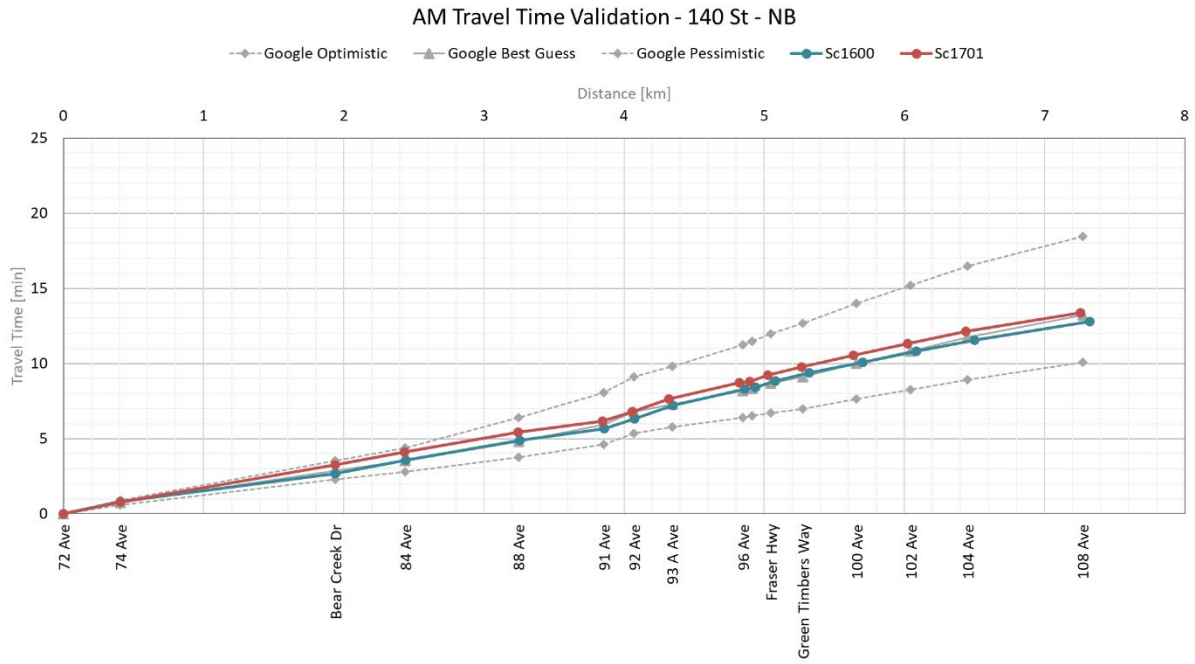
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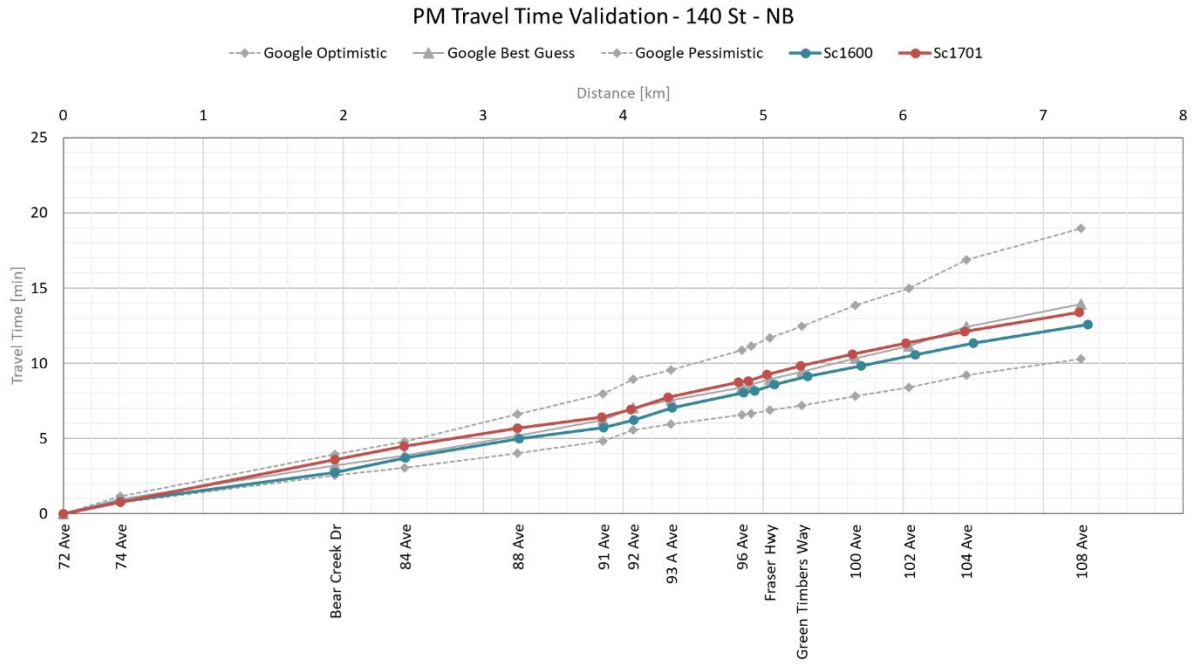
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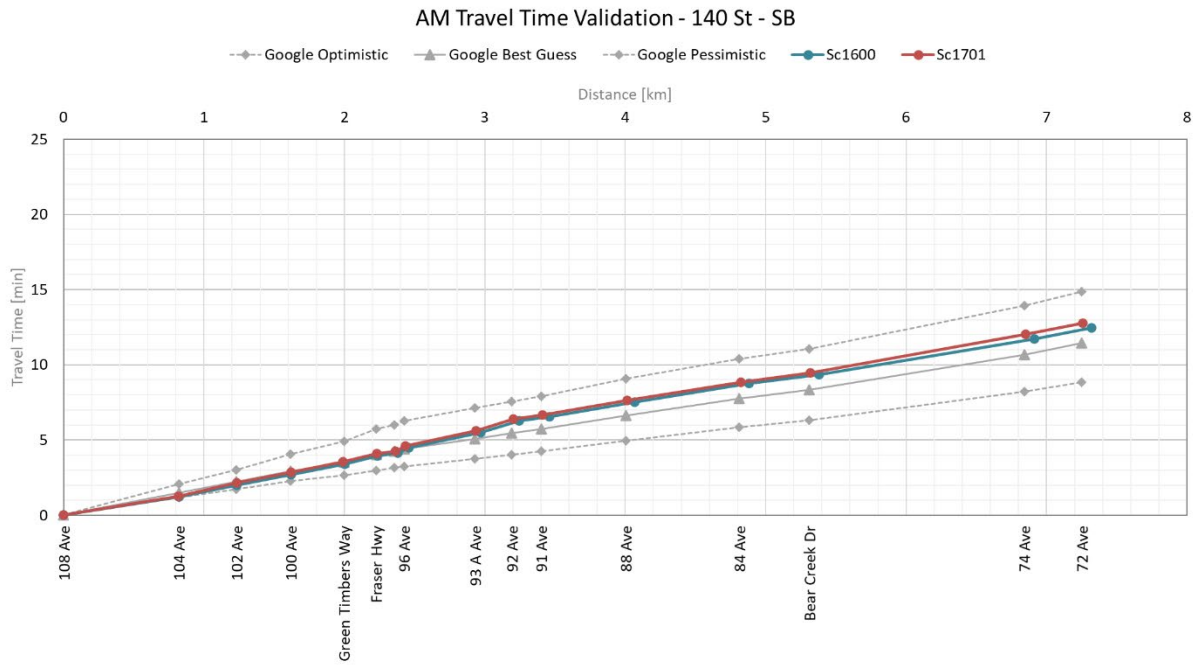
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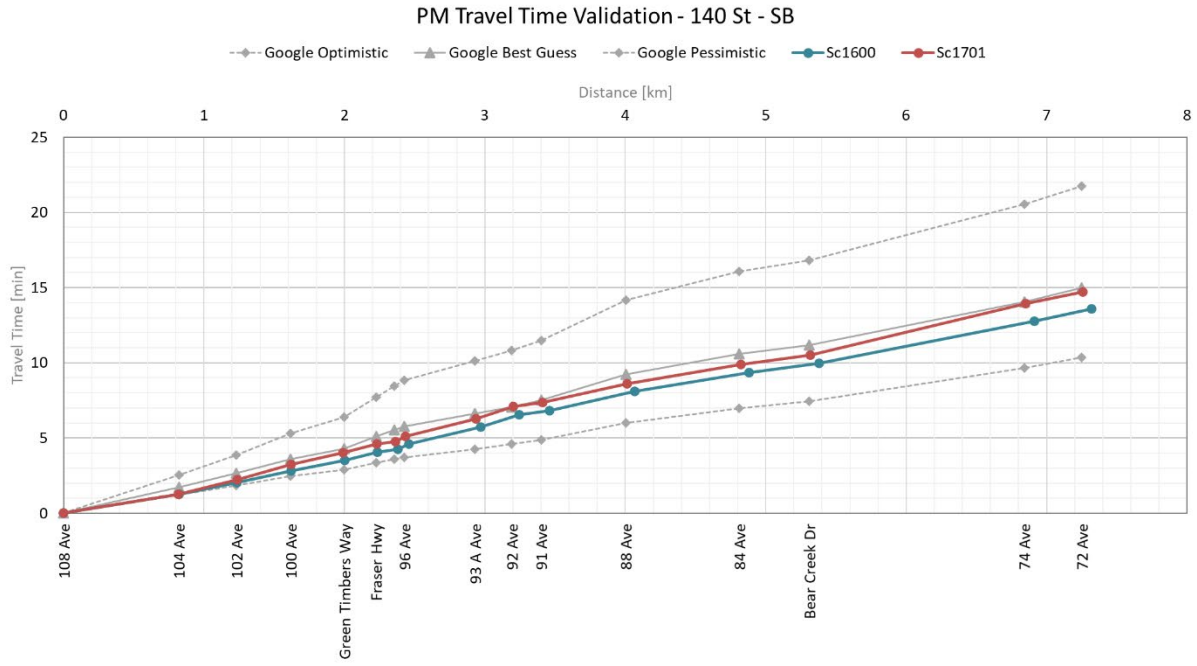
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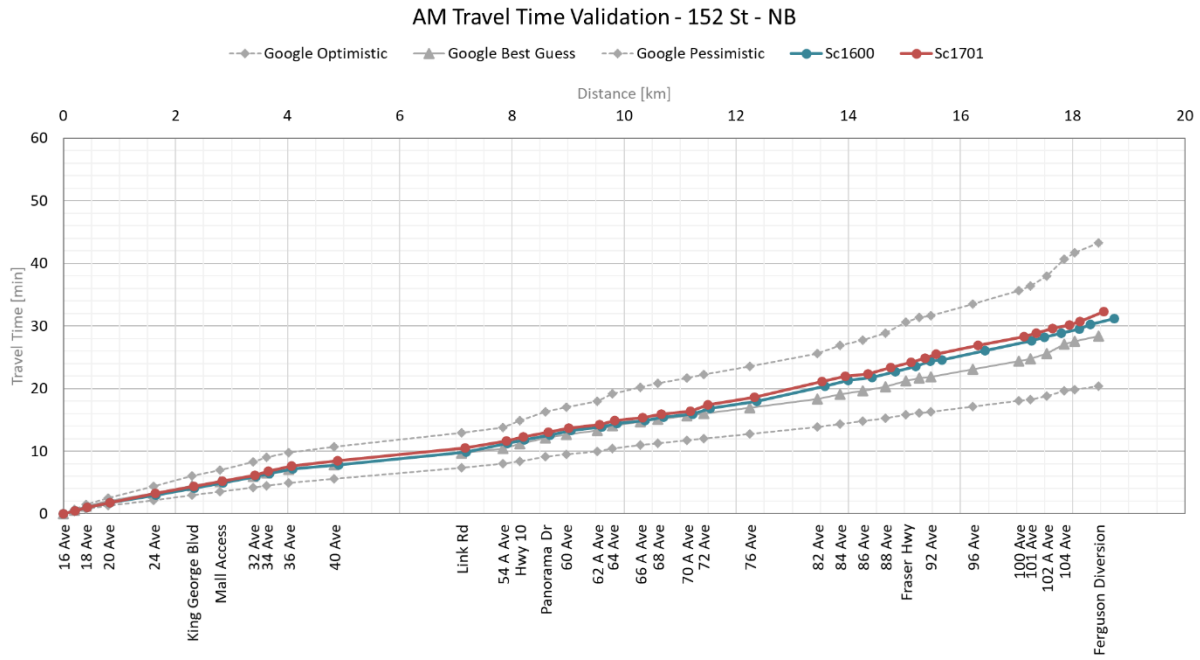
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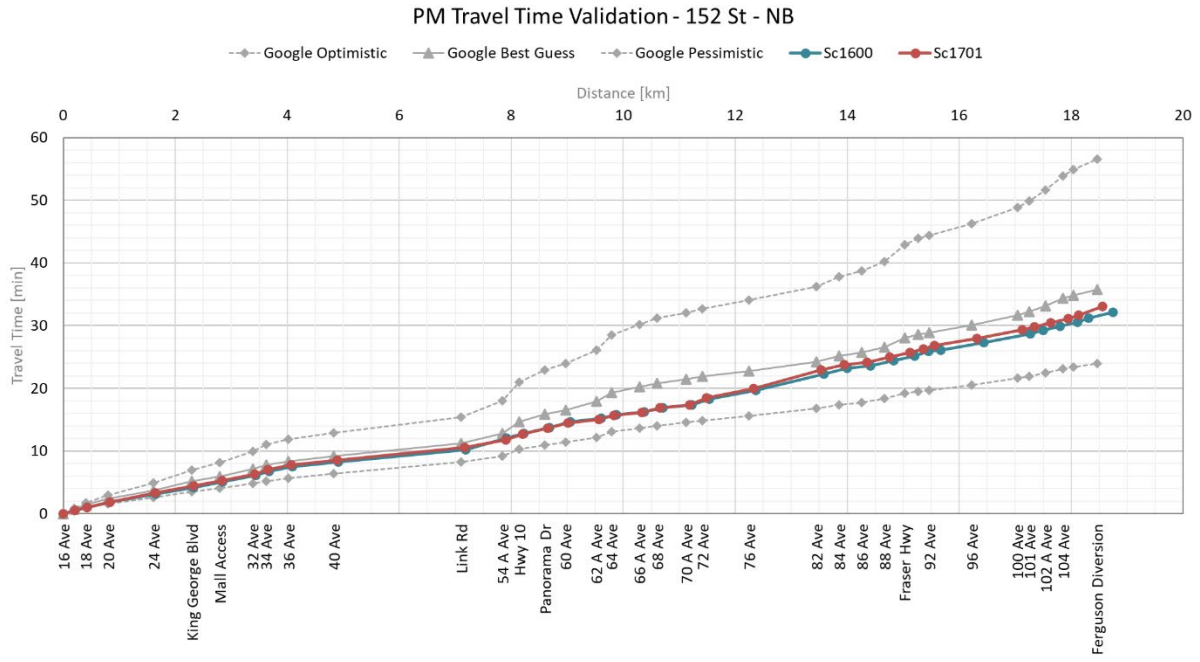
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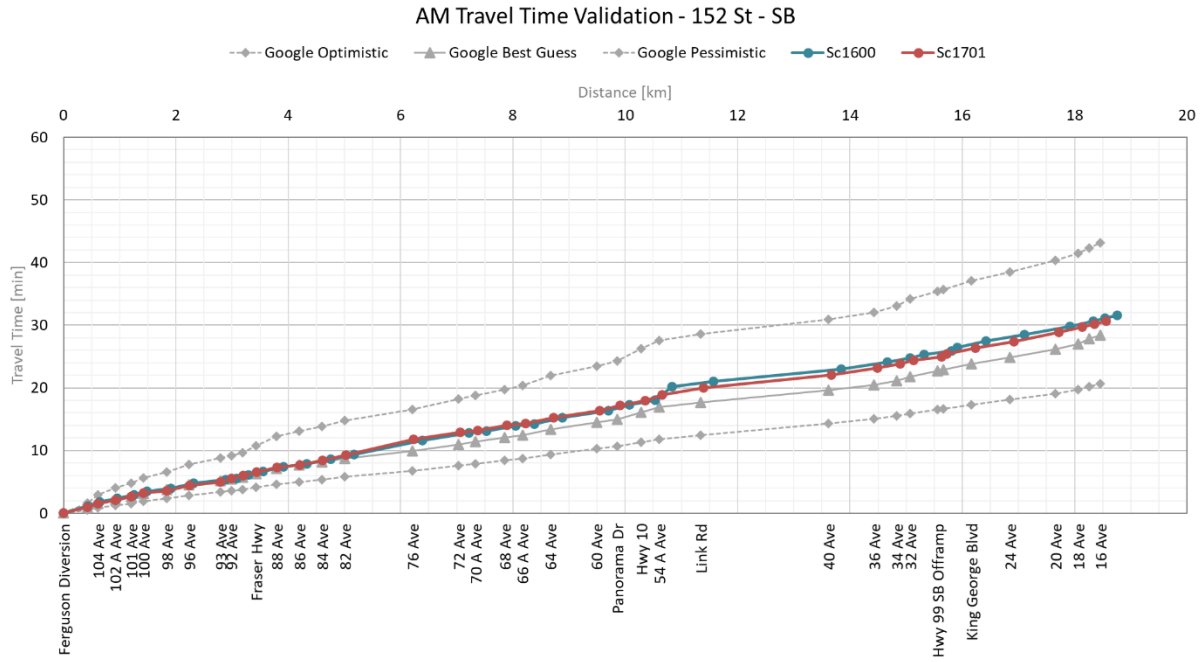
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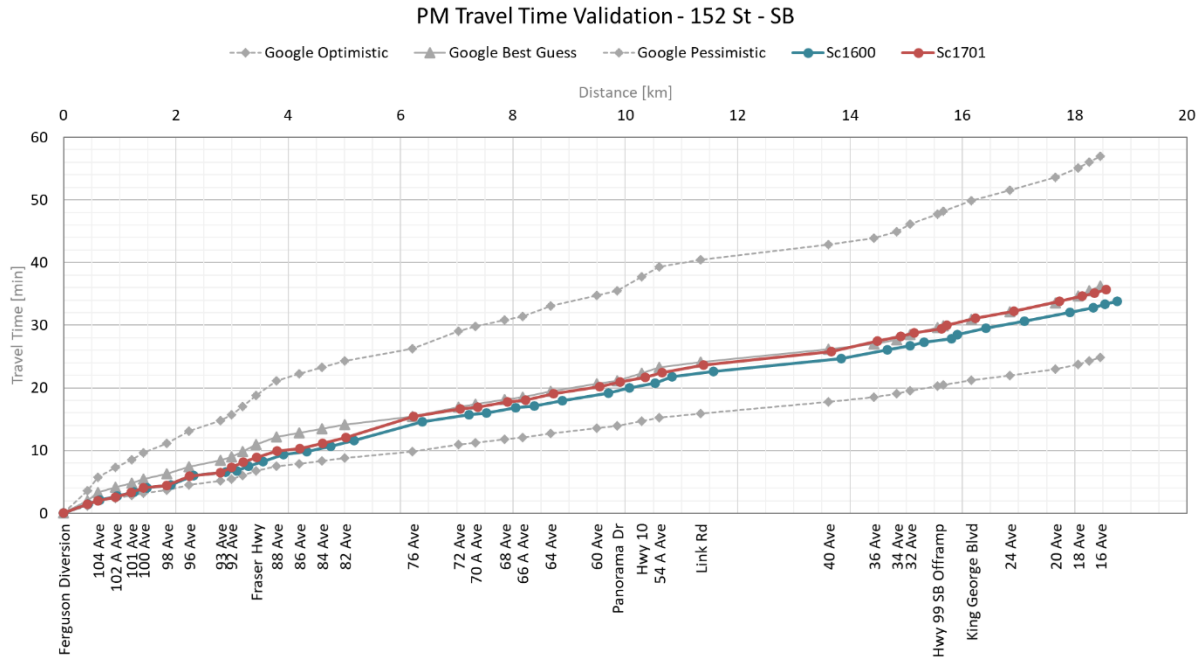
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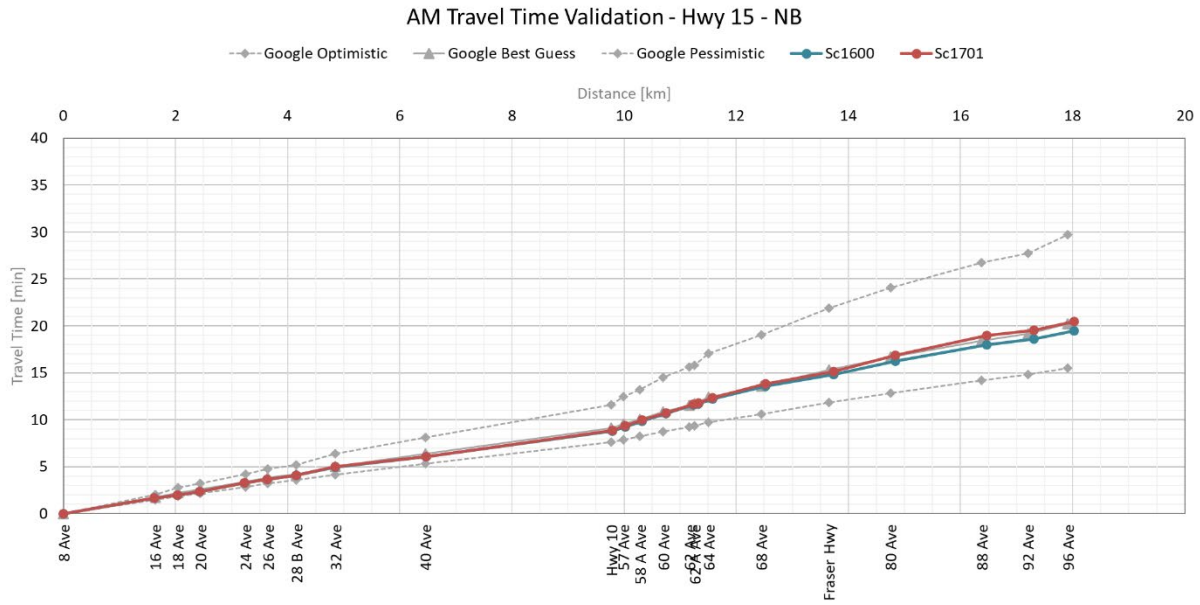
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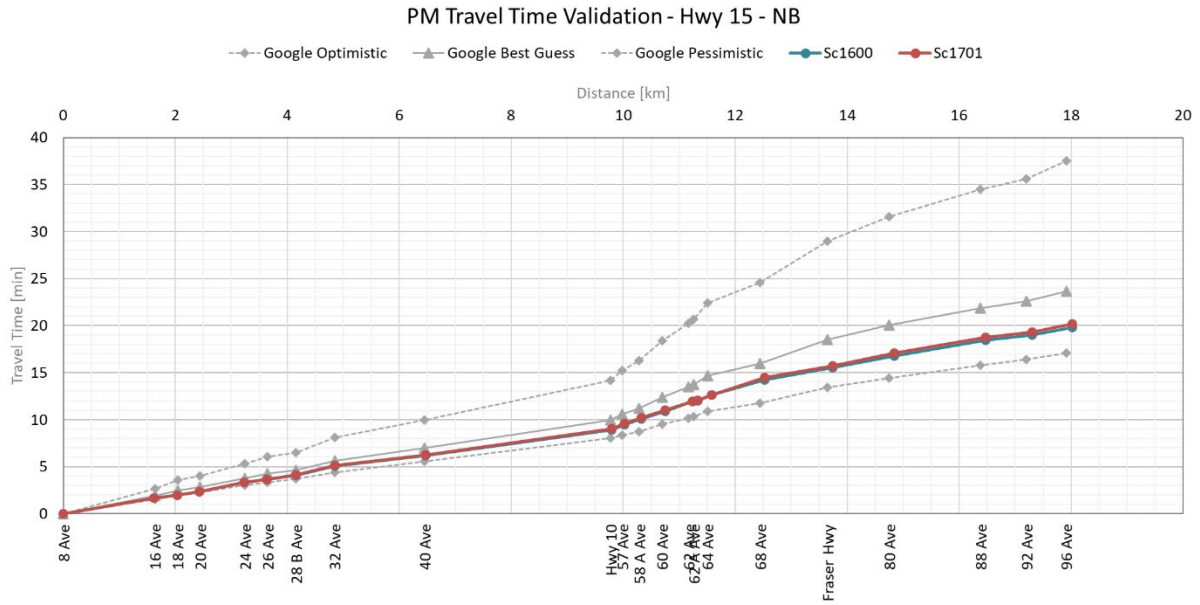
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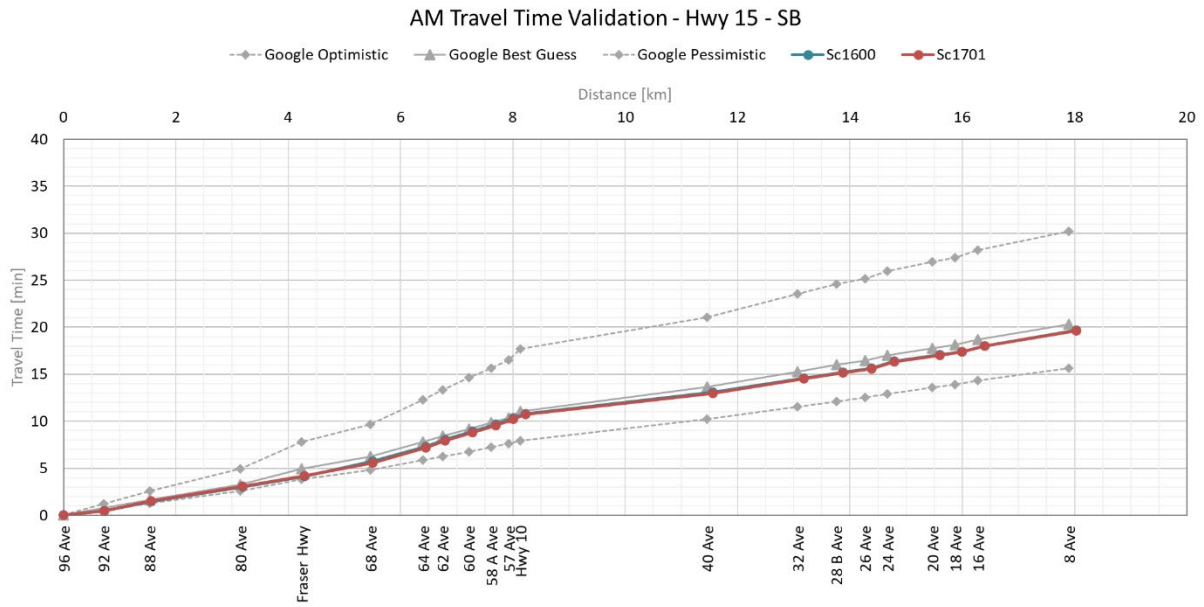
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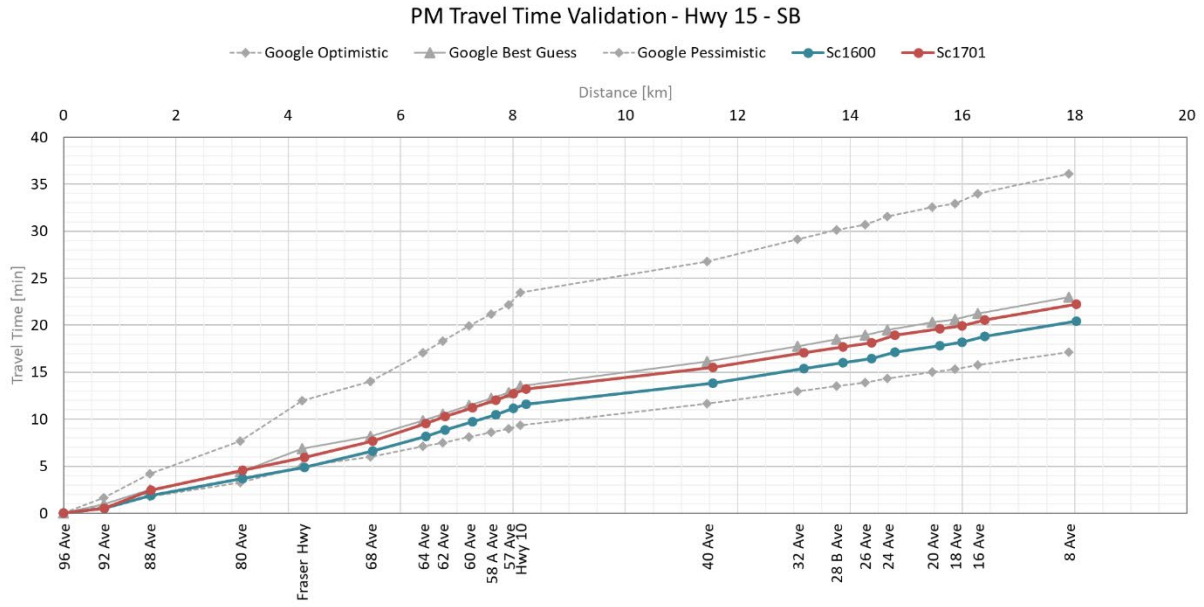
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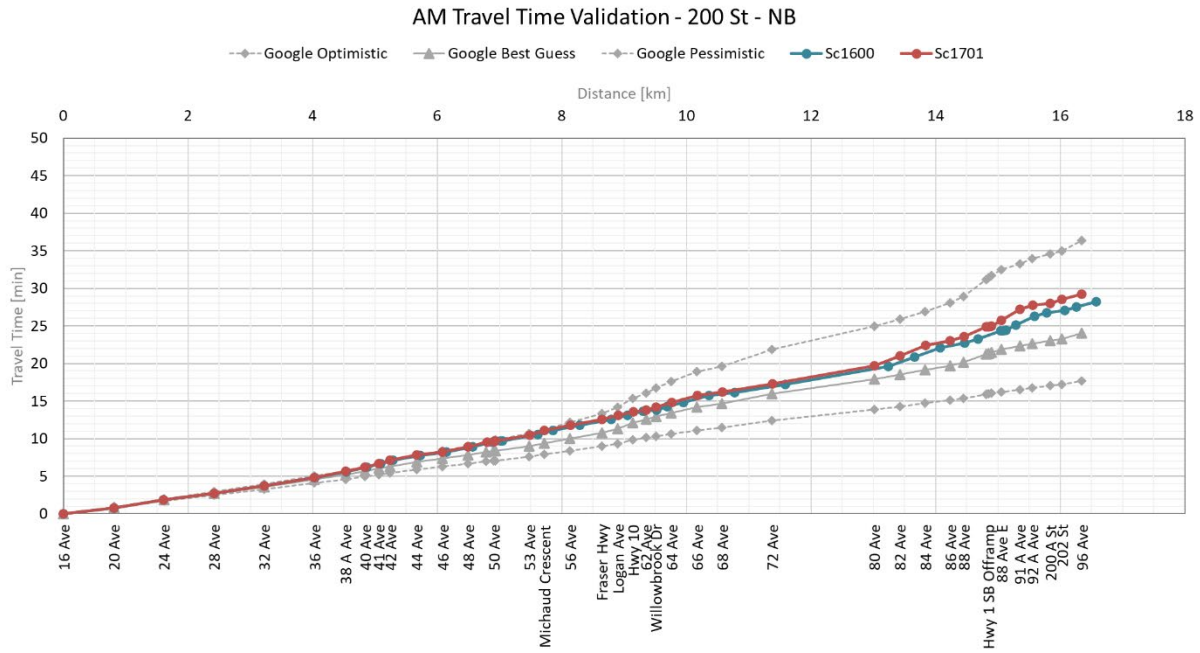
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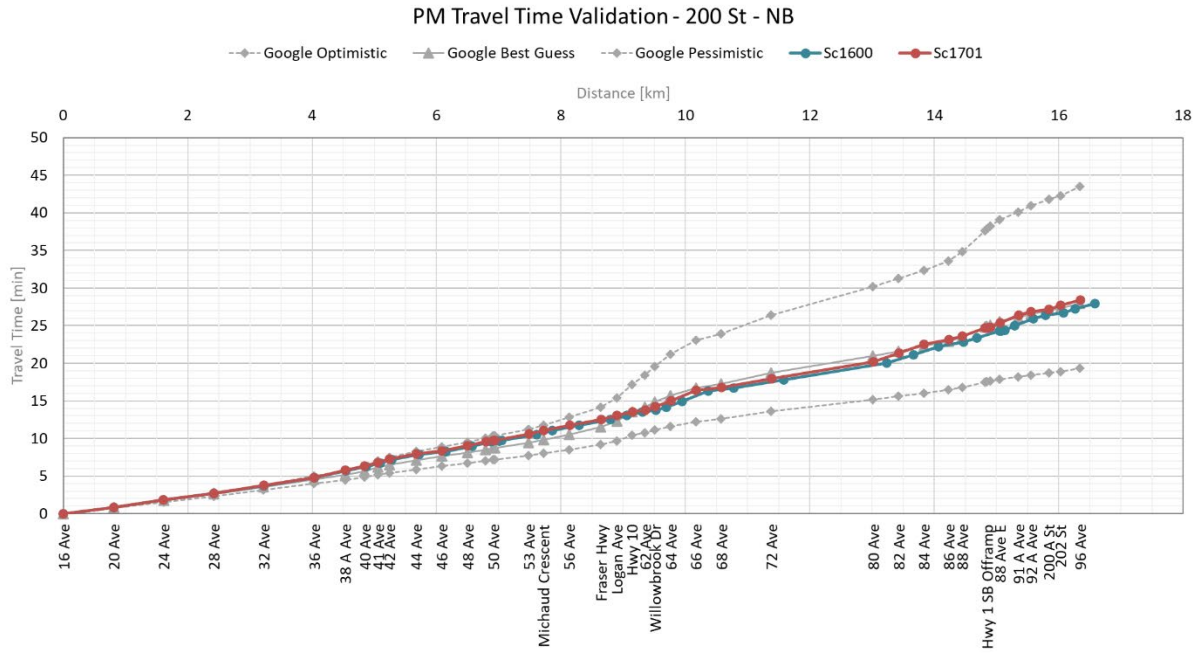
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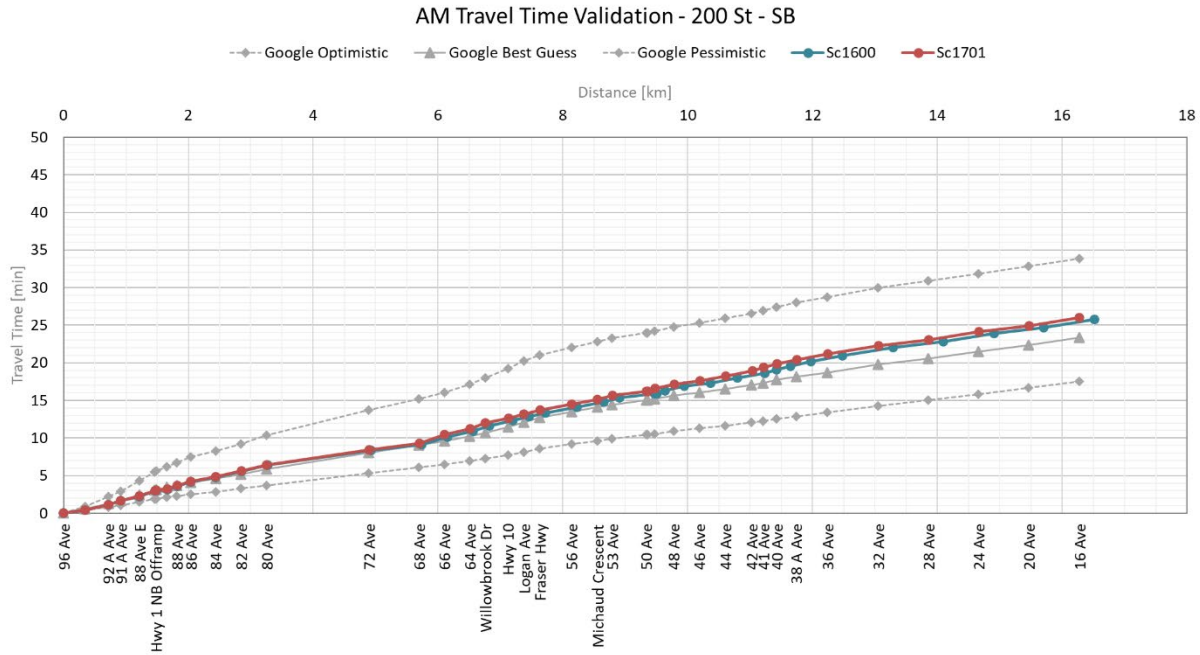
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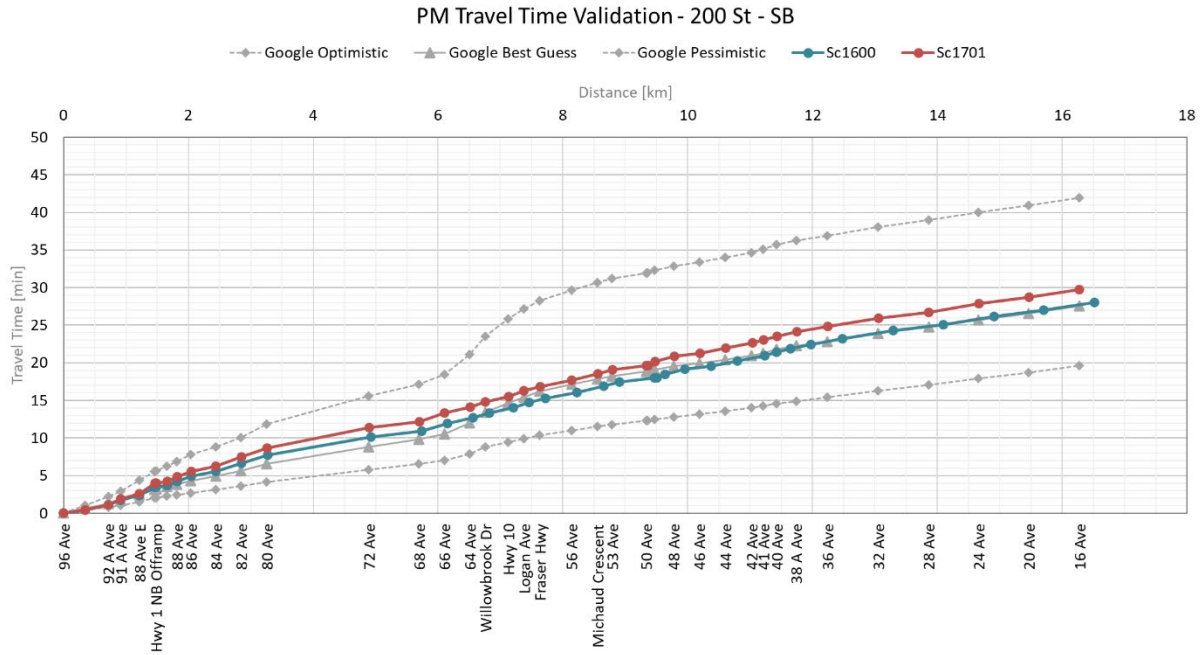
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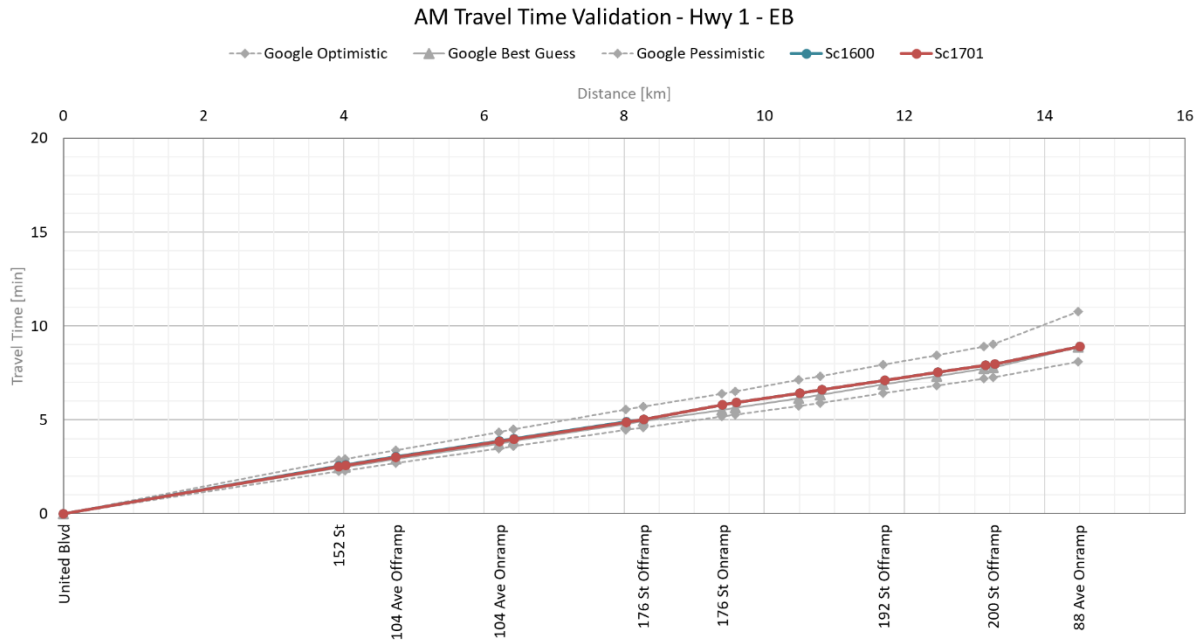
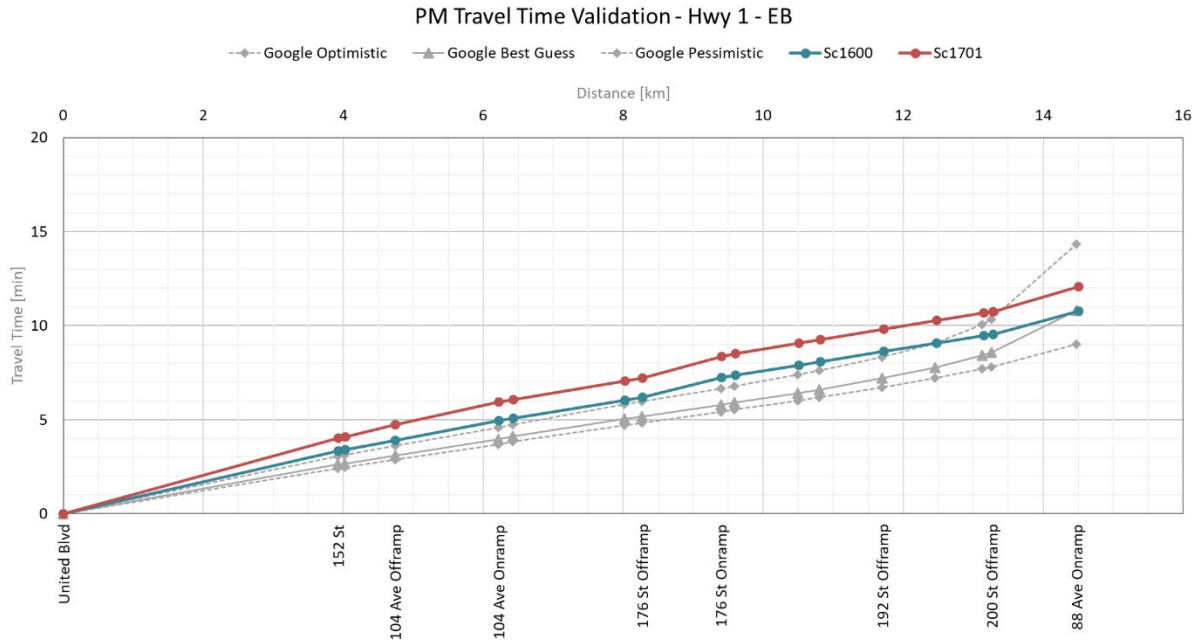
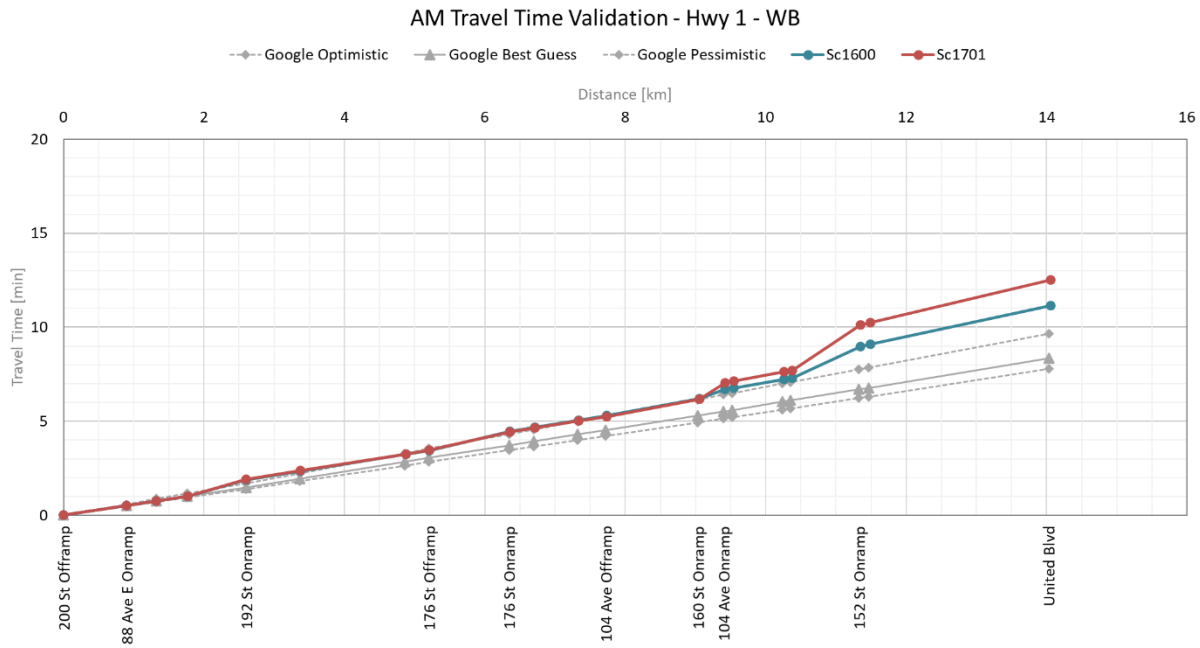
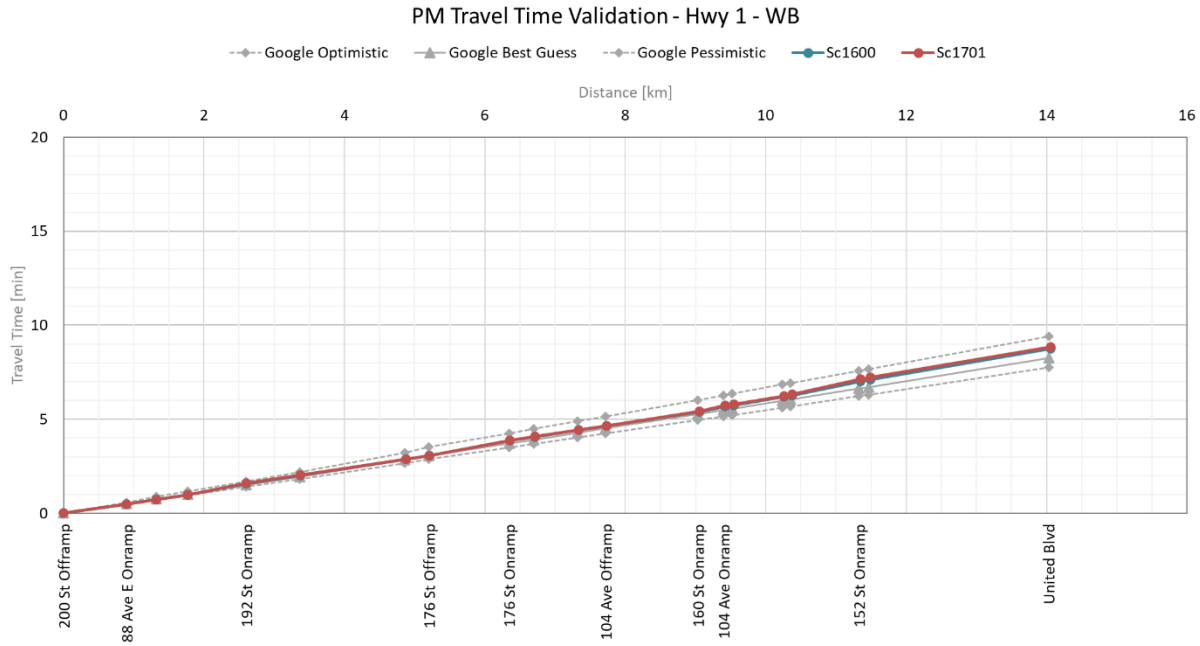
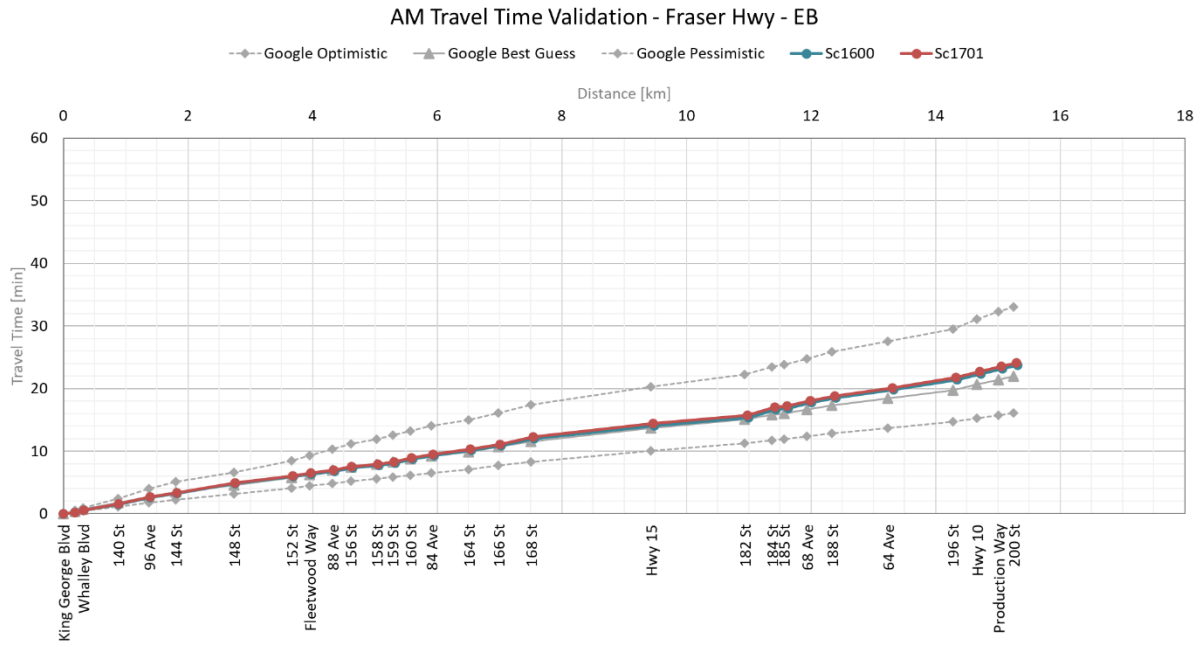
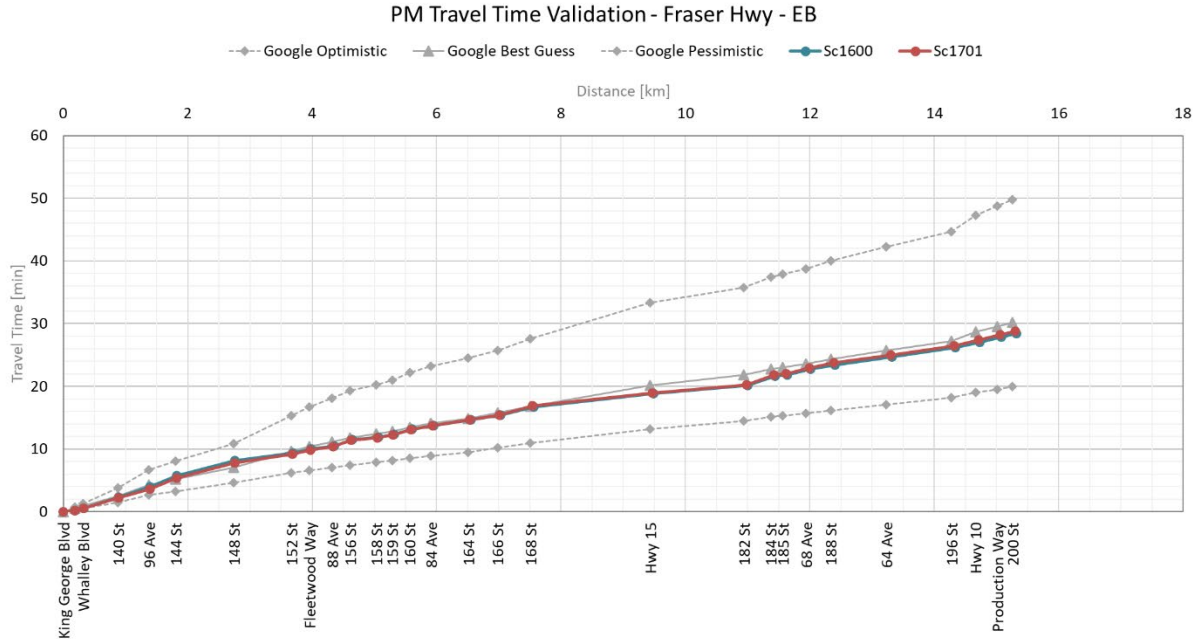

AM Travel Time Validation - Hwy 1 - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
Travel Time [min]
0
5
10
15
20
United Blvd
152 St
104 Ave Offramp
104 Ave Onramp
176 St Offramp
176 St Onramp
192 St Offramp
200 St Offramp
88 Ave Onramp

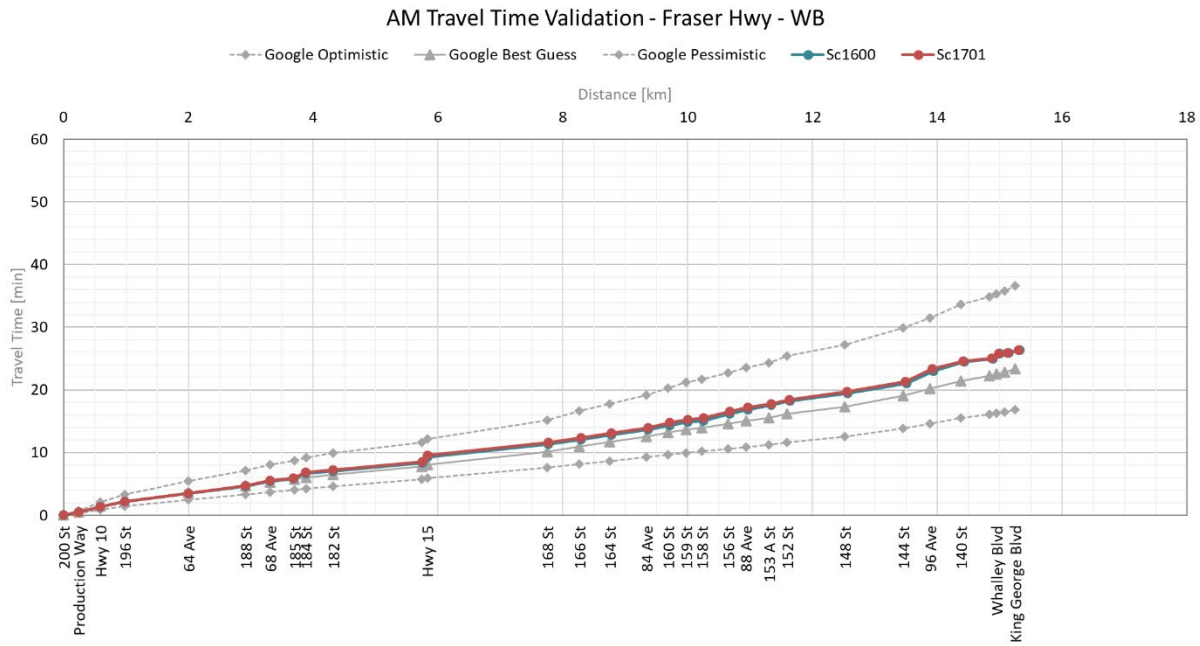

PM Travel Time Validation - Hwy 1 - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
Travel Time [min]
0
5
10
15
20
United Blvd
152 St
104 Ave Offramp
104 Ave Onramp
176 St Offramp
176 St Onramp
192 St Offramp
200 St Offramp
88 Ave Onramp

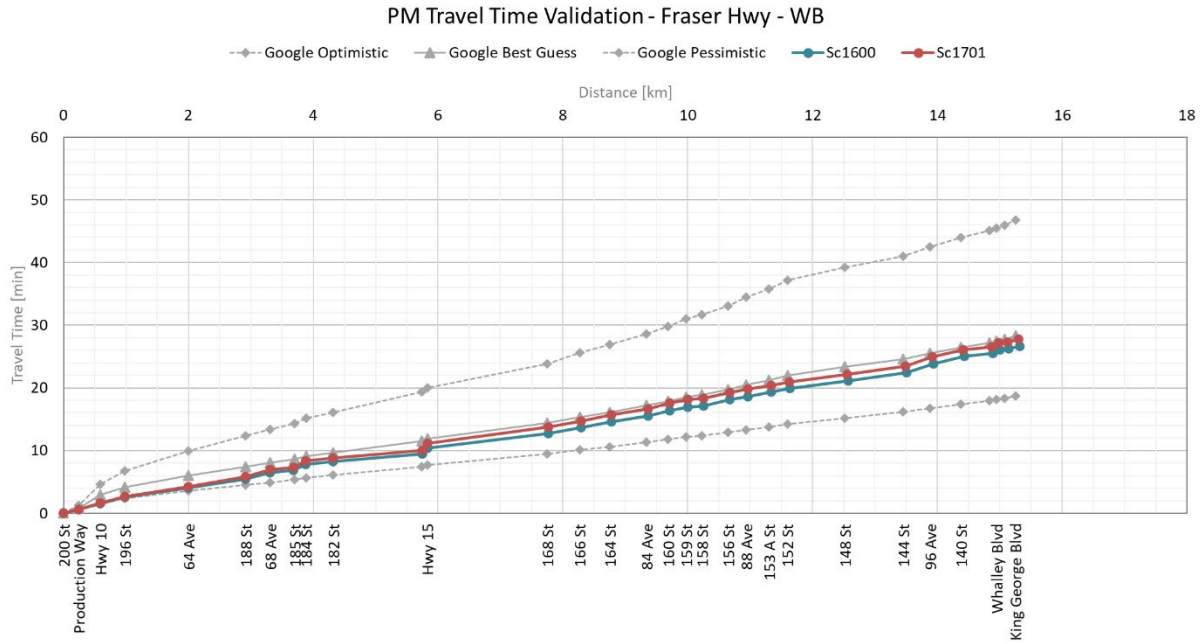

AM Travel Time Validation - Hwy 1 - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
Travel Time [min]
0
5
10
15
20
200 St Offramp
88 Ave E Onramp
192 St Onramp
176 St Offramp
176 St Onramp
104 Ave Offramp
160 St Onramp
104 Ave Onramp
152 St Onramp
United Blvd

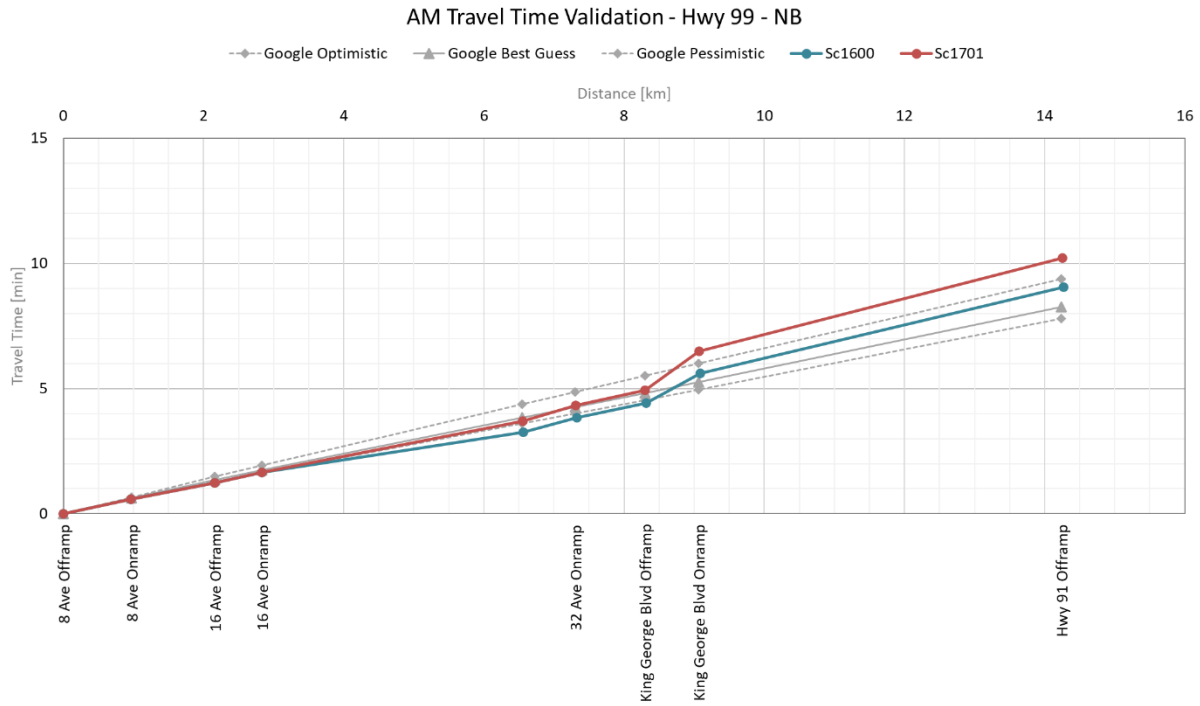

PM Travel Time Validation - Hwy 1 - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
Travel Time [min]
0
5
10
15
20
200 St Offramp
88 Ave E Onramp
192 St Onramp
176 St Offramp
176 St Onramp
104 Ave Offramp
160 St Onramp
104 Ave Onramp
152 St Onramp
United Blvd

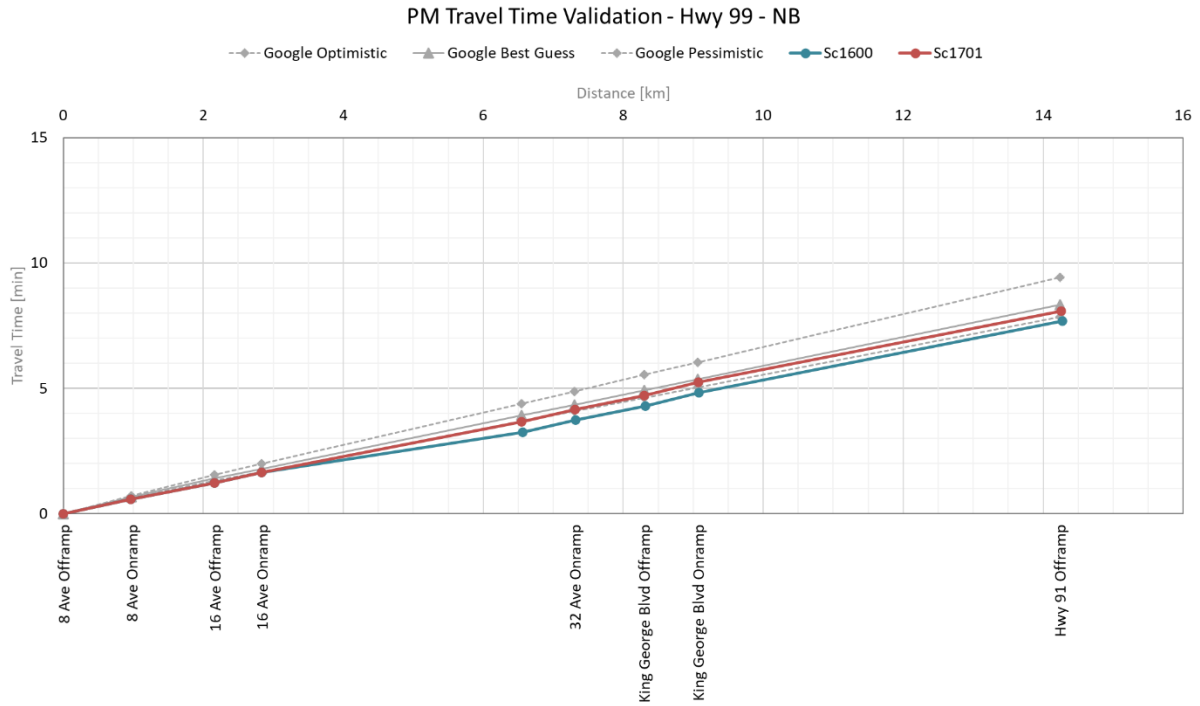

AM Travel Time Validation - Fraser Hwy - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
18
Travel Time [min]
0
10
20
30
40
50
60
King George Blvd
Whalley Blvd
140 St
96 Ave
144 St
148 St
152 St
Fleetwood Way
88 Ave
156 St
158 St
159 St
160 St
84 Ave
164 St
166 St
168 St
Hwy 15
182 St
184 St
185 St
68 Ave
188 St
64 Ave
196 St
Hwy 10
Production Way
200 St

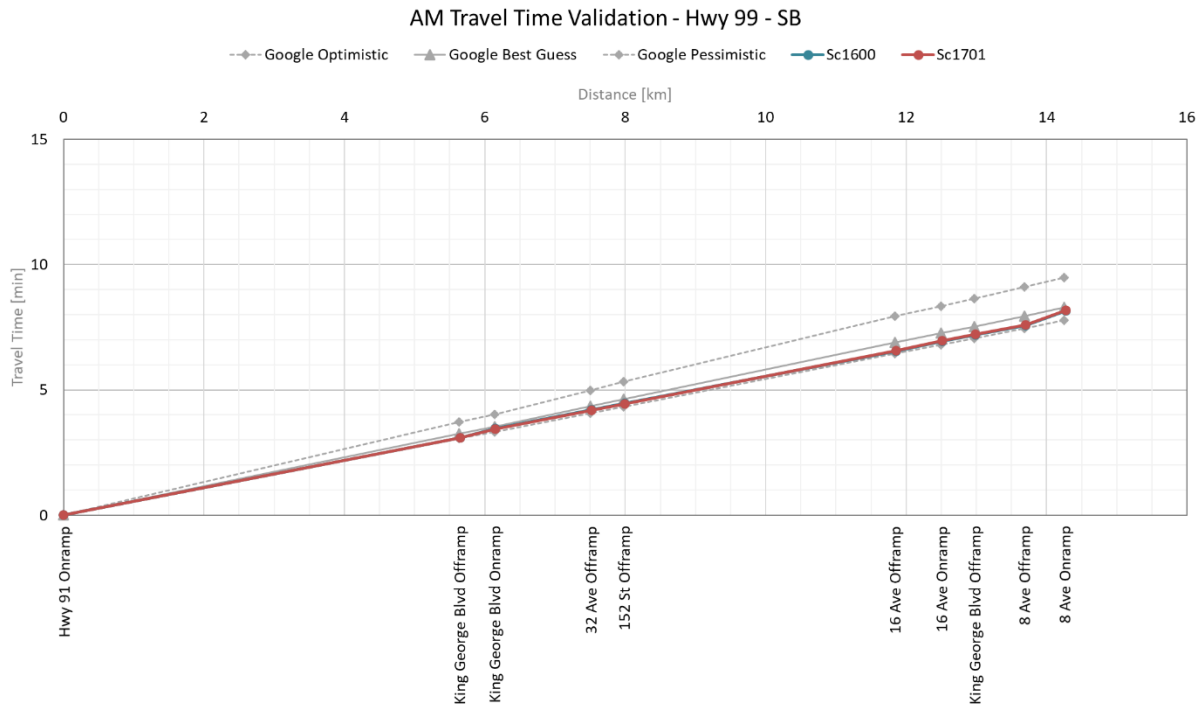

PM Travel Time Validation - Fraser Hwy - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
18
Travel Time [min]
0
10
20
30
40
50
60
King George Blvd
Whalley Blvd
140 St
96 Ave
144 St
148 St
152 St
Fleetwood Way
88 Ave
156 St
158 St
159 St
160 St
84 Ave
164 St
166 St
168 St
Hwy 15
182 St
184 St
185 St
68 Ave
188 St
64 Ave
196 St
Hwy 10
Production Way
200 St

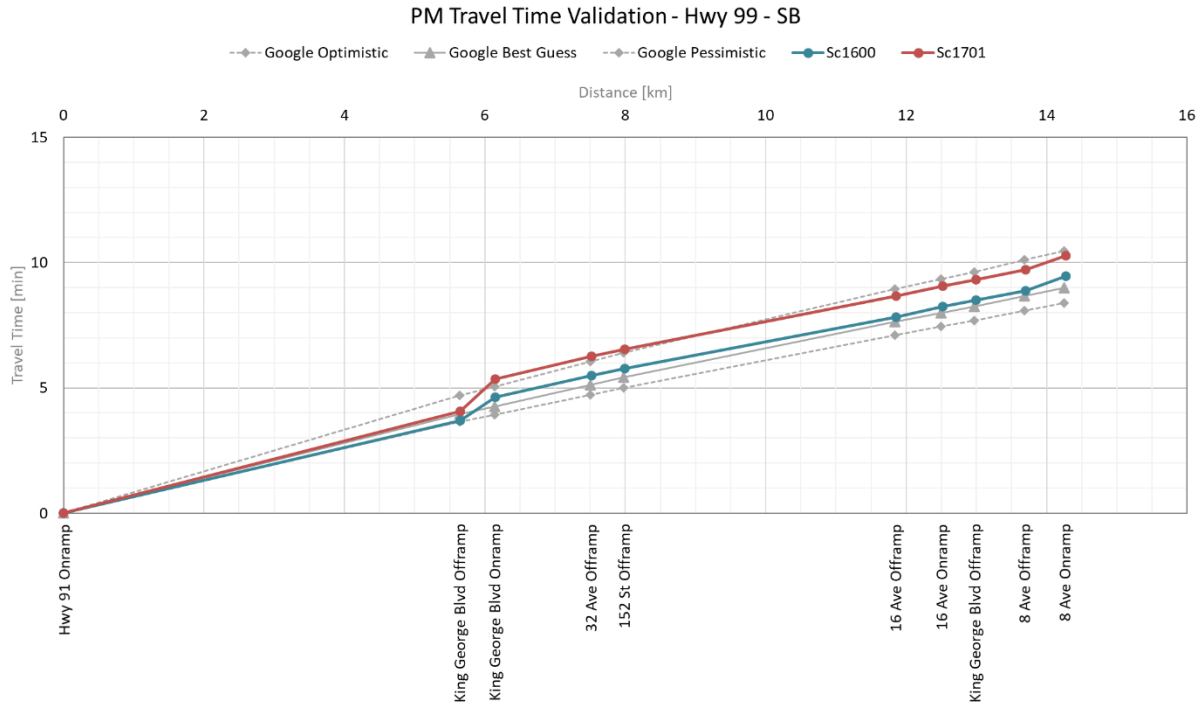

AM Travel Time Validation - Fraser Hwy - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
18
Travel Time [min]
0
10
20
30
40
50
60
200 St
Production Way
Hwy 10
196 St
64 Ave
188 St
68 Ave
185 St
184 St
182 St
Hwy 15
168 St
166 St
164 St
84 Ave
160 St
159 St
158 St
156 St
88 Ave
153 A St
152 St
148 St
144 St
96 Ave
140 St
Whalley Blvd
King George Blvd

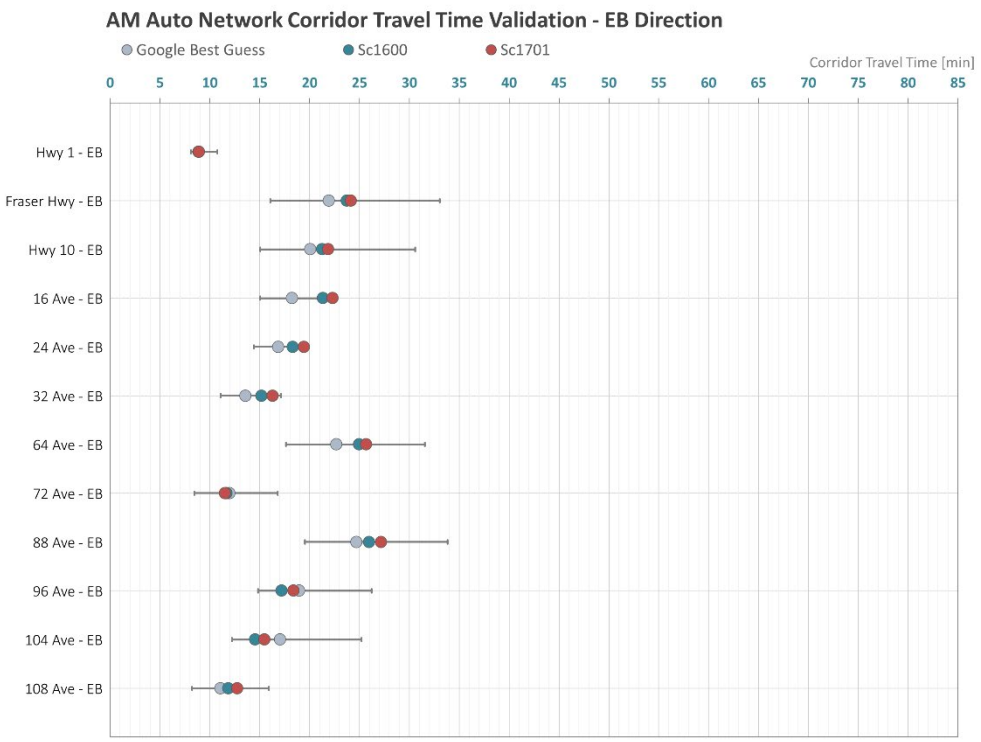

PM Travel Time Validation - Fraser Hwy - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
18
Travel Time [min]
0
10
20
30
40
50
60
200 St
Production Way
Hwy 10
196 St
64 Ave
188 St
68 Ave
185 St
184 St
182 St
Hwy 15
168 St
166 St
164 St
84 Ave
160 St
159 St
158 St
156 St
88 Ave
153 A St
152 St
148 St
144 St
96 Ave
140 St
Whalley Blvd
King George Blvd

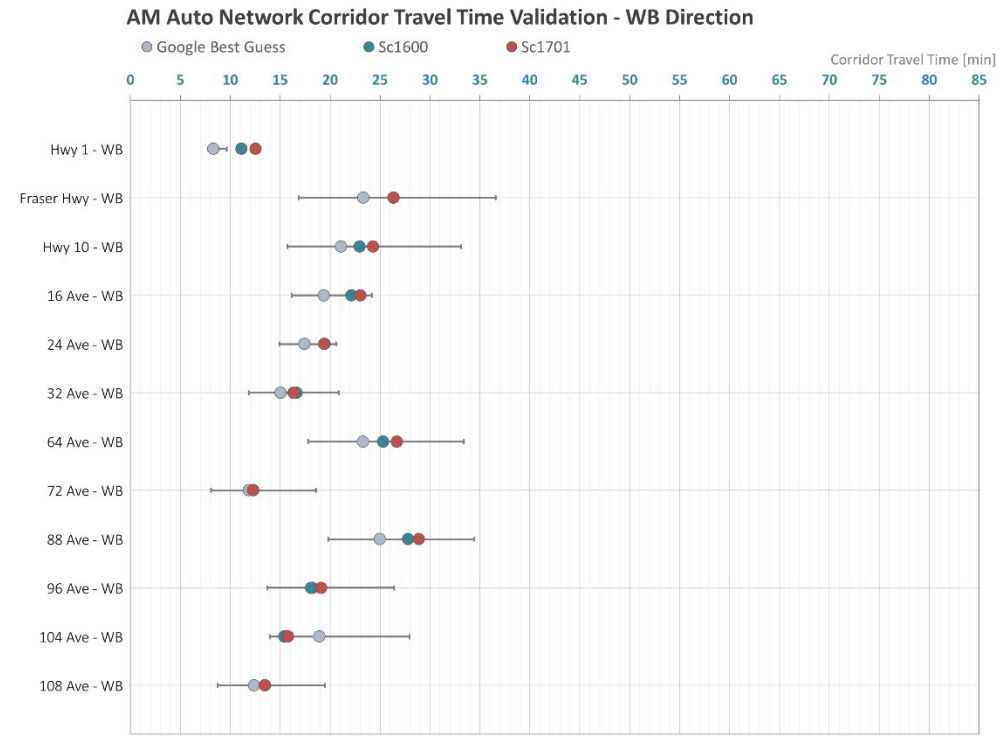

AM Travel Time Validation - Hwy 99 - NB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
Travel Time [min]
0
5
10
15
8 Ave Offramp
8 Ave Onramp
16 Ave Offramp
16 Ave Onramp
32 Ave Onramp
King George Blvd Offramp
King George Blvd Onramp
Hwy 91 Offramp

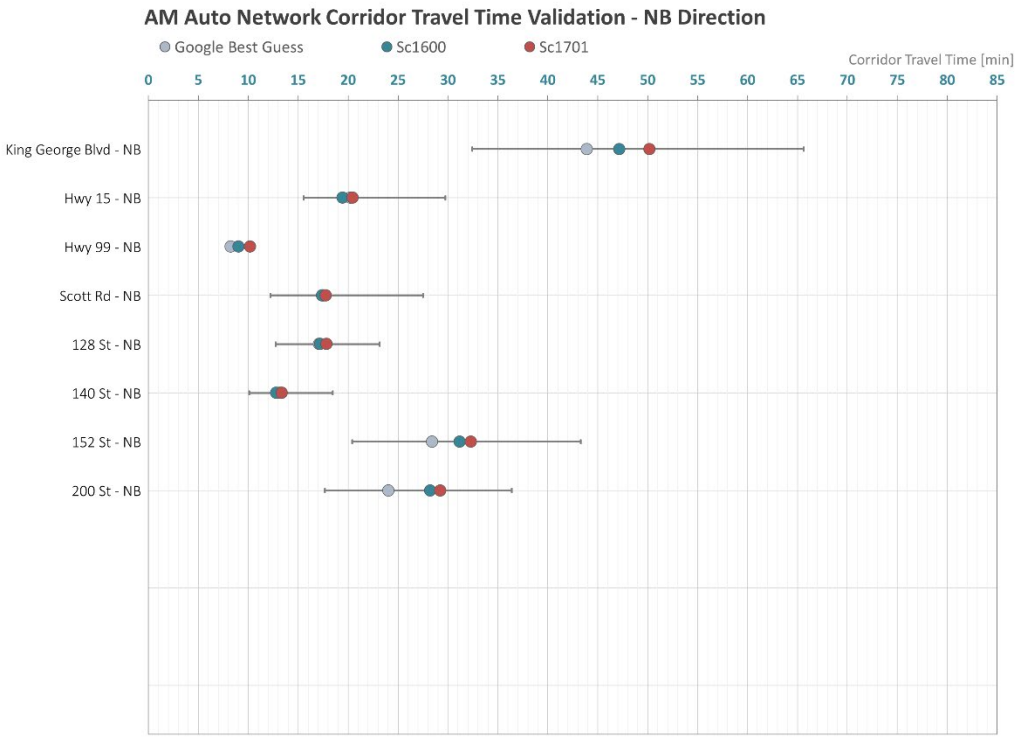

PM Travel Time Validation - Hwy 99 - NB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
Travel Time [min]
0
5
10
15
8 Ave Offramp
8 Ave Onramp
16 Ave Offramp
16 Ave Onramp
32 Ave Onramp
King George Blvd Offramp
King George Blvd Onramp
Hwy 91 Offramp

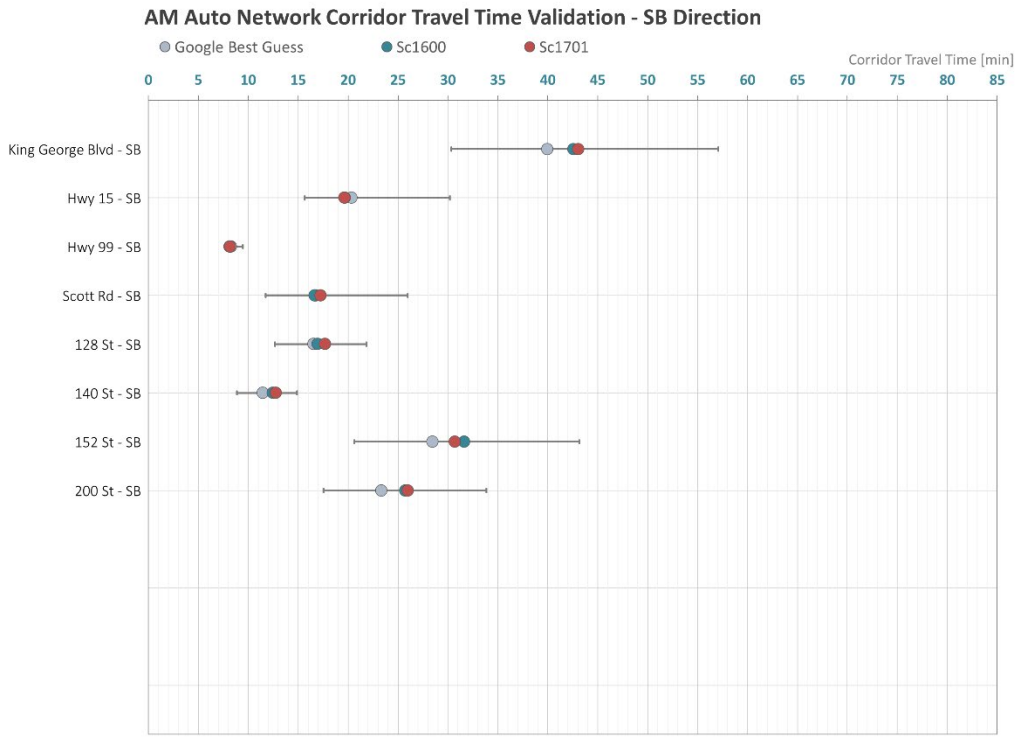

AM Travel Time Validation - Hwy 99 - SB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
Travel Time [min]
0
5
10
15
Hwy 91 Onramp
King George Blvd Offramp
King George Blvd Onramp
32 Ave Offramp
152 St Offramp
16 Ave Offramp
16 Ave Onramp
King George Blvd Offramp
8 Ave Offramp
8 Ave Onramp

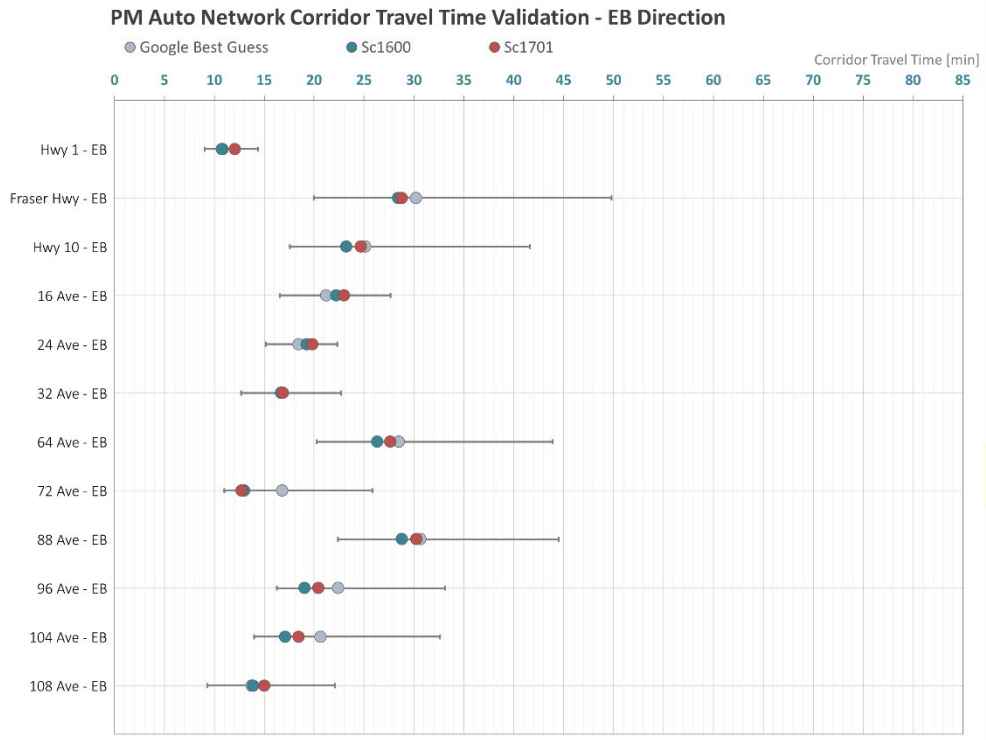

PM Travel Time Validation - Hwy 99 - SB
Google Optimistic
Google Best Guess
Google Pessimistic
Sc1600
Sc1701
Distance [km]
0
2
4
6
8
10
12
14
16
Travel Time [min]
0
5
10
15
Hwy 91 Onramp
King George Blvd Offramp
King George Blvd Onramp
32 Ave Offramp
152 St Offramp
16 Ave Offramp
16 Ave Onramp
King George Blvd Offramp
8 Ave Offramp
8 Ave Onramp

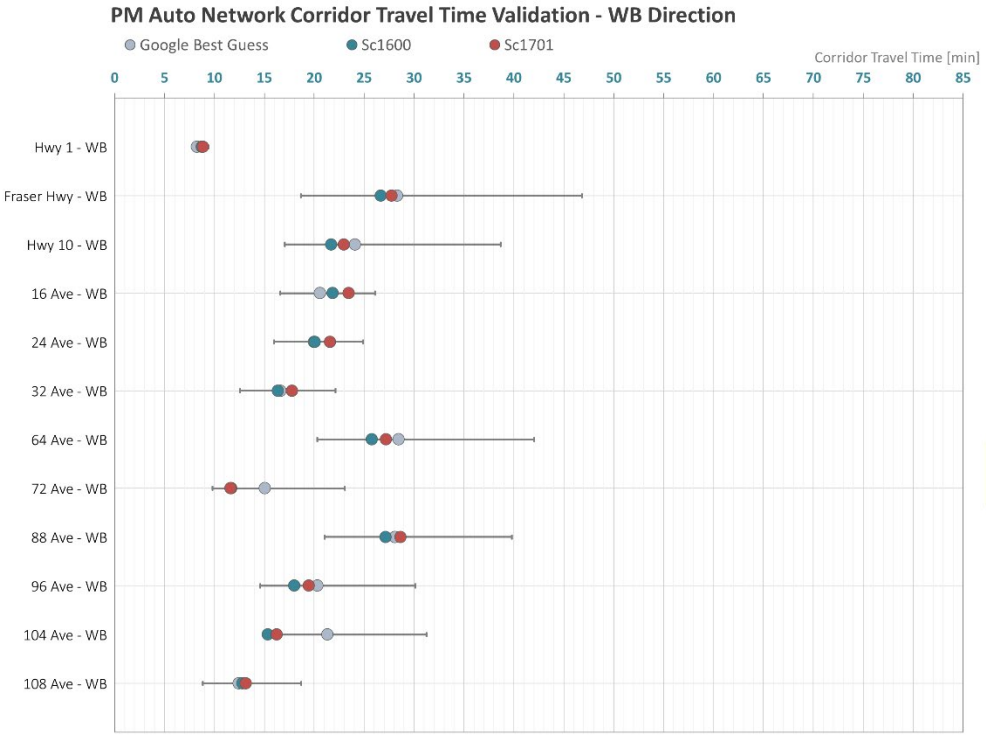

AM Auto Network Corridor Travel Time Validation - EB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
Hwy 1 - EB
Fraser Hwy - EB
Hwy 10 - EB
16 Ave - EB
24 Ave - EB
32 Ave - EB
64 Ave - EB
72 Ave - EB
88 Ave - EB
96 Ave - EB
104 Ave - EB
108 Ave - EB

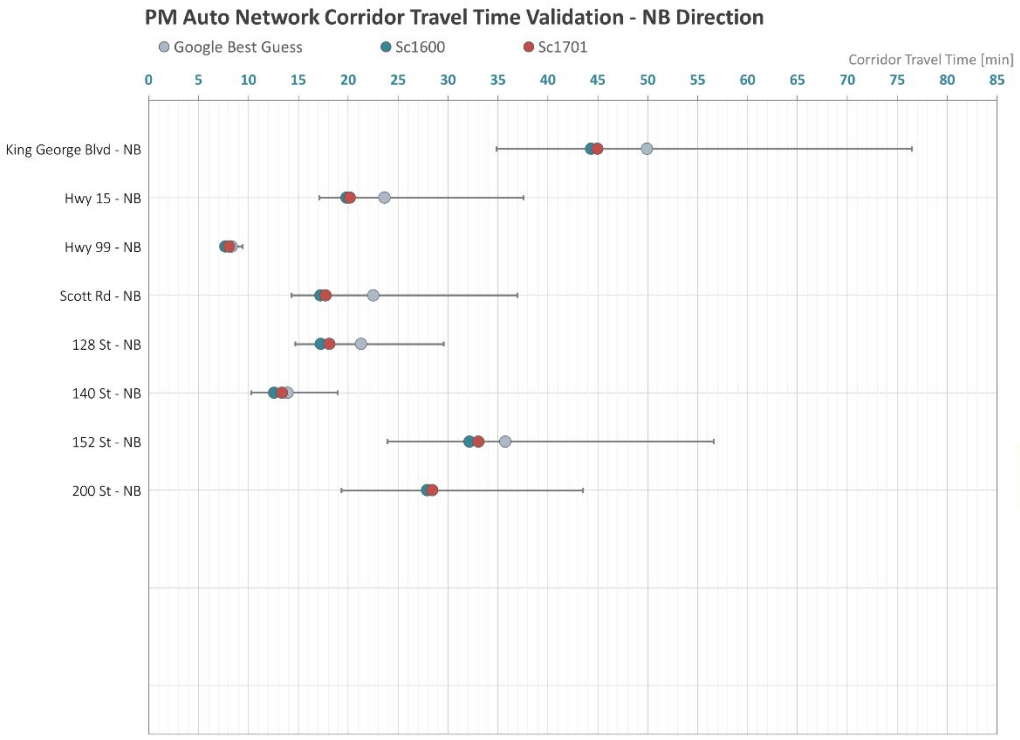

AM Auto Network Corridor Travel Time Validation - WB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
Hwy 1 - WB
Fraser Hwy - WB
Hwy 10 - WB
16 Ave - WB
24 Ave - WB
32 Ave - WB
64 Ave - WB
72 Ave - WB
88 Ave - WB
96 Ave - WB
104 Ave - WB
108 Ave - WB

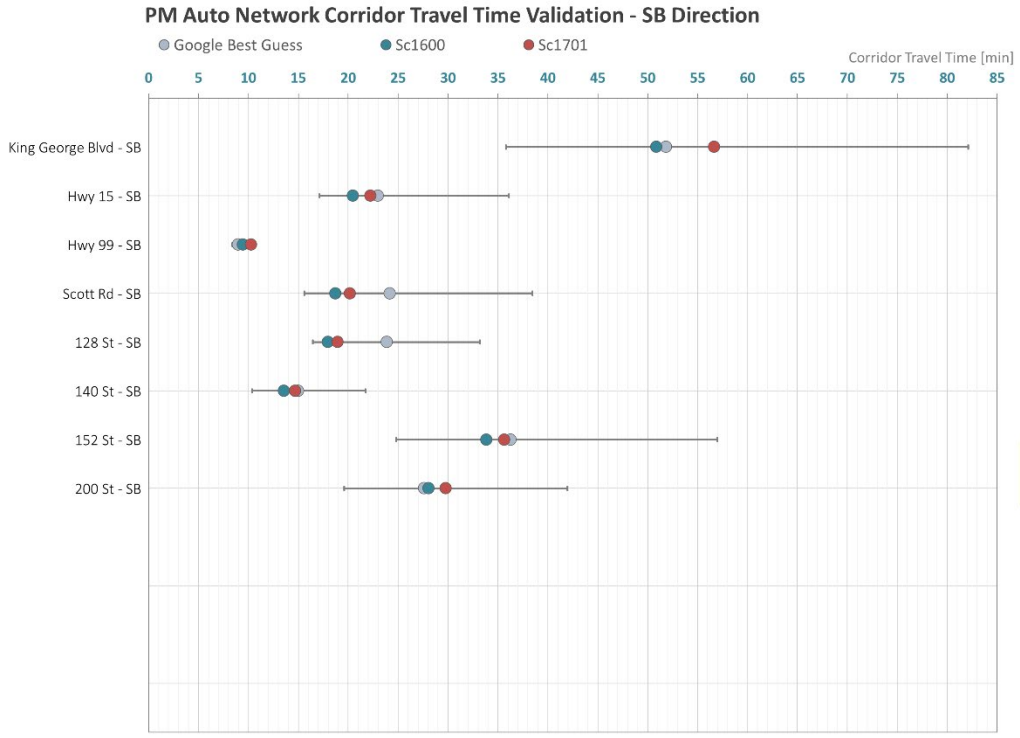

AM Auto Network Corridor Travel Time Validation - NB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
King George Blvd - NB
Hwy 15 - NB
Hwy 99 - NB
Scott Rd - NB
128 St - NB
140 St - NB
152 St - NB
200 St - NB


AM Auto Network Corridor Travel Time Validation - SB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
King George Blvd - SB
Hwy 15 - SB
Hwy 99 - SB
Scott Rd - SB
128 St - SB
140 St - SB
152 St - SB
200 St - SB


PM Auto Network Corridor Travel Time Validation - EB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
Hwy 1 - EB
Fraser Hwy - EB
Hwy 10 - EB
16 Ave - EB
24 Ave - EB
32 Ave - EB
64 Ave - EB
72 Ave - EB
88 Ave - EB
96 Ave - EB
104 Ave - EB
108 Ave - EB

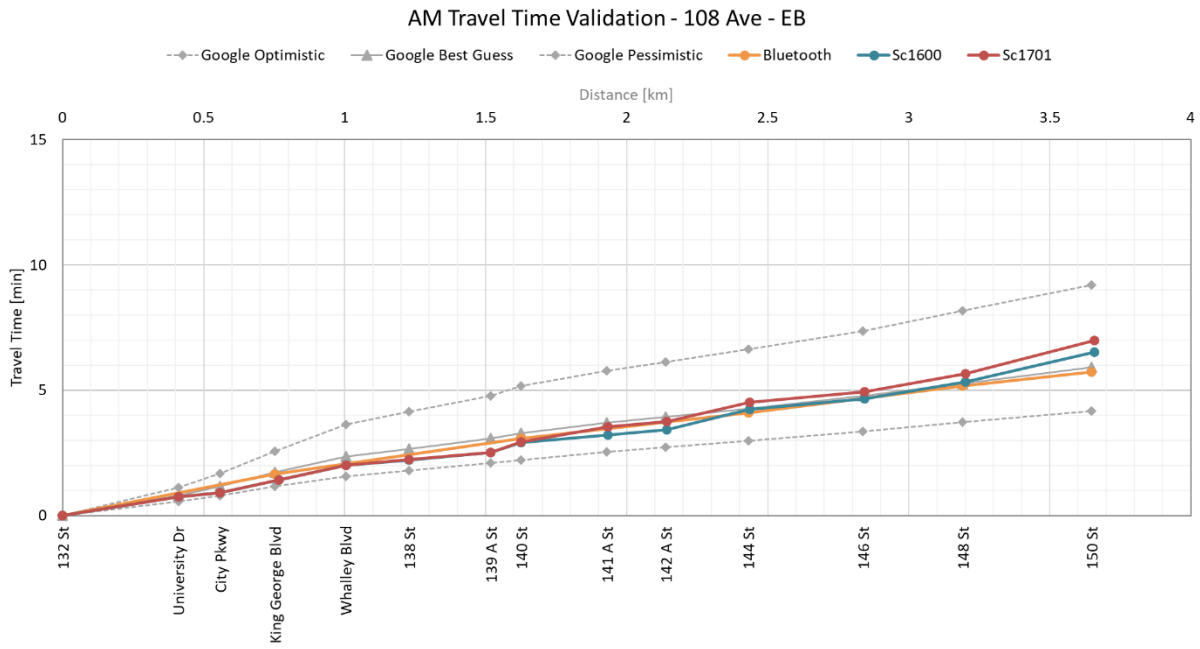

PM Auto Network Corridor Travel Time Validation - WB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
Hwy 1 - WB
Fraser Hwy - WB
Hwy 10 - WB
16 Ave - WB
24 Ave - WB
32 Ave - WB
64 Ave - WB
72 Ave - WB
88 Ave - WB
96 Ave - WB
104 Ave - WB
108 Ave - WB

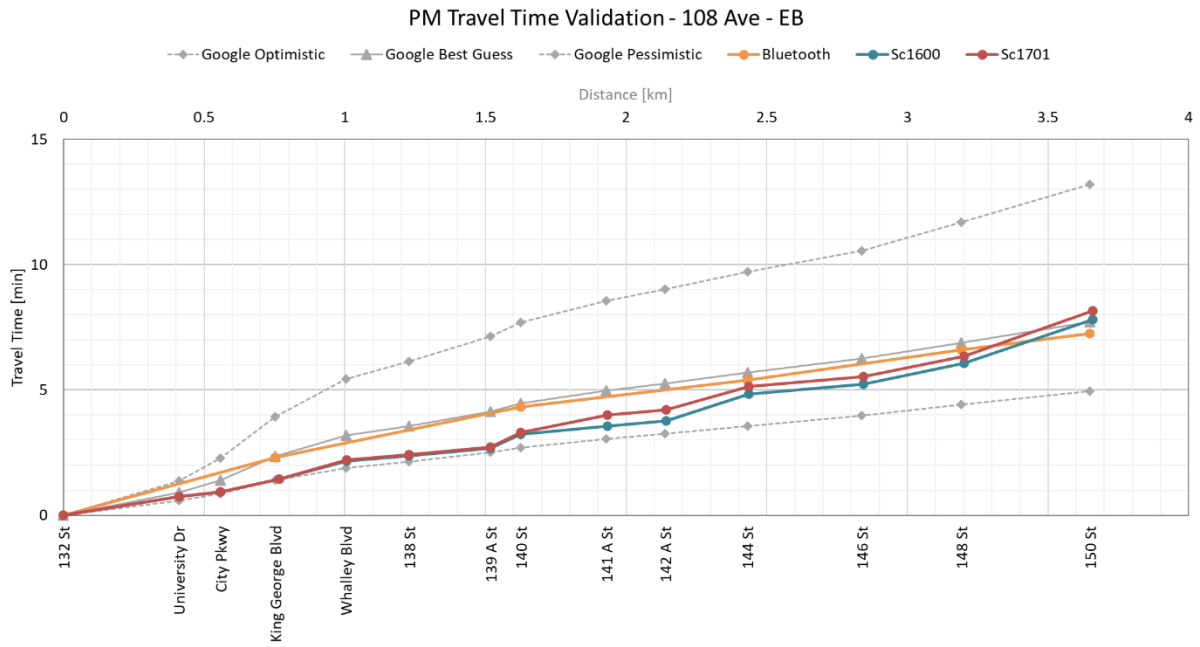

PM Auto Network Corridor Travel Time Validation - NB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
King George Blvd - NB
Hwy 15 - NB
Hwy 99 - NB
Scott Rd - NB
128 St - NB
140 St - NB
152 St - NB
200 St - NB

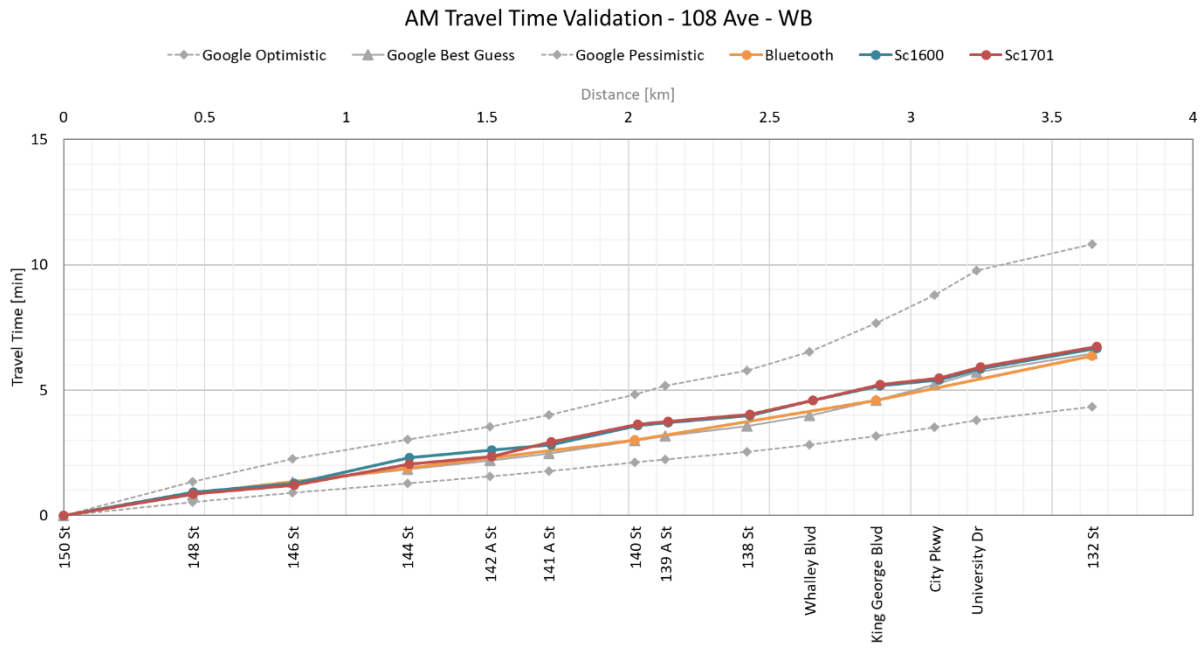

PM Auto Network Corridor Travel Time Validation - SB Direction
Google Best Guess
Sc1600
Sc1701
Corridor Travel Time [min]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
King George Blvd - SB
Hwy 15 - SB
Hwy 99 - SB
Scott Rd - SB
128 St - SB
140 St - SB
152 St - SB
200 St - SB

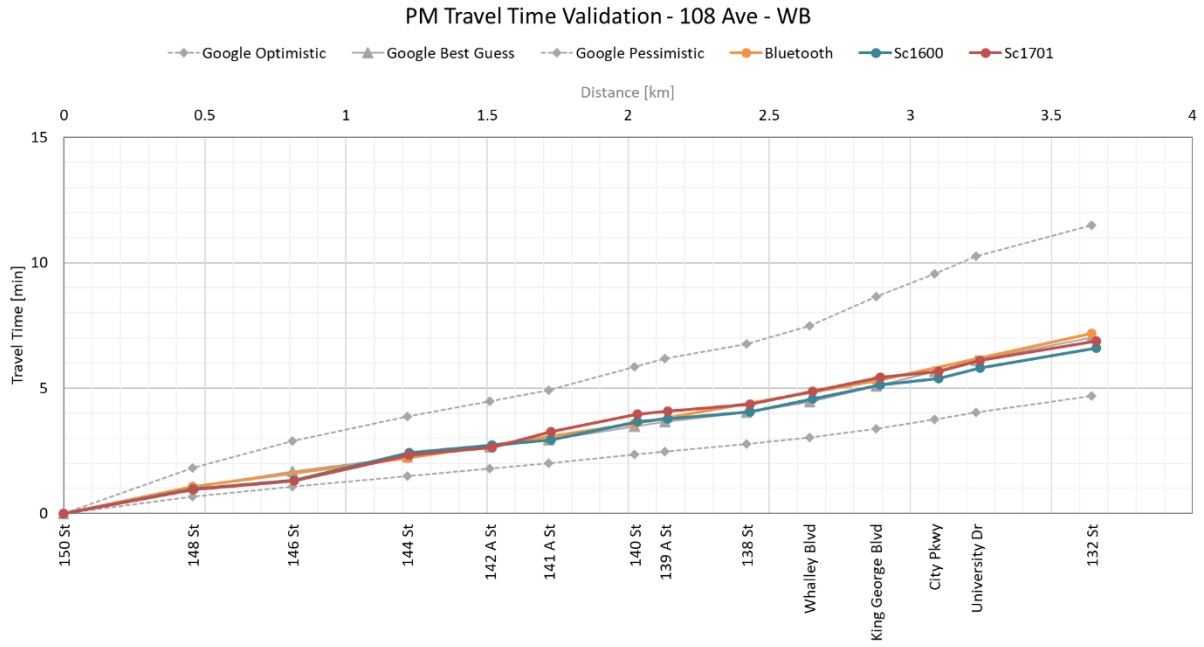
APPENDIX G

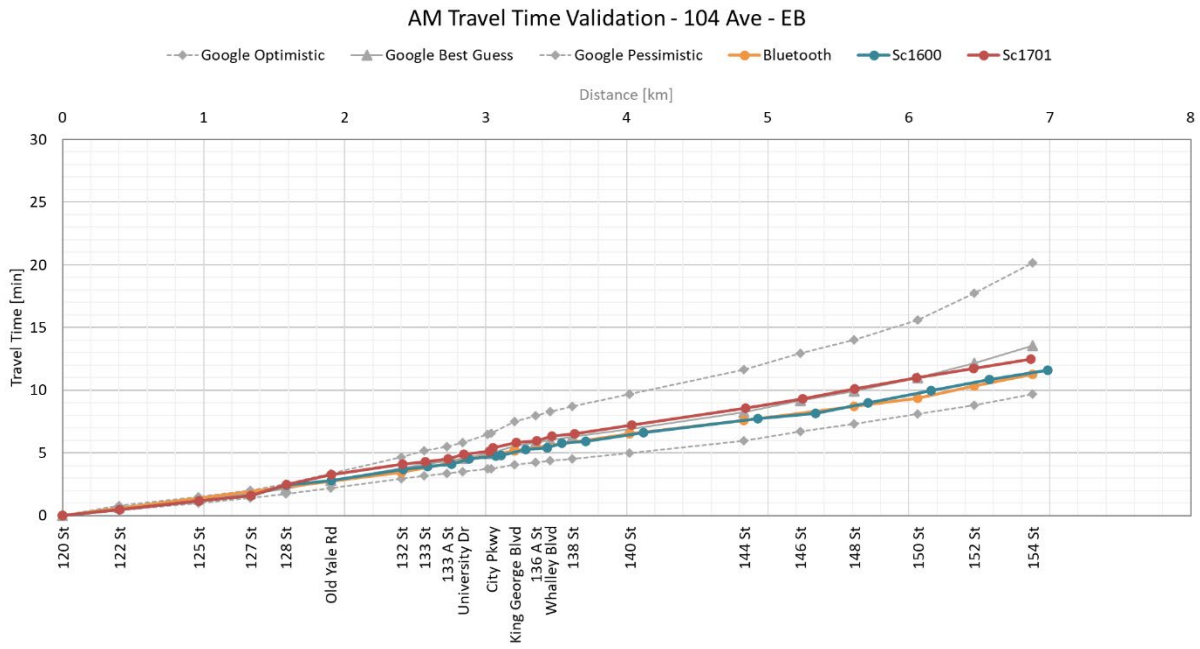
Auto Travel Time Validation (Bluetooth Data)

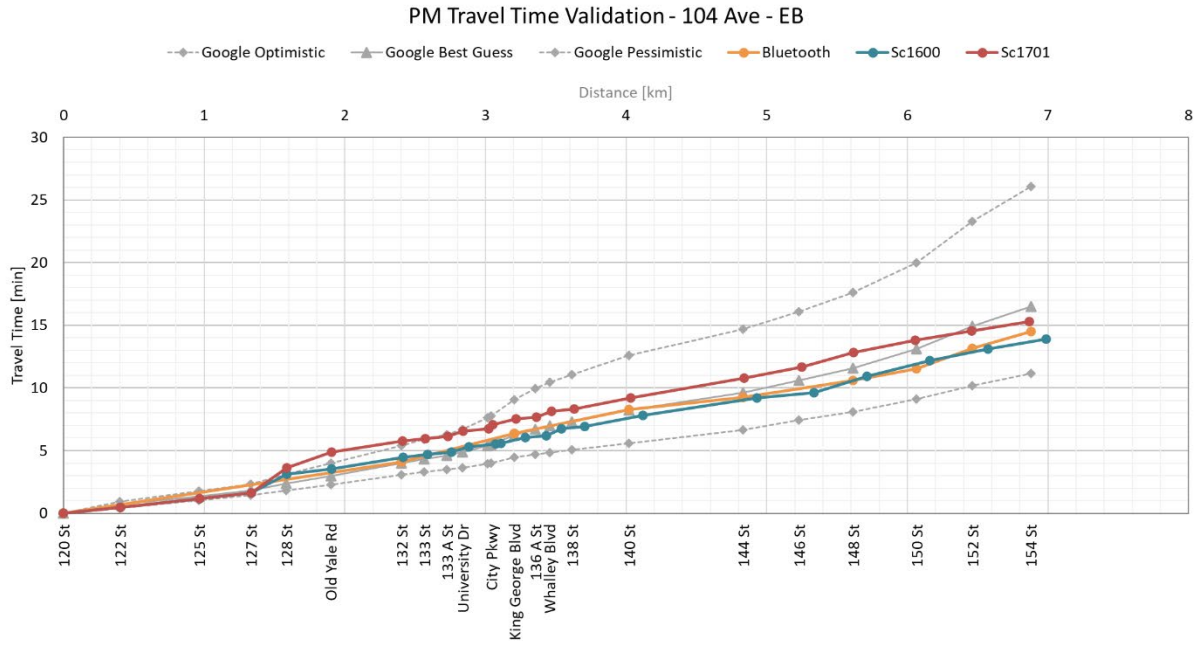

AM Travel Time Validation - 108 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
0
0.5
1
1.5
2
2.5
3
3.5
4
Travel Time [min]
15
10
5
0
132 St
University Dr
City Pkwy
King George Blvd
Whalley Blvd
138 St
139 A St
140 St
141 A St
142 A St
144 St
146 St
148 St
150 St

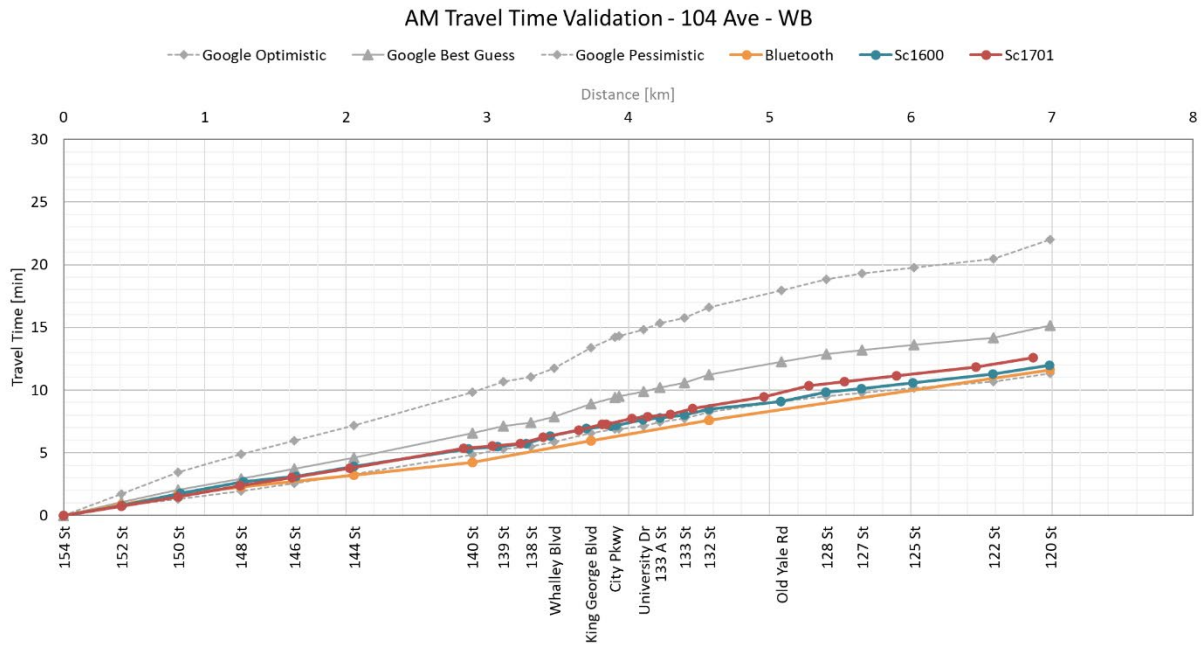

PM Travel Time Validation - 108 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
0
0.5
1
1.5
2
2.5
3
3.5
4
Travel Time [min]
15
10
5
0
132 St
University Dr
City Pkwy
King George Blvd
Whalley Blvd
138 St
139 A St
140 St
141 A St
142 A St
144 St
146 St
148 St
150 St

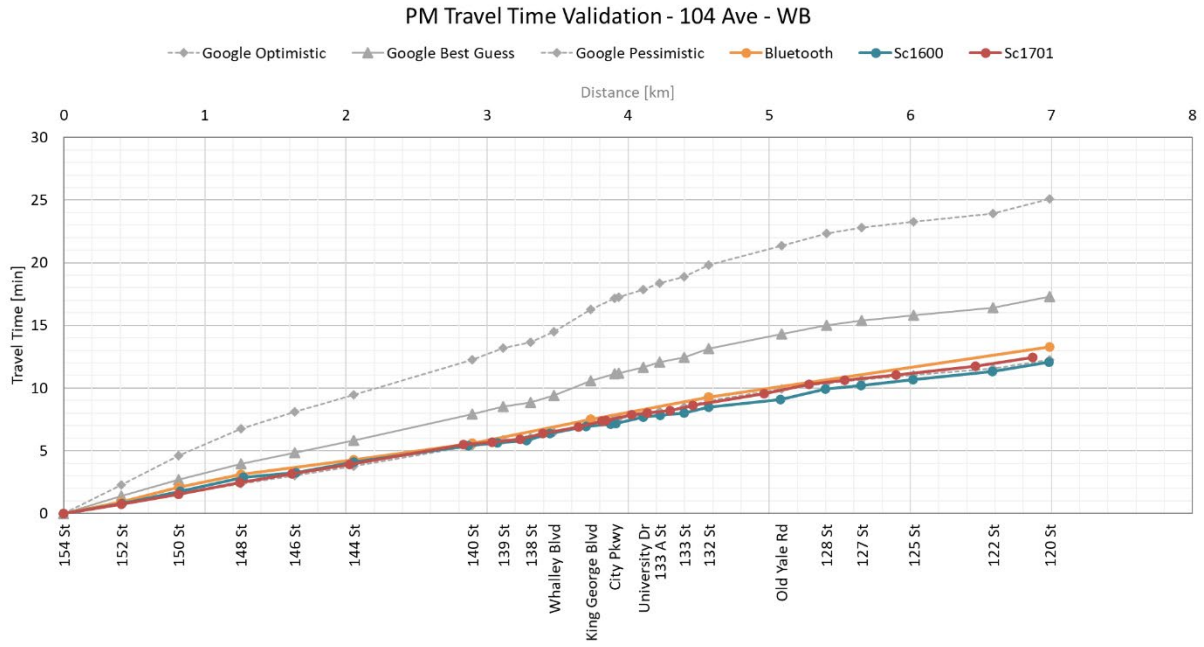

AM Travel Time Validation - 108 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
0
0.5
1
1.5
2
2.5
3
3.5
4
Travel Time [min]
15
10
5
0
150 St
148 St
146 St
144 St
142 A St
141 A St
140 St
139 A St
138 St
Whalley Blvd
King George Blvd
City Pkwy
University Dr
132 St


PM Travel Time Validation - 108 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
0
0.5
1
1.5
2
2.5
3
3.5
4
Travel Time [min]
15
10
5
0
150 St
148 St
146 St
144 St
142 A St
141 A St
140 St
139 A St
138 St
Whalley Blvd
King George Blvd
City Pkwy
University Dr
132 St


AM Travel Time Validation - 104 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
Travel Time [min]
120 St
122 St
125 St
127 St
128 St
Old Yale Rd
132 St
133 St
133 A St
University Dr
City Pkwy
King George Blvd
136 A St
Whalley Blvd
138 St
140 St
144 St
146 St
148 St
150 St
152 St
154 St


PM Travel Time Validation - 104 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
Travel Time [min]
120 St
122 St
125 St
127 St
128 St
Old Yale Rd
132 St
133 St
133 A St
University Dr
City Pkwy
King George Blvd
136 A St
Whalley Blvd
138 St
140 St
144 St
146 St
148 St
150 St
152 St
154 St


AM Travel Time Validation - 104 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
0
1
2
3
4
5
6
7
8
Travel Time [min]
0
5
10
15
20
25
30
154 St
152 St
150 St
148 St
146 St
144 St
140 St
139 St
138 St
Whalley Blvd
King George Blvd
City Pkwy
University Dr
133 A St
133 St
132 St
Old Yale Rd
128 St
127 St
125 St
122 St
120 St


PM Travel Time Validation - 104 Ave - WB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
0
1
2
3
4
5
6
7
8
Travel Time [min]
0
5
10
15
20
25
30
154 St
152 St
150 St
148 St
146 St
144 St
140 St
139 St
138 St
Whalley Blvd
King George Blvd
City Pkwy
University Dr
133 A St
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Old Yale Rd
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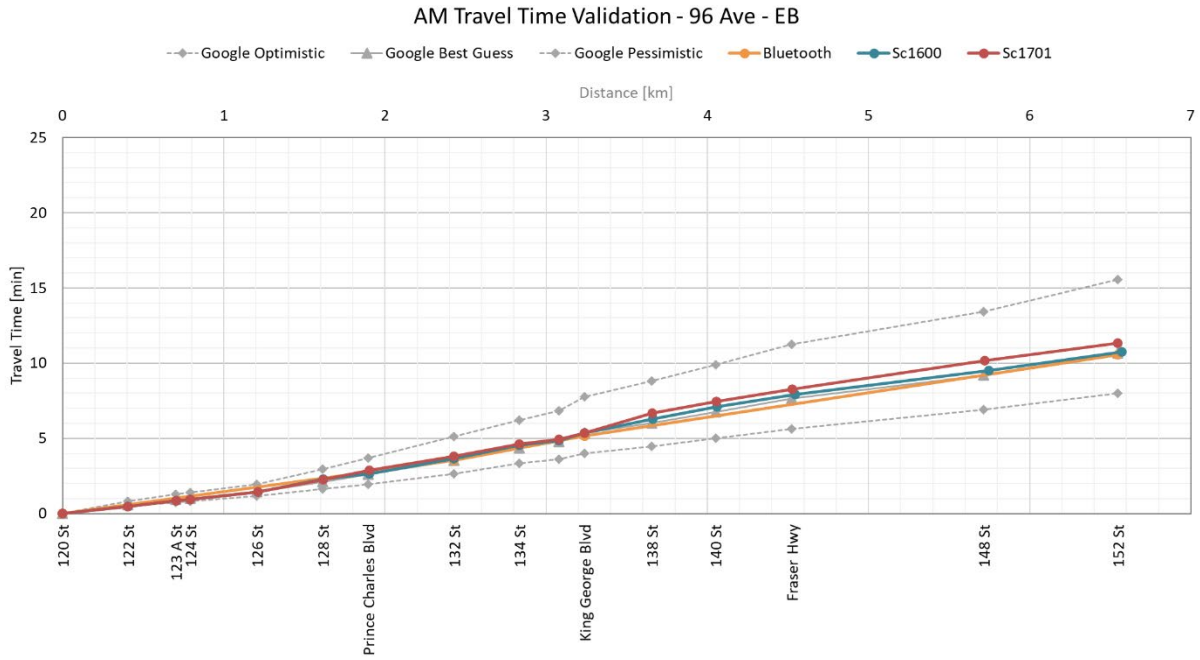
125 St
122 St
120 St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Google Best Guess
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Travel Time [min]
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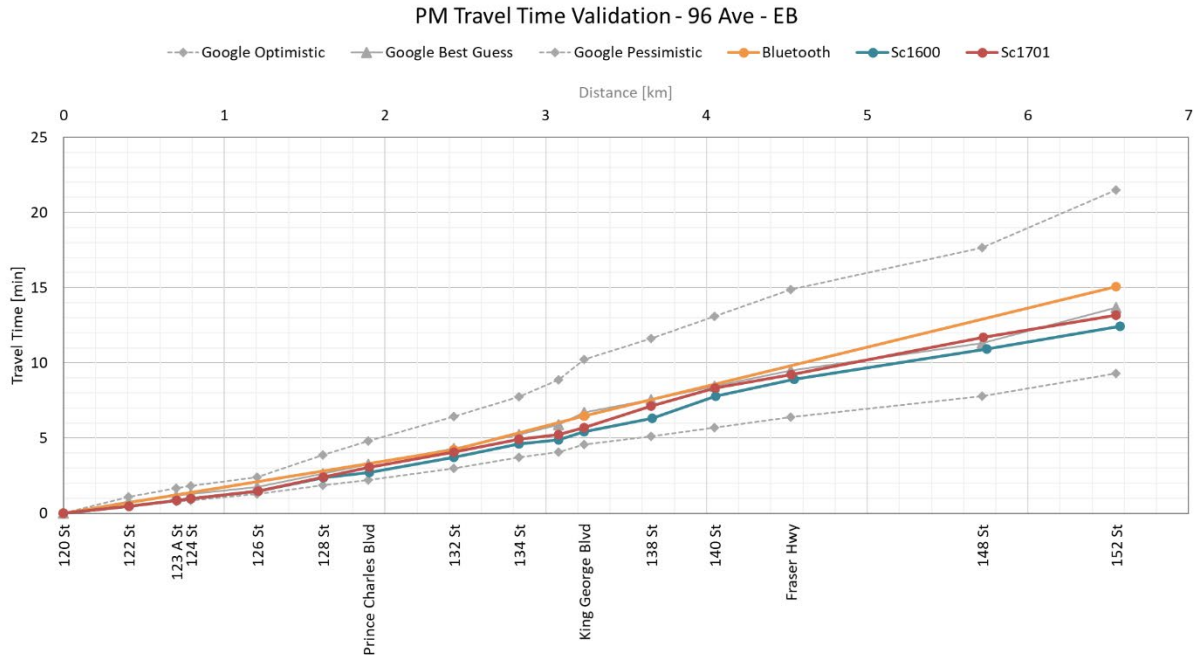
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Travel Time [min]
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132 St
134 St
King George Blvd
138 St
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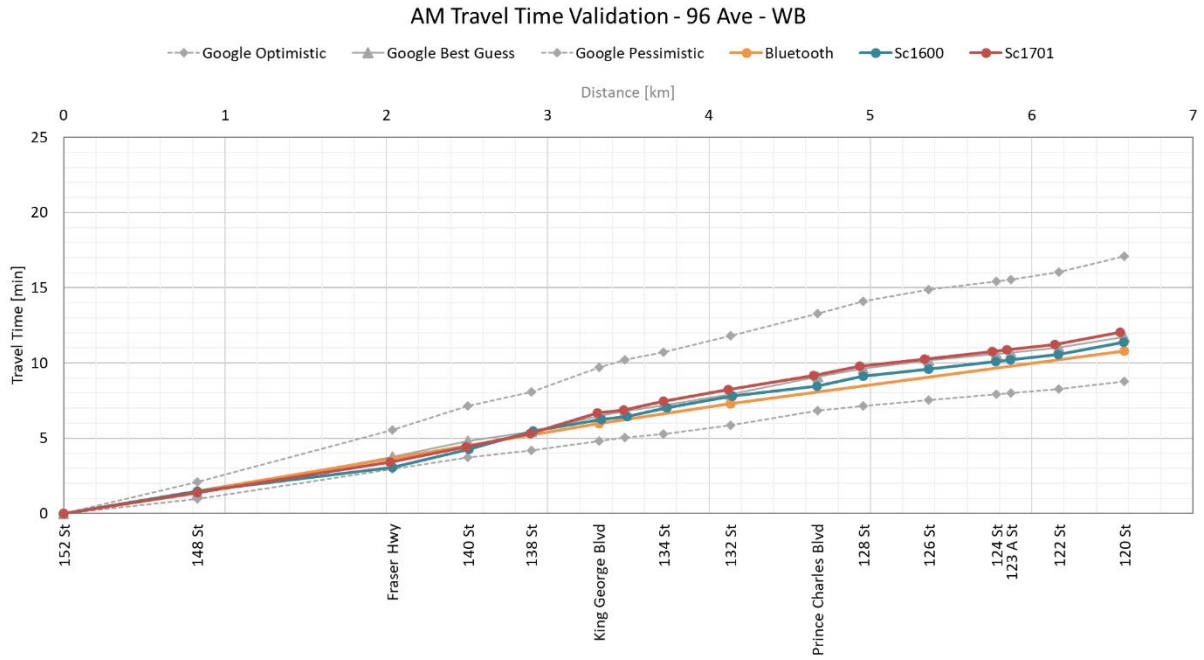
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Travel Time [min]
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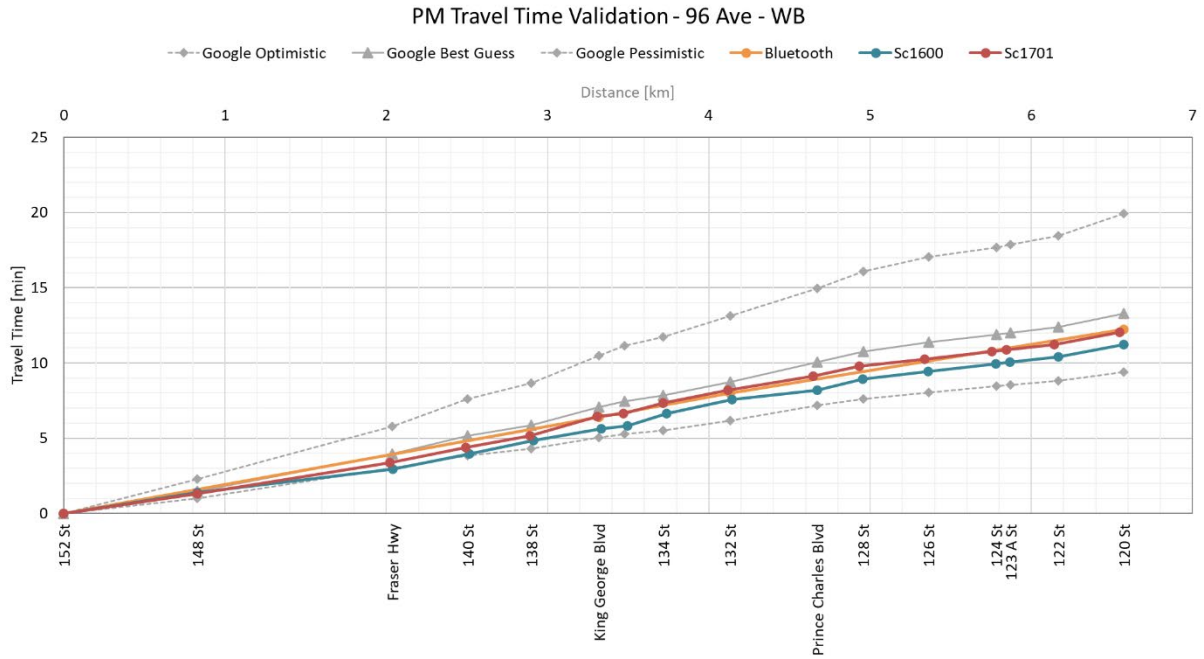
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Travel Time [min]
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152 St
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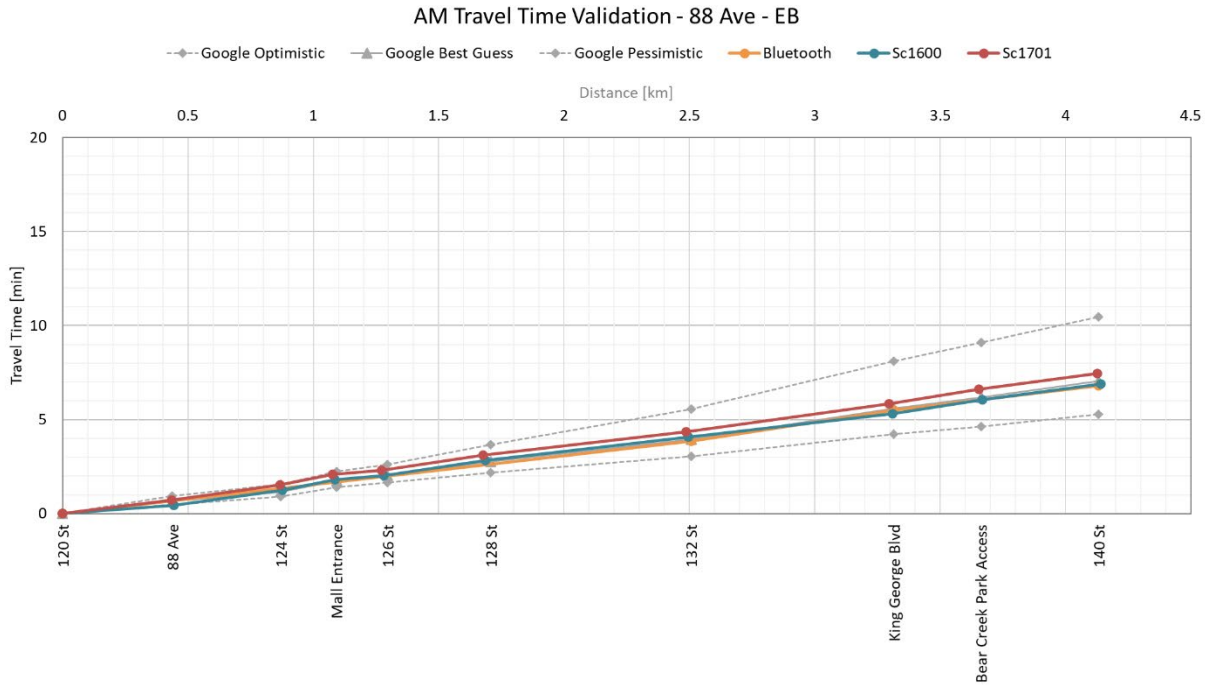
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Travel Time [min]
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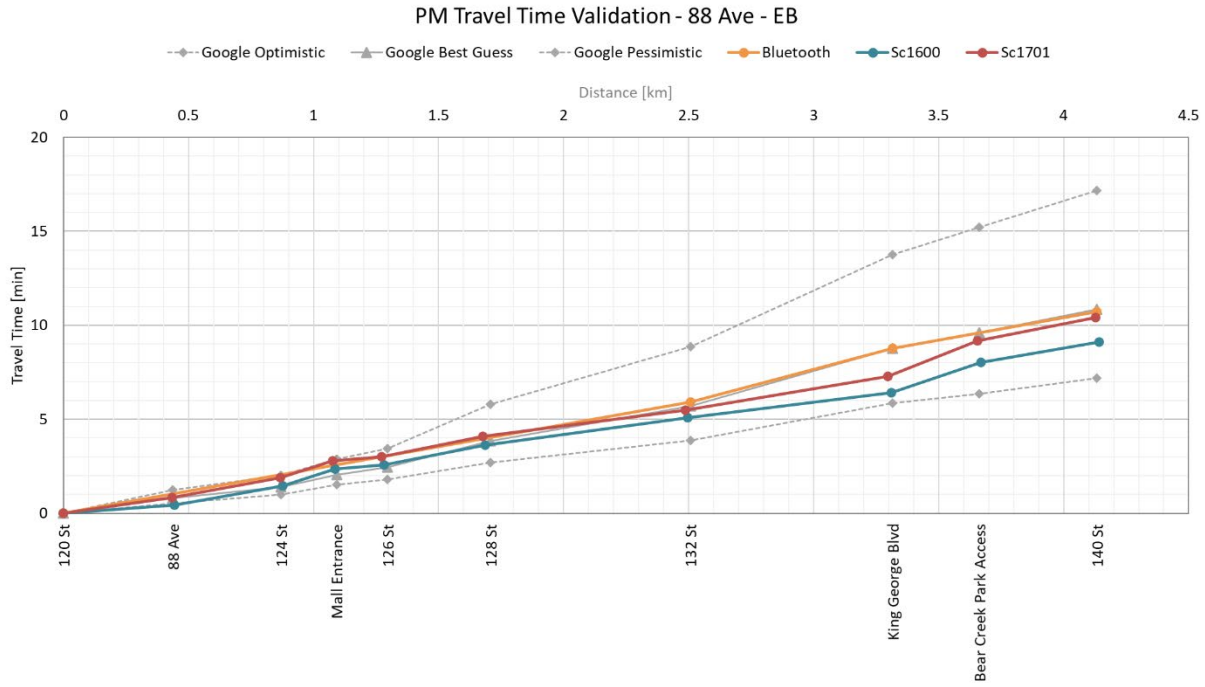
King George Blvd
Bear Creek Park Access
140 St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Google Best Guess
Google Pessimistic
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Sc1701
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Travel Time [min]
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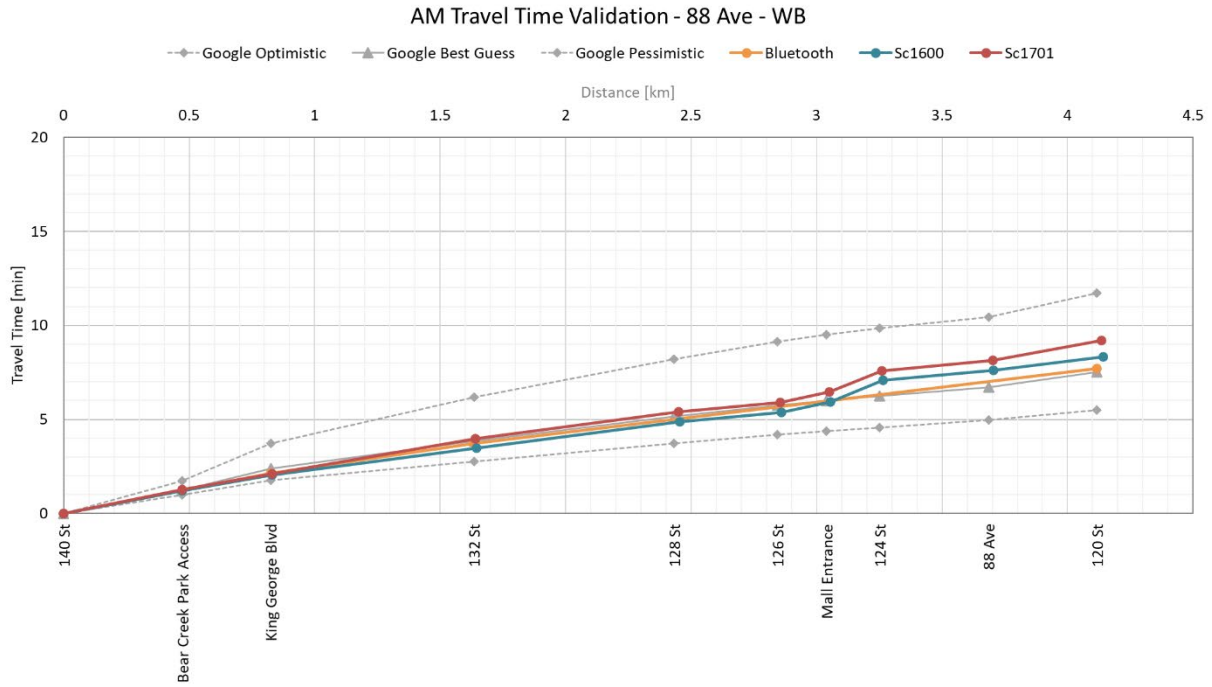
Bear Creek Park Access
140 St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Mall Entrance
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88 Ave
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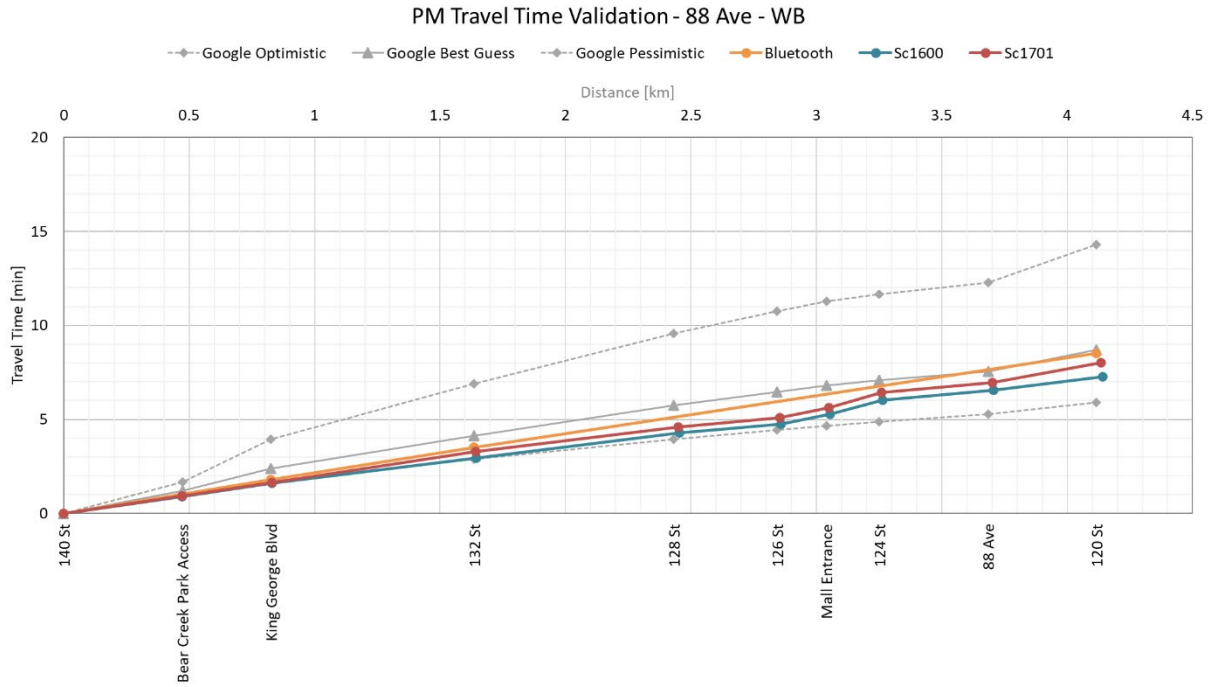
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Travel Time [min]
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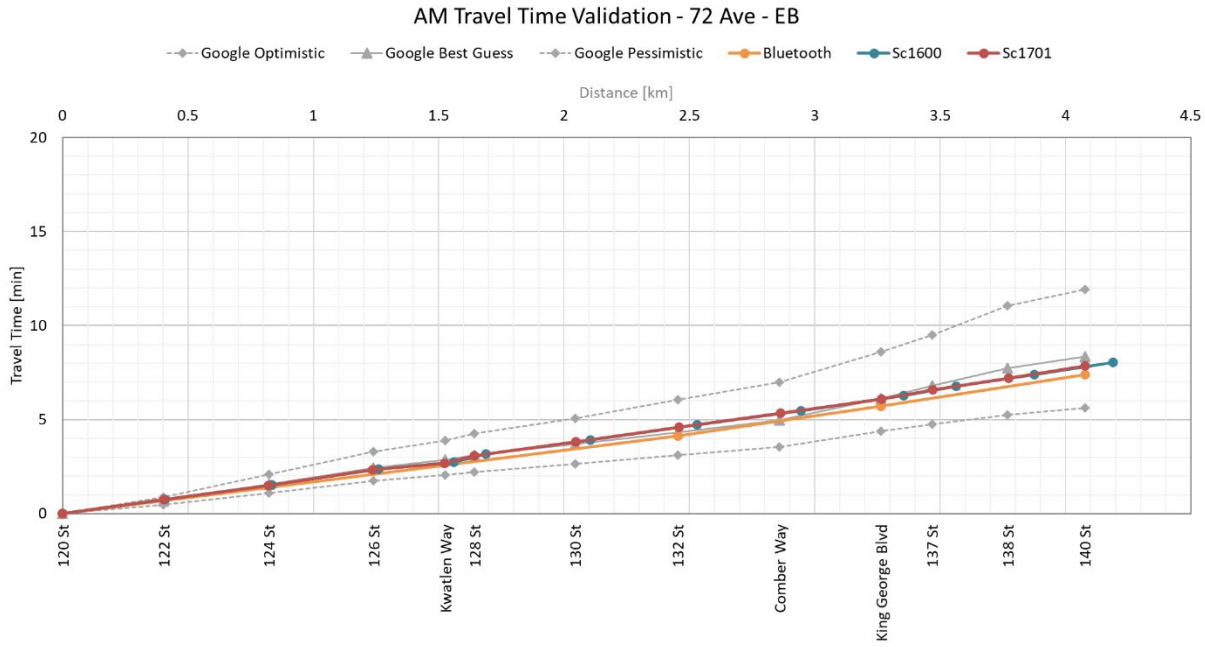
Bear Creek Park Access
King George Blvd
132 St
128 St
126 St
Mall Entrance
124 St
88 Ave
120 St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Travel Time [min]
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Comber Way
King George Blvd
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138 St
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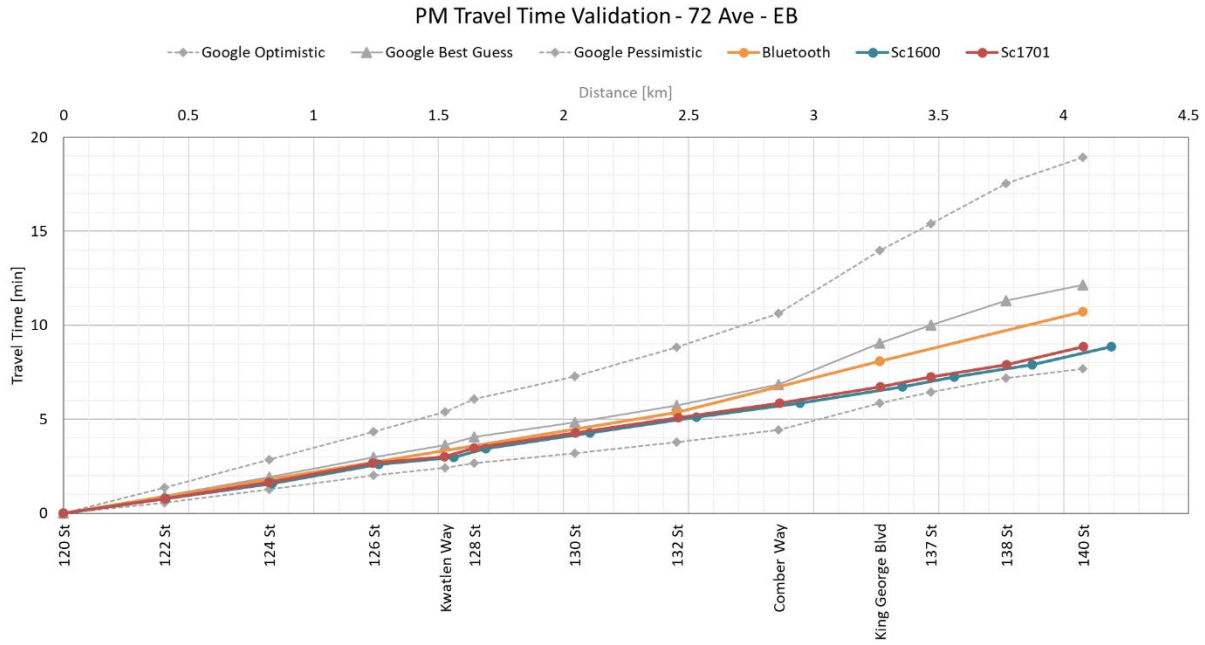
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Bluetooth
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Sc1701
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Travel Time [min]
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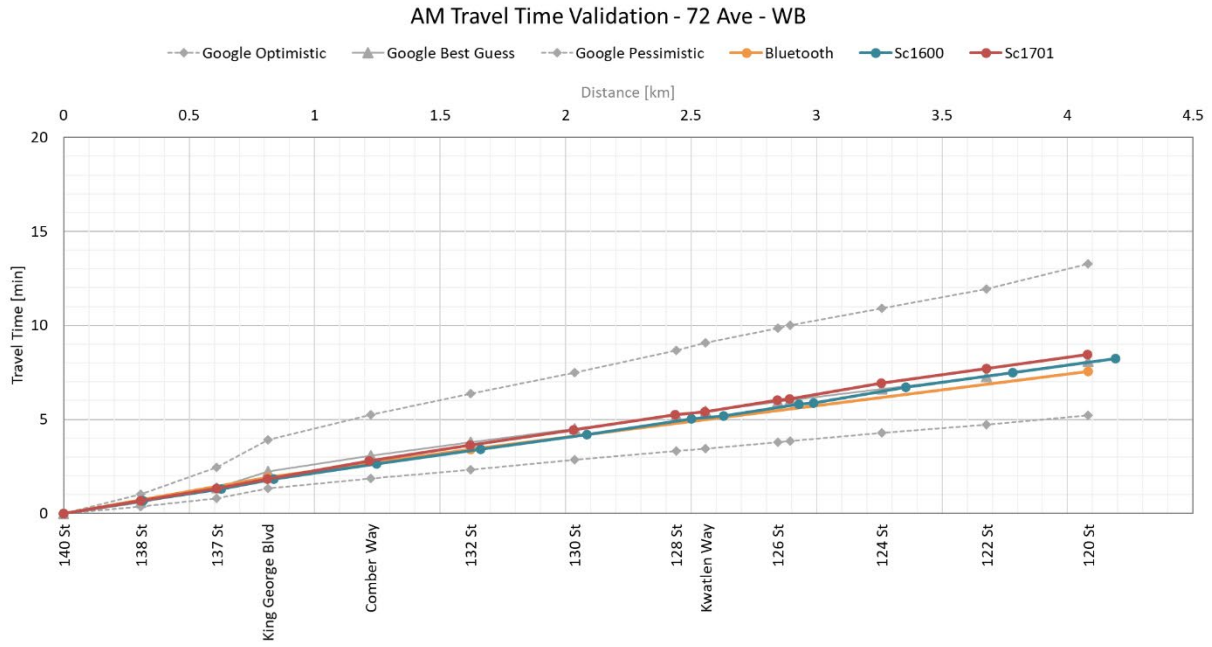
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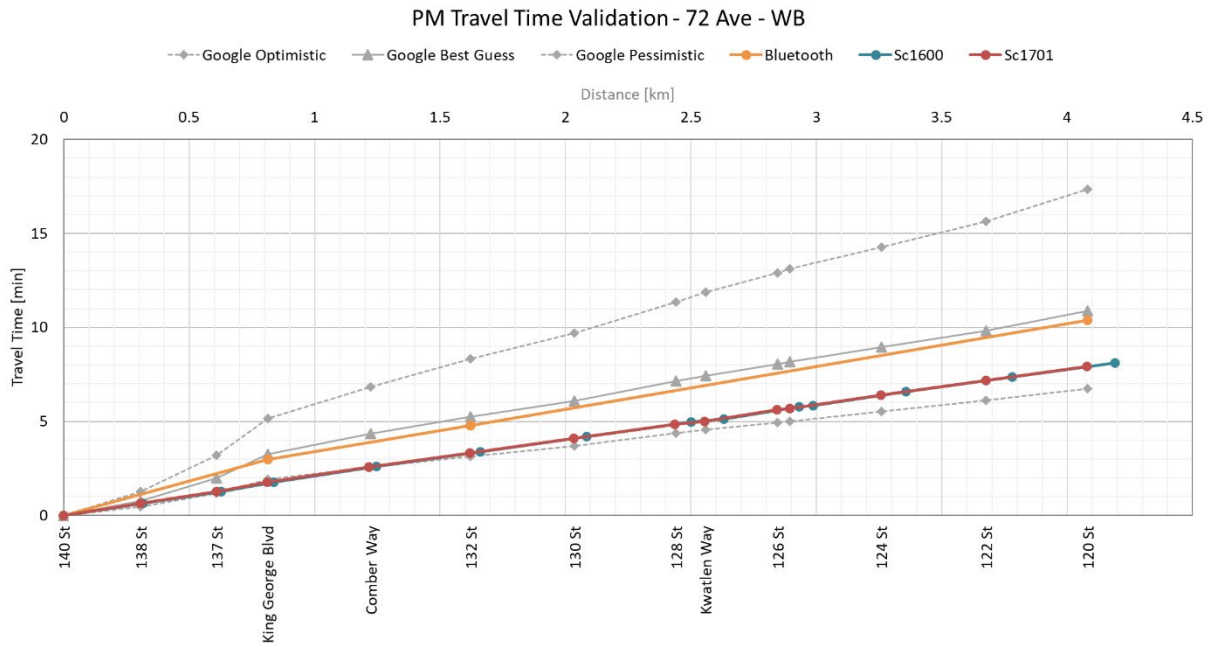
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Travel Time [min]
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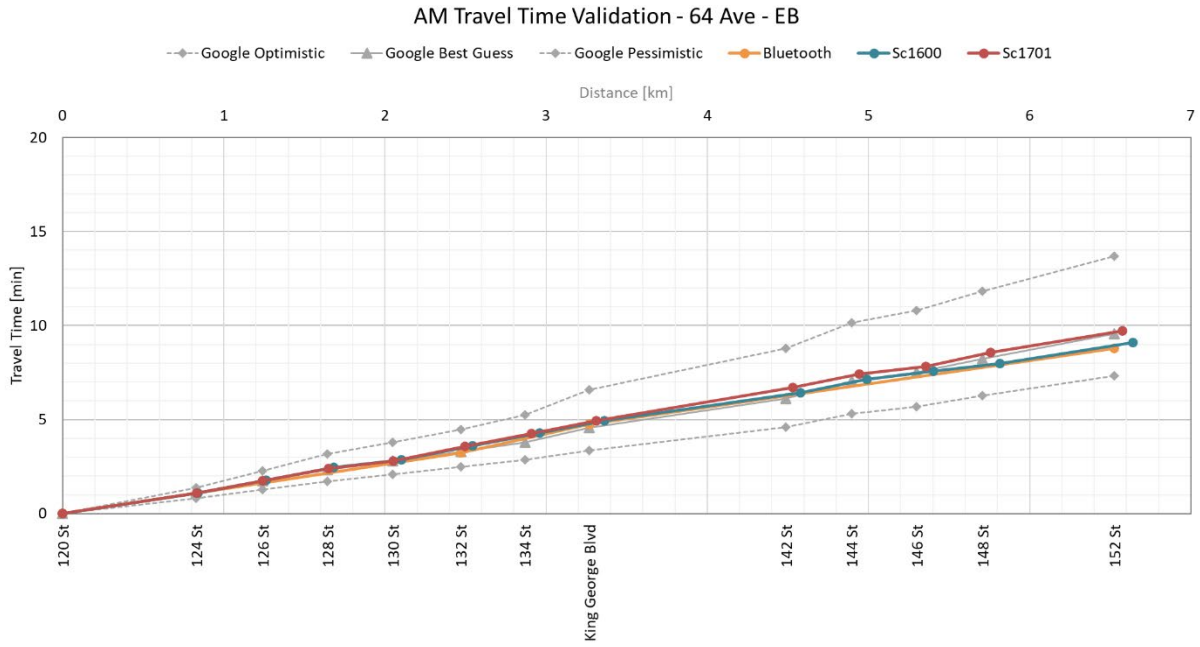
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Travel Time [min]
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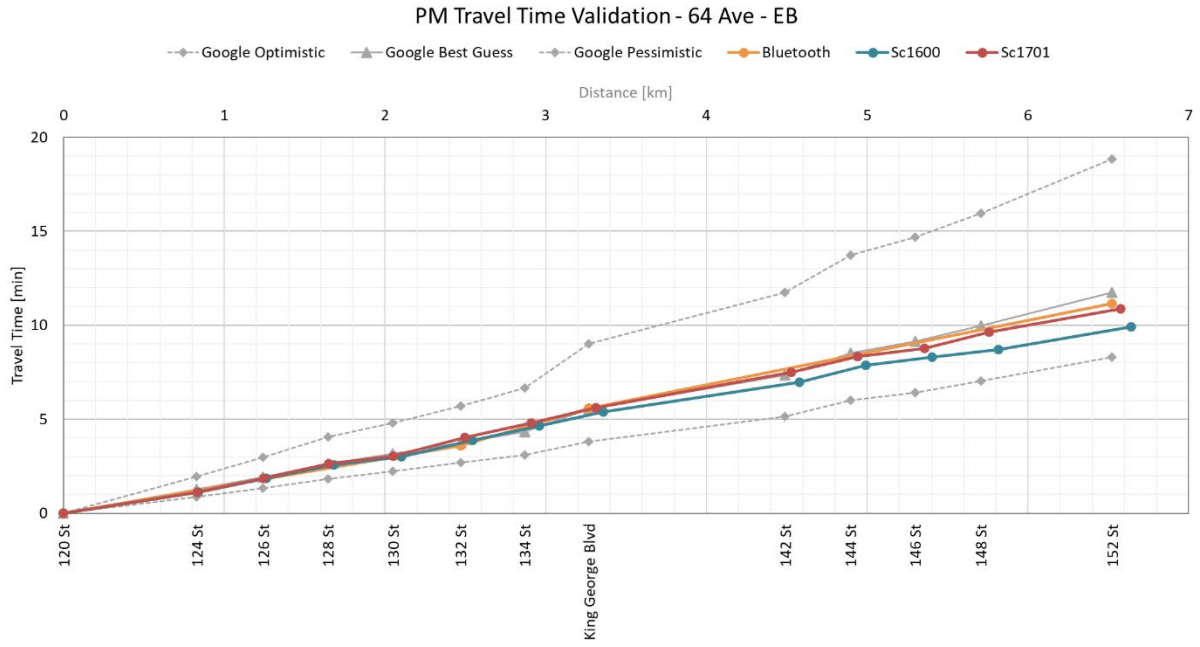
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Travel Time [min]
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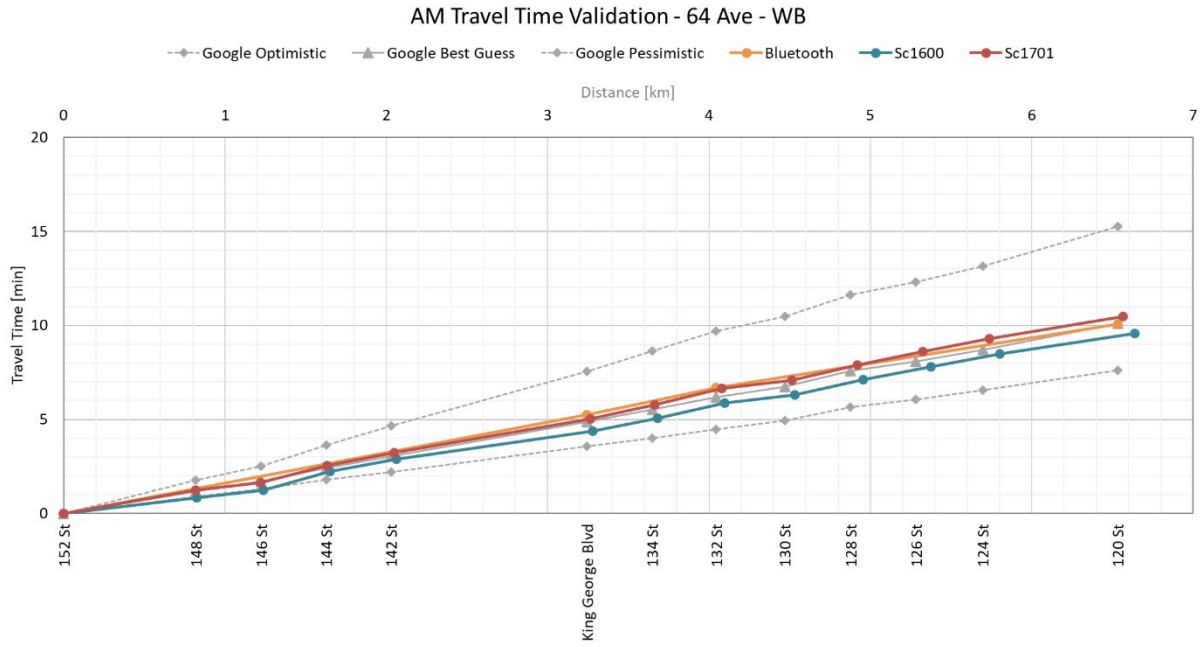
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Travel Time [min]
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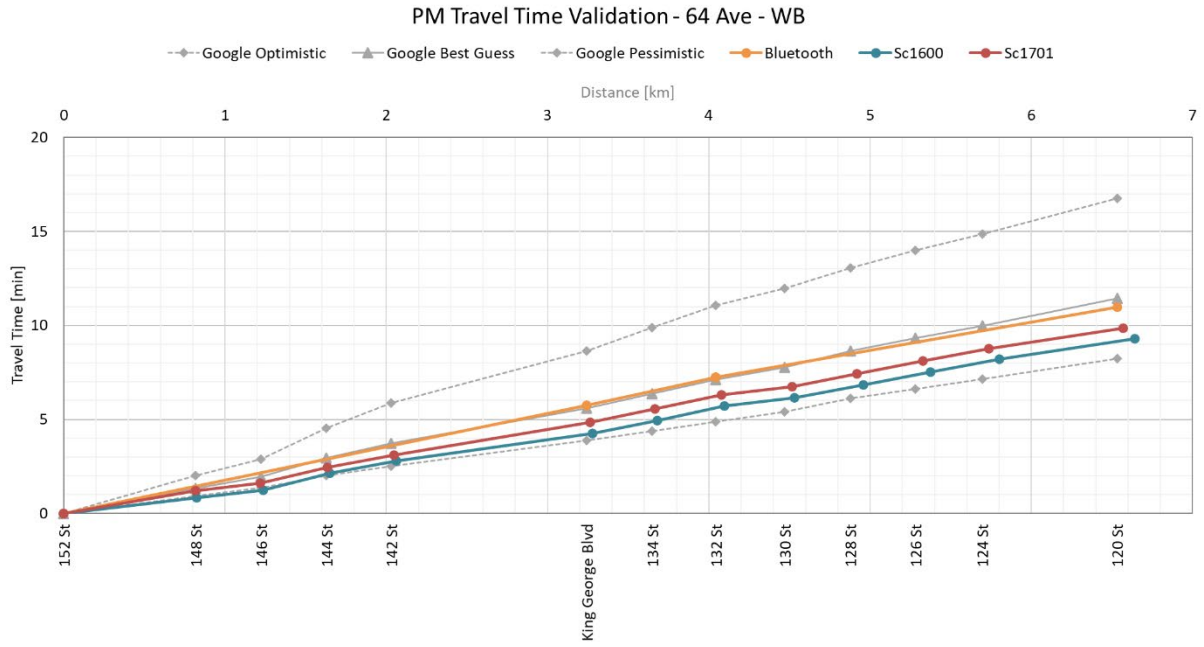
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Travel Time [min]
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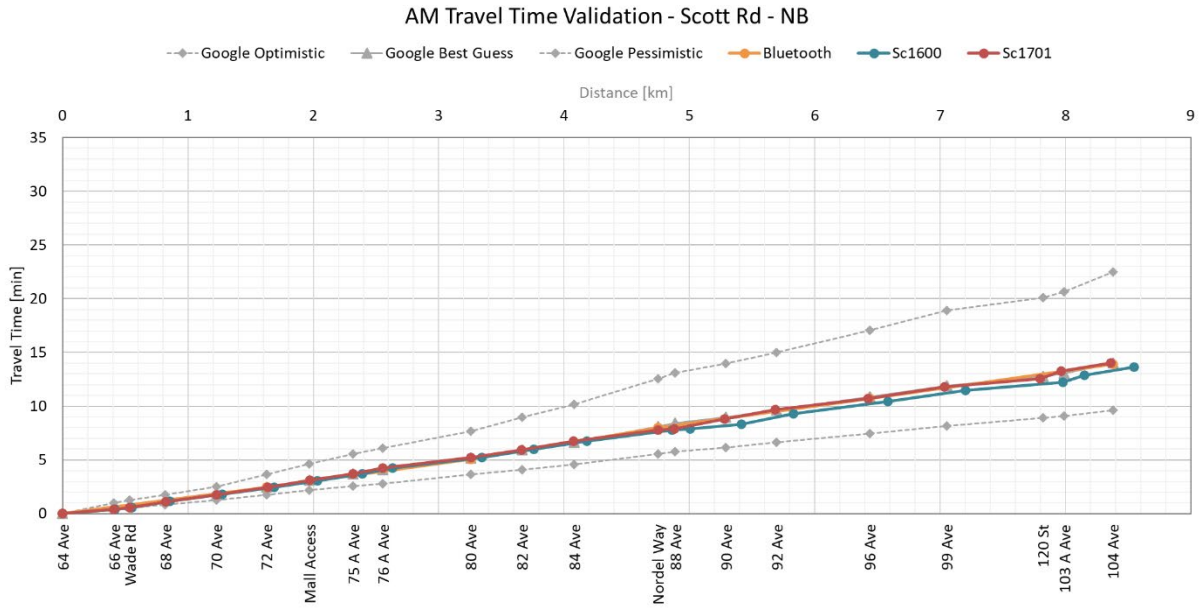
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Google Best Guess
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Bluetooth
Sc1600
Sc1701
Distance [km]
Travel Time [min]
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66 Ave
Wade Rd
68 Ave
70 Ave
72 Ave
Mall Access
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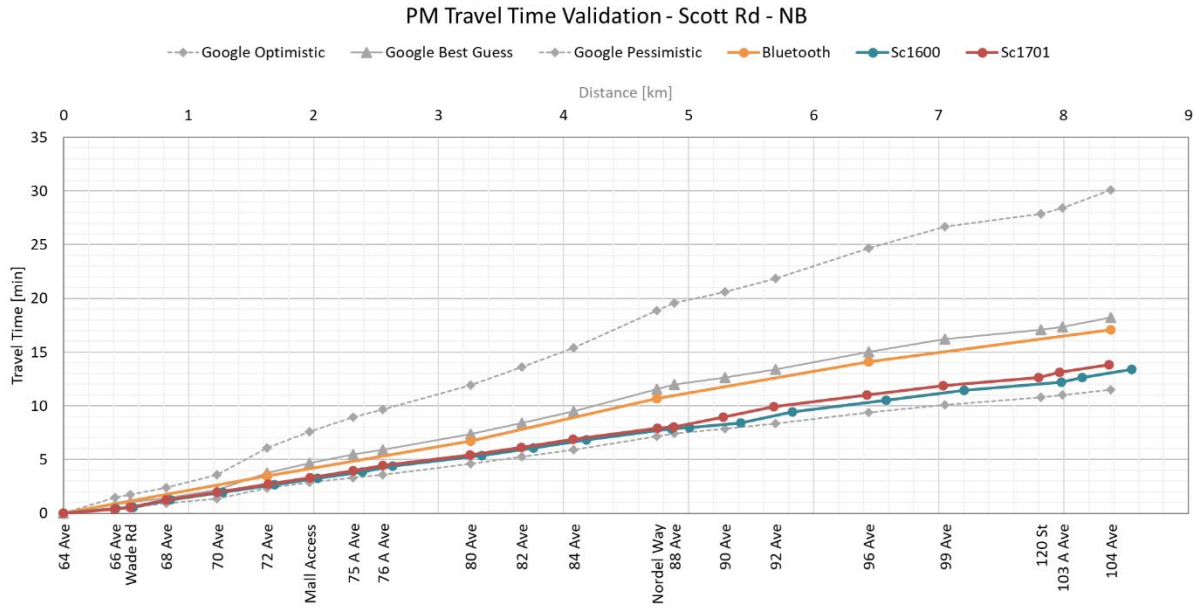
PM Travel Time Validation - Scott Rd - NB
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Distance [km]
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Mall Access
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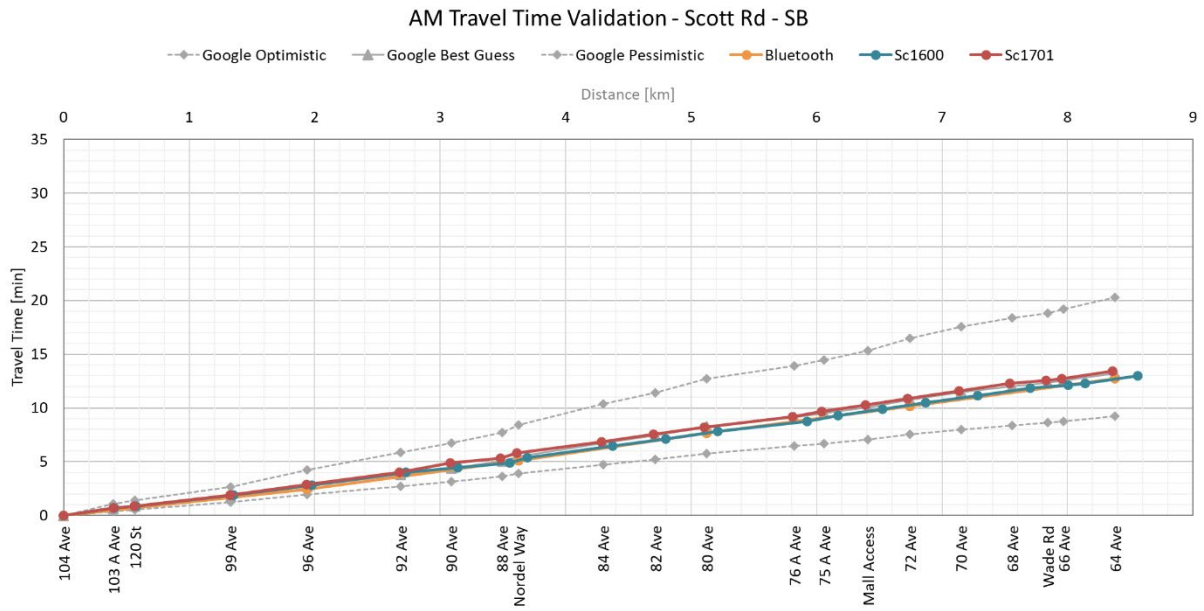
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Travel Time [min]
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103 A Ave
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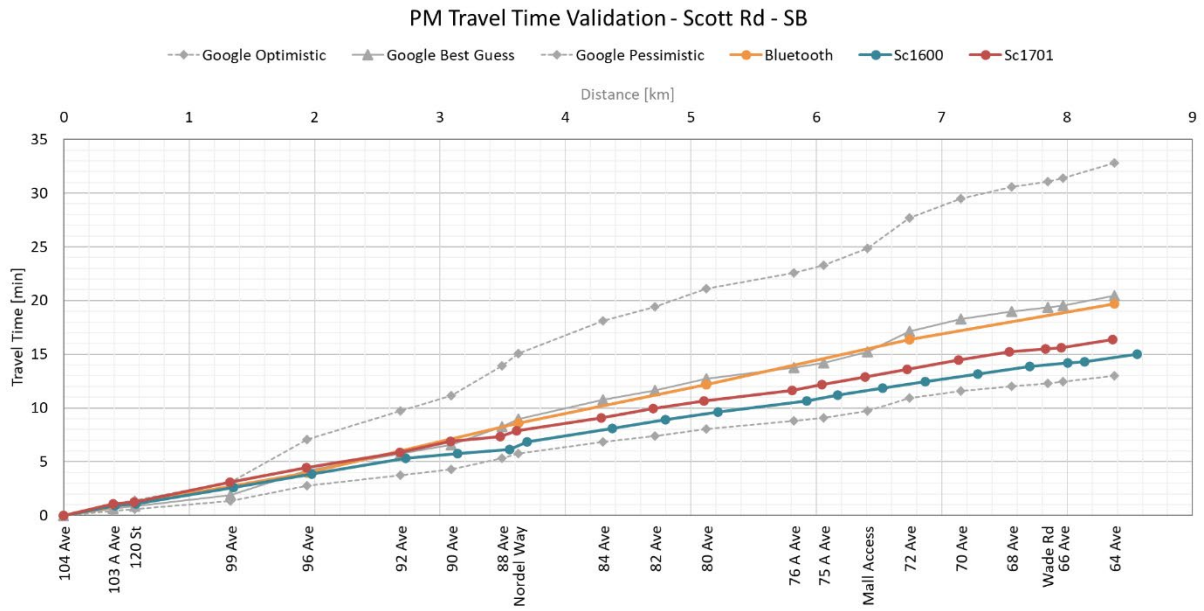
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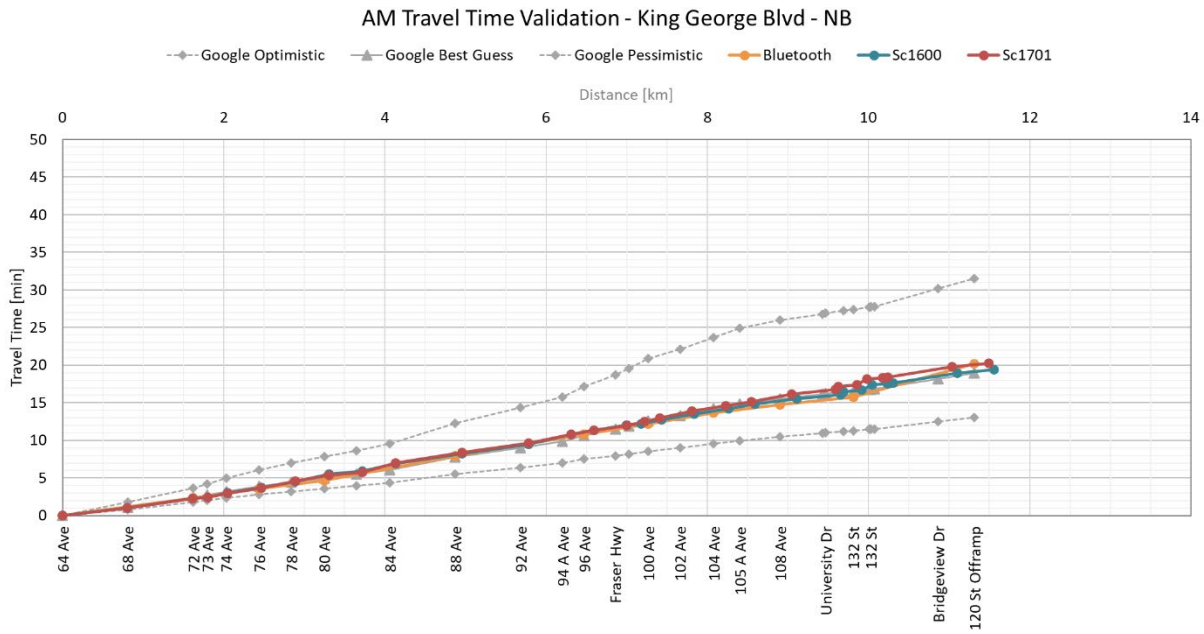
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Travel Time [min]
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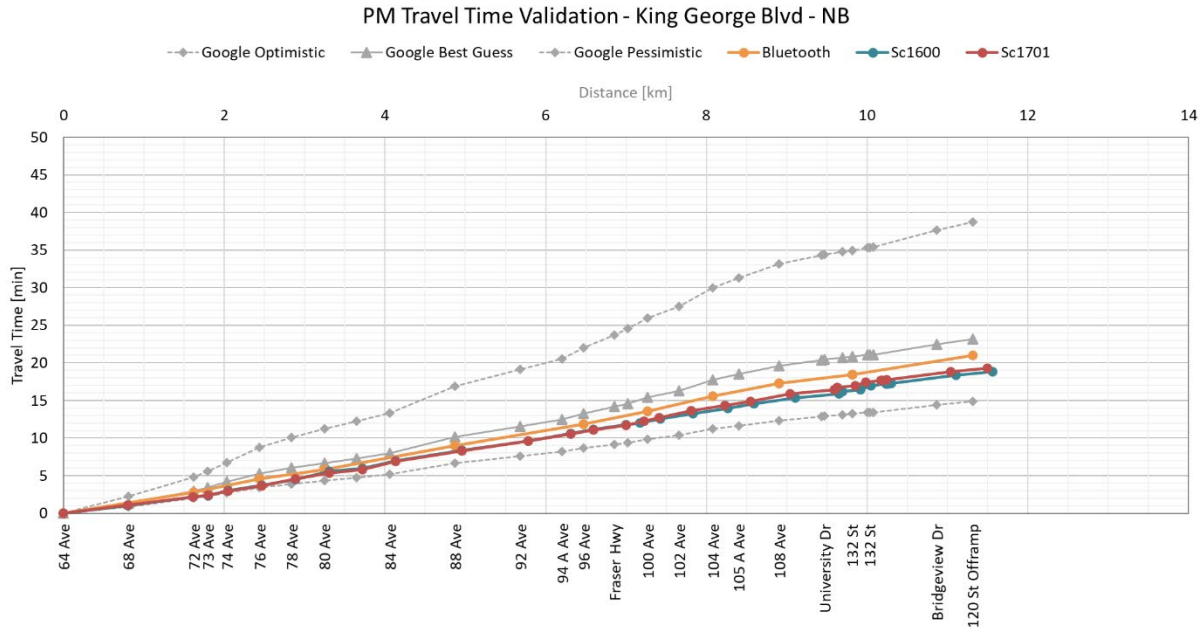
132 St
Bridgeview Dr
120 St Offramp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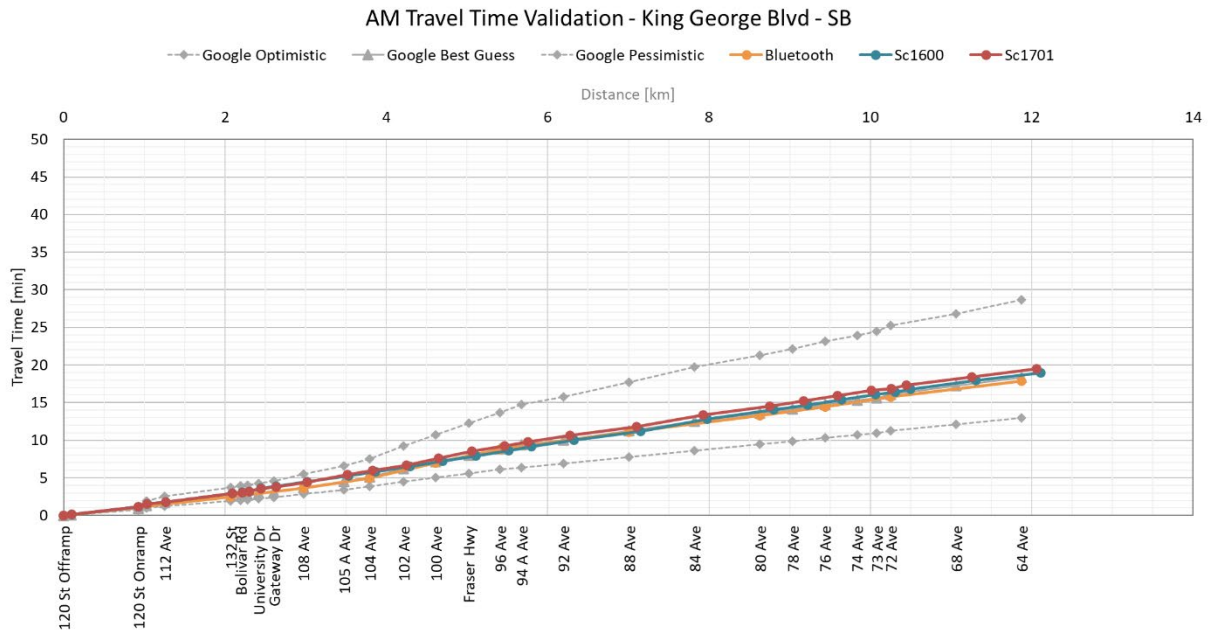
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Distance [km]
Travel Time [min]
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120 St Onramp
112 Ave
132 St
Bolivar Rd
University Dr
Gateway Dr
108 Ave
105 A Ave
104 Ave
102 Ave
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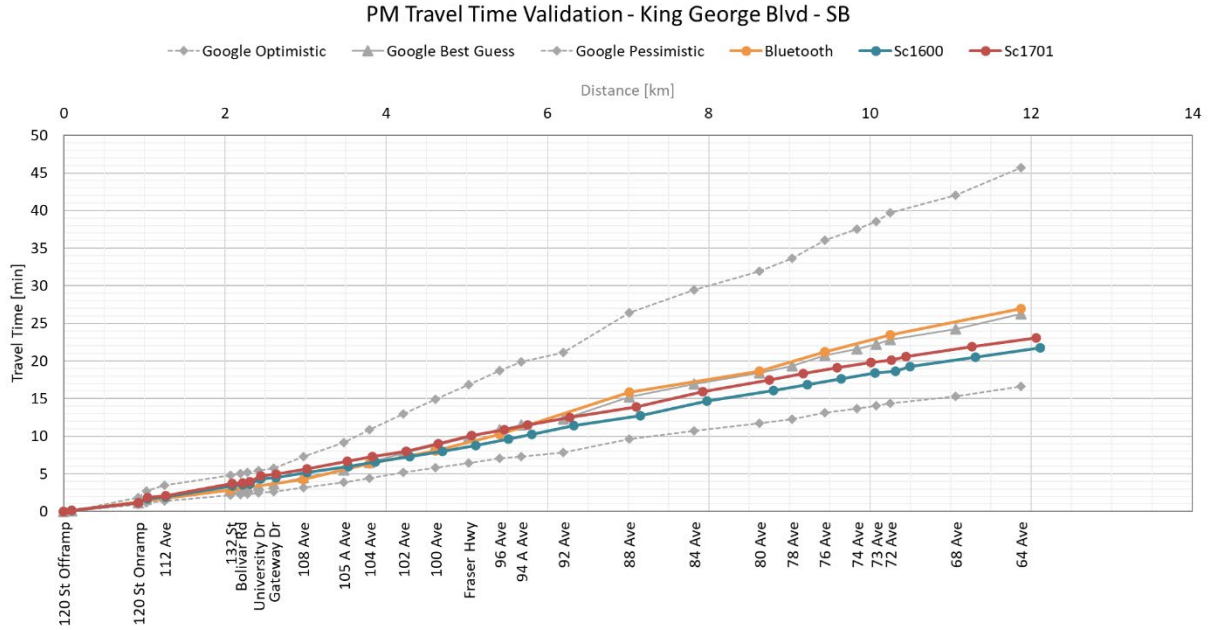
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Travel Time [min]
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120 St Onramp
112 Ave
132 St
Bolivar Rd
University Dr
Gateway Dr
108 Ave
105 A Ave
104 Ave
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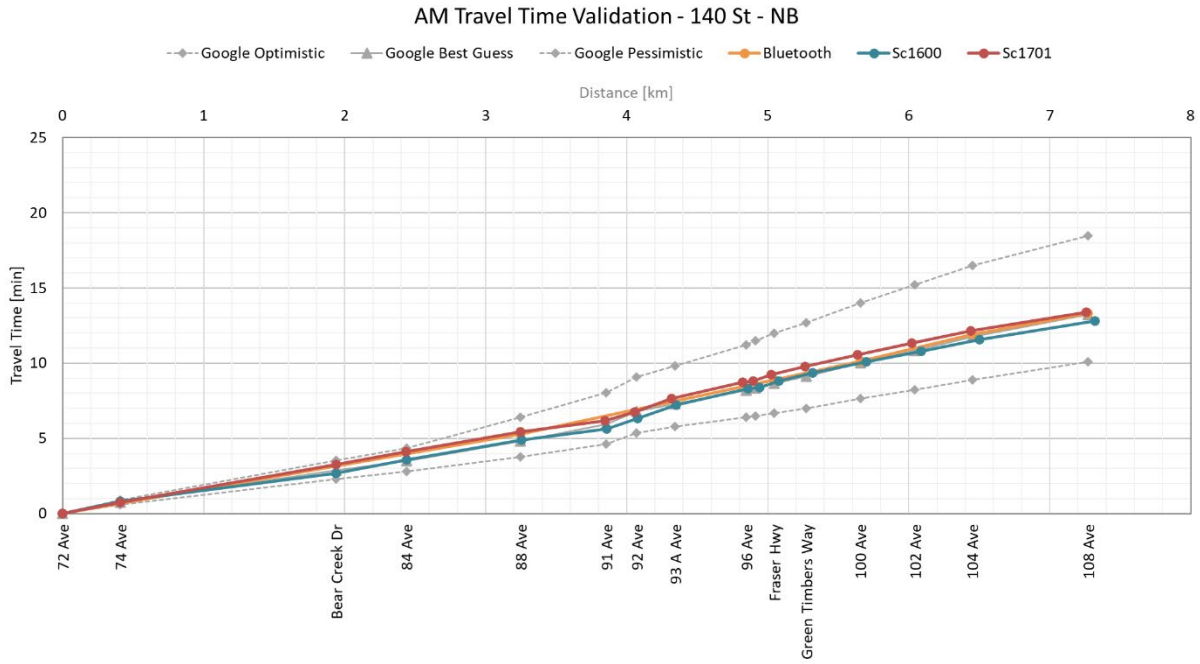
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Travel Time [min]
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Fraser Hwy
Green Timbers Way
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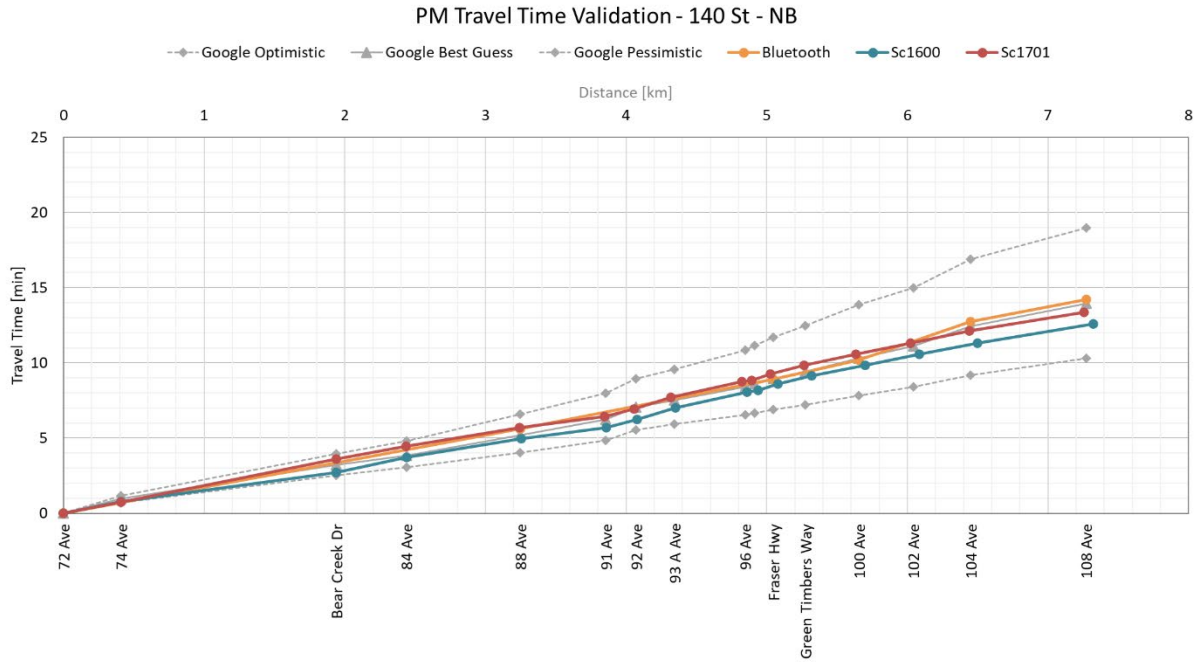
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Green Timbers Way
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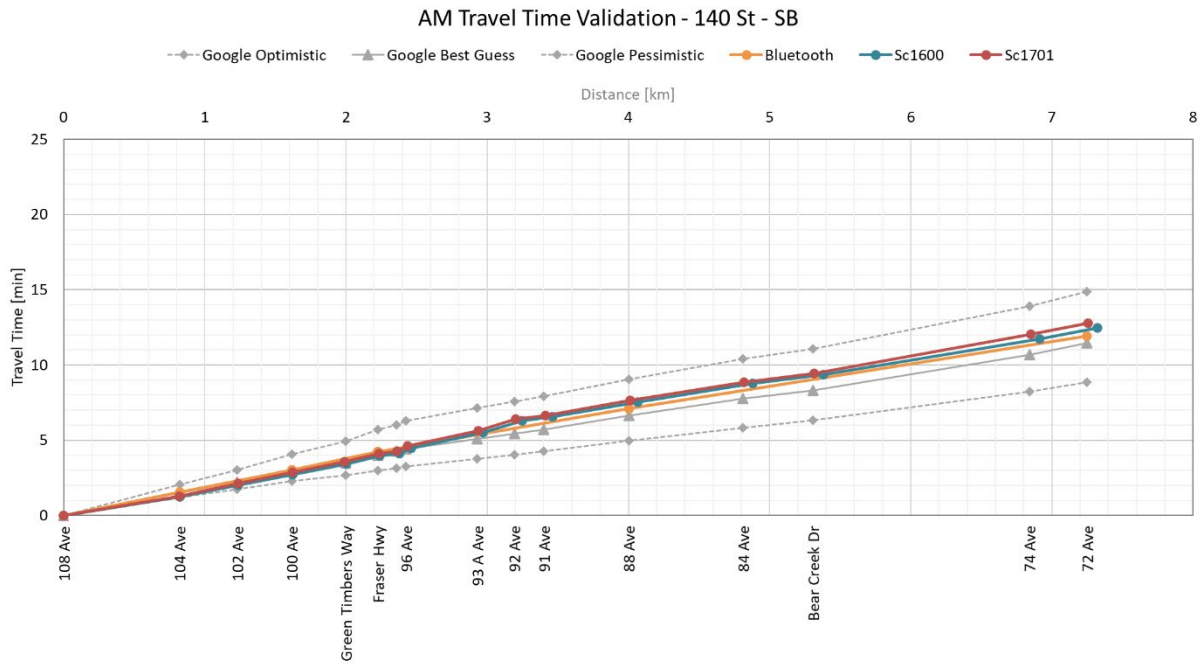
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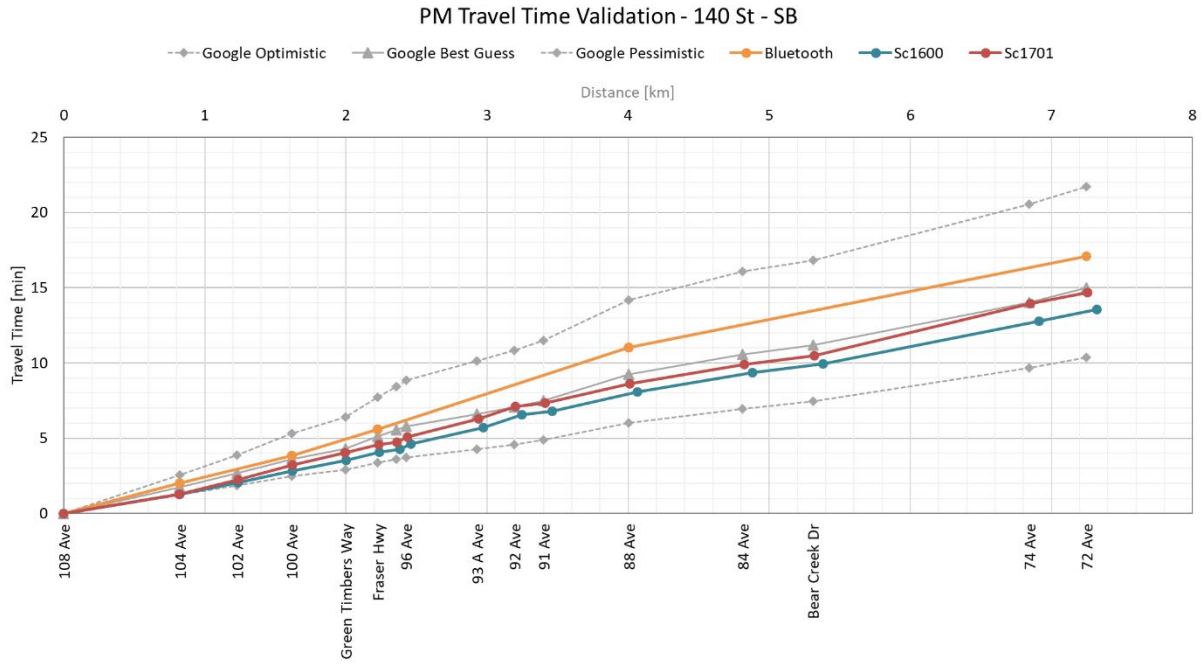
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Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
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Travel Time [min]
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108 Ave
104 Ave
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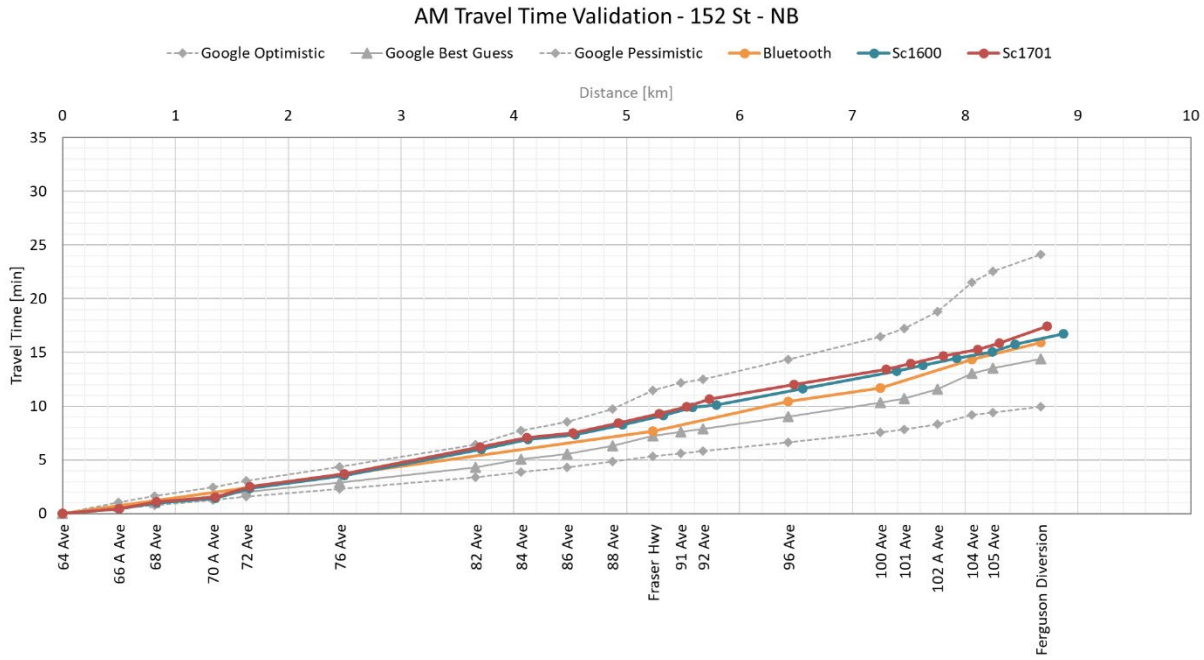
Fraser Hwy
96 Ave
93 A Ave
92 Ave
91 Ave
88 Ave
84 Ave
Bear Creek Dr
74 Ave
72 Ave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Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
Travel Time [min]
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66 A Ave
68 Ave
70 A Ave
72 Ave
76 Ave
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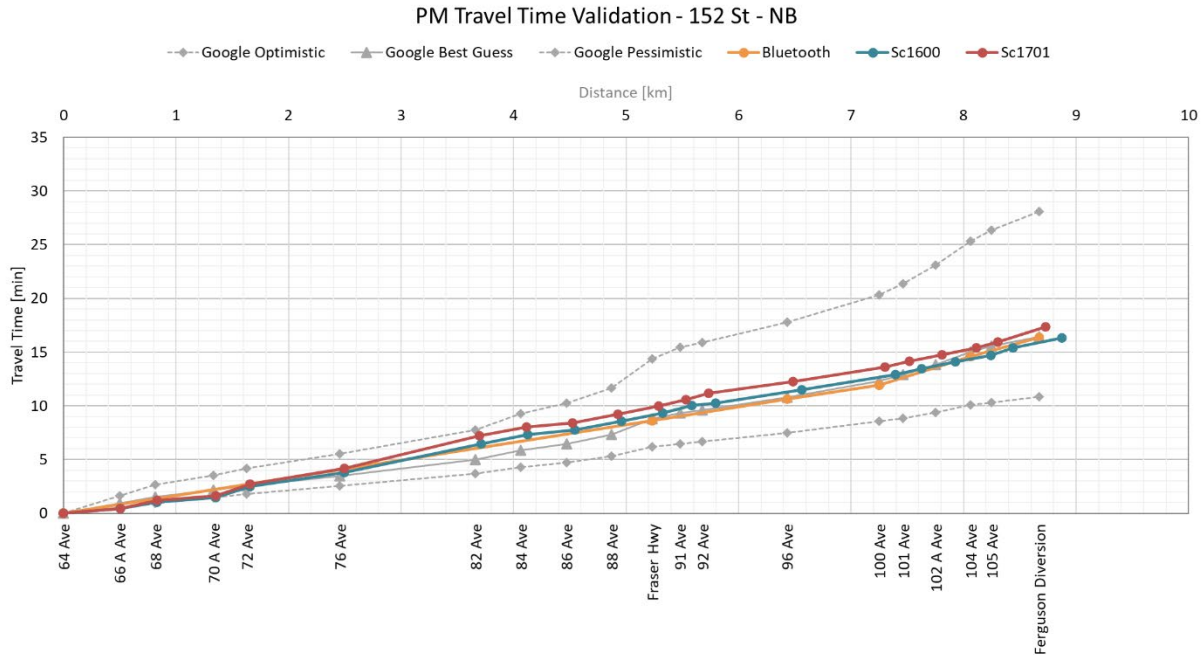
Ferguson Diversion


PM Travel Time Validation - 152 St - NB
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Bluetooth
Sc1600
Sc1701
Distance [km]
Travel Time [min]
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68 Ave
70 A Ave
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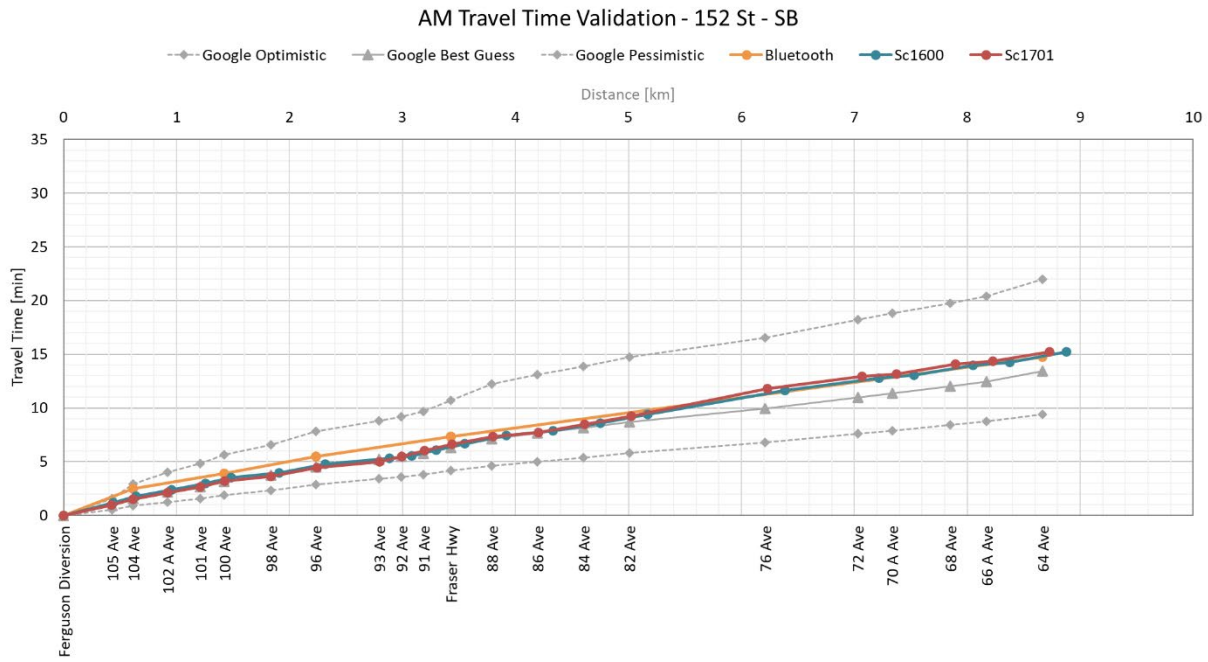
Ferguson Diversion


AM Travel Time Validation - 152 St - SB
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Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
Travel Time [min]
Ferguson Diversion
105 Ave
104 Ave
102 A Ave
101 Ave
100 Ave
98 Ave
96 Ave
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Fraser Hwy
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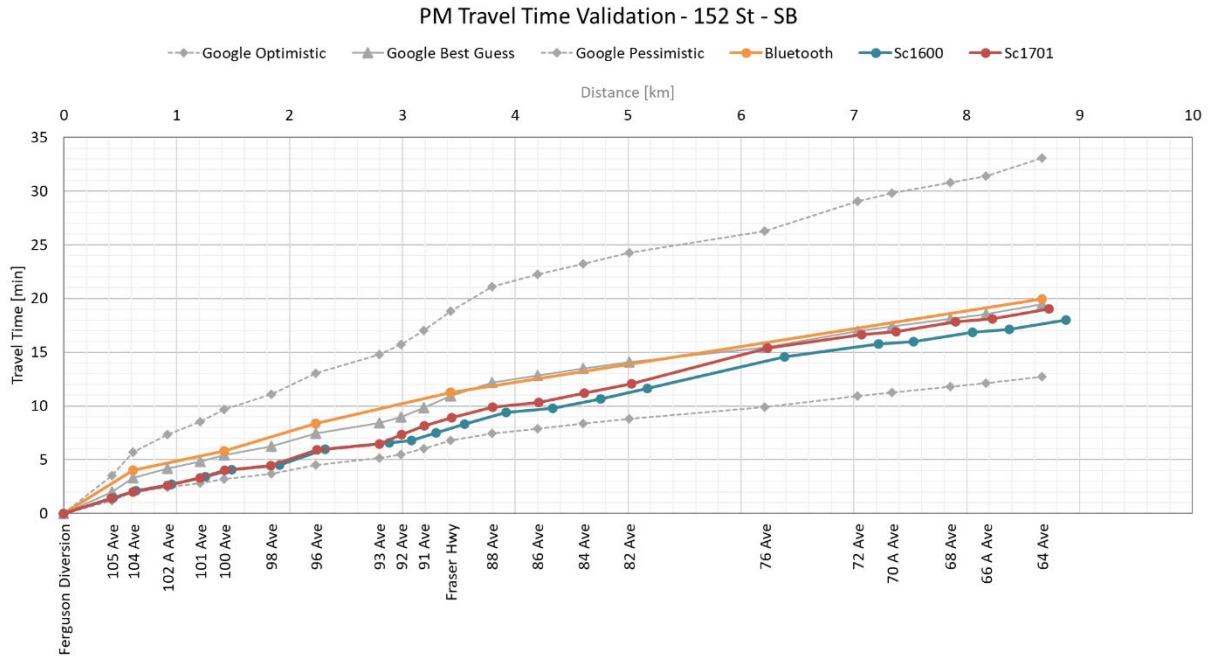
66 A Ave
64 Ave


PM Travel Time Validation - 152 St - SB
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Bluetooth
Sc1600
Sc1701
Distance [km]
Travel Time [min]
Ferguson Diversion
105 Ave
104 Ave
102 A Ave
101 Ave
100 Ave
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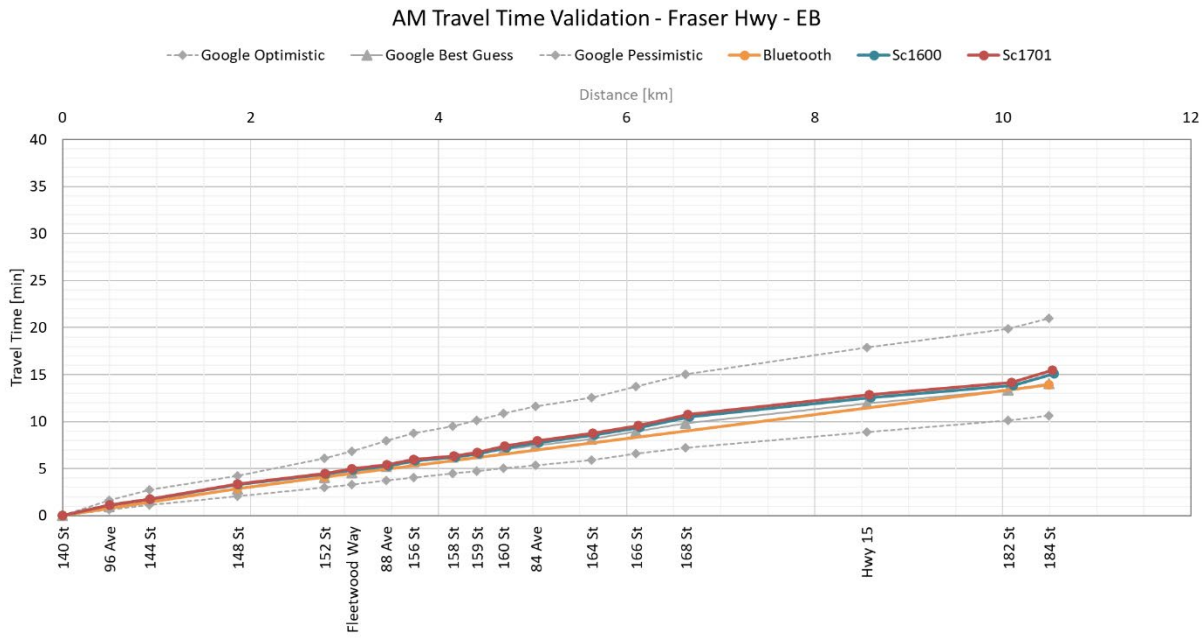
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Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
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12
Travel Time [min]
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140 St
96 Ave
144 St
148 St
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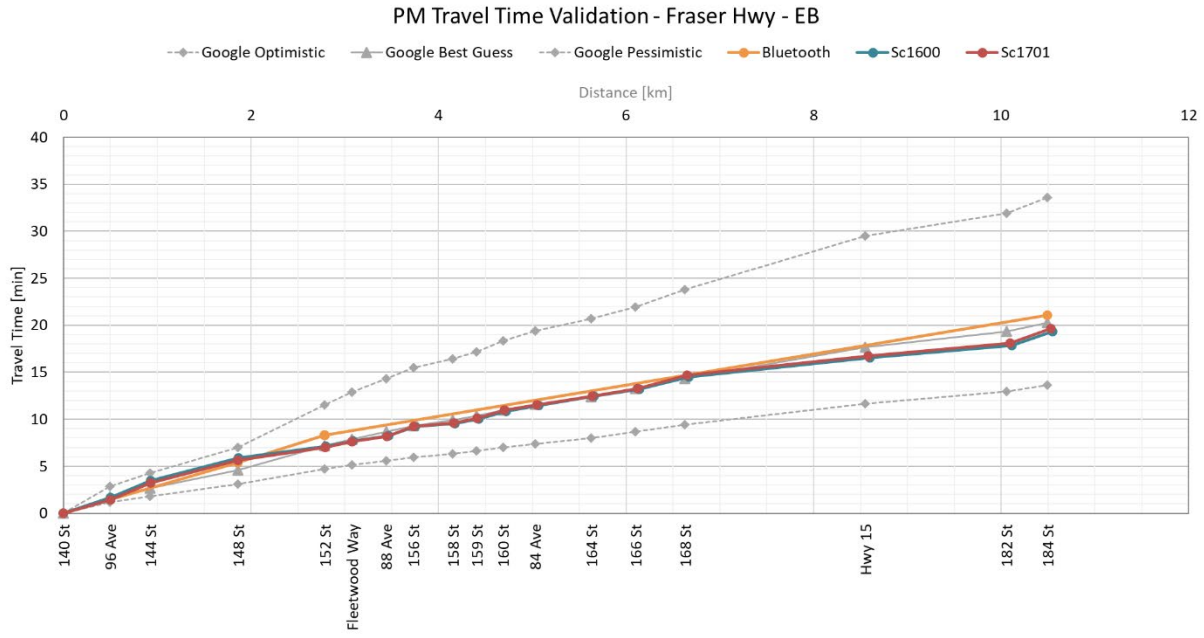
Hwy 15
182 St
184 St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Google Best Guess
Google Pessimistic
Bluetooth
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Sc1701
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Travel Time [min]
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148 St
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Hwy 15
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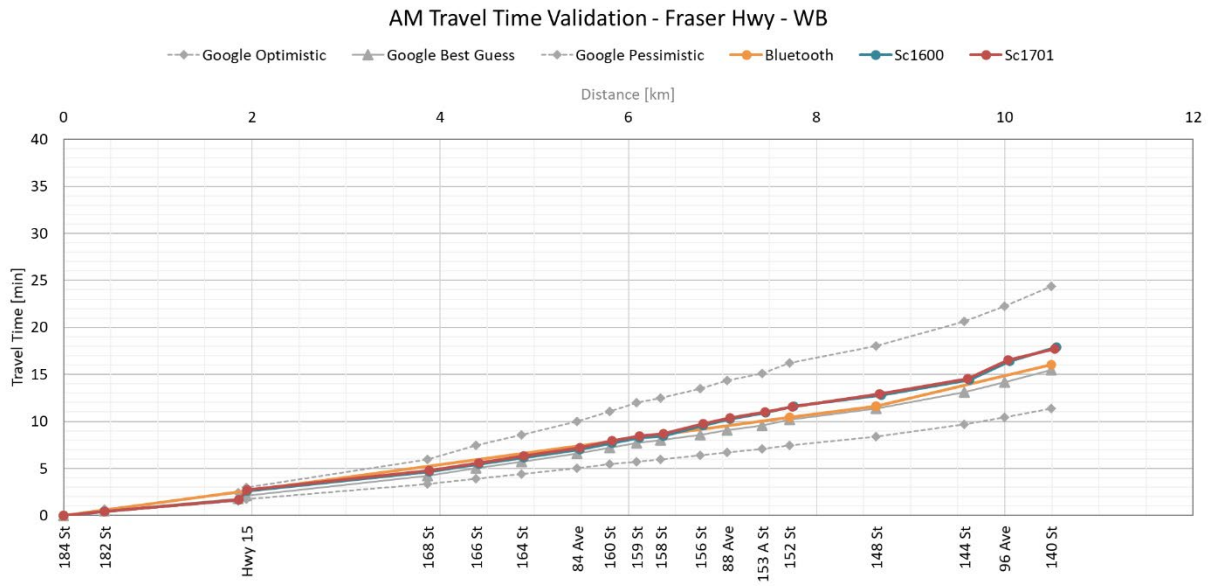
184 St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Travel Time [min]
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182 St
Hwy 15
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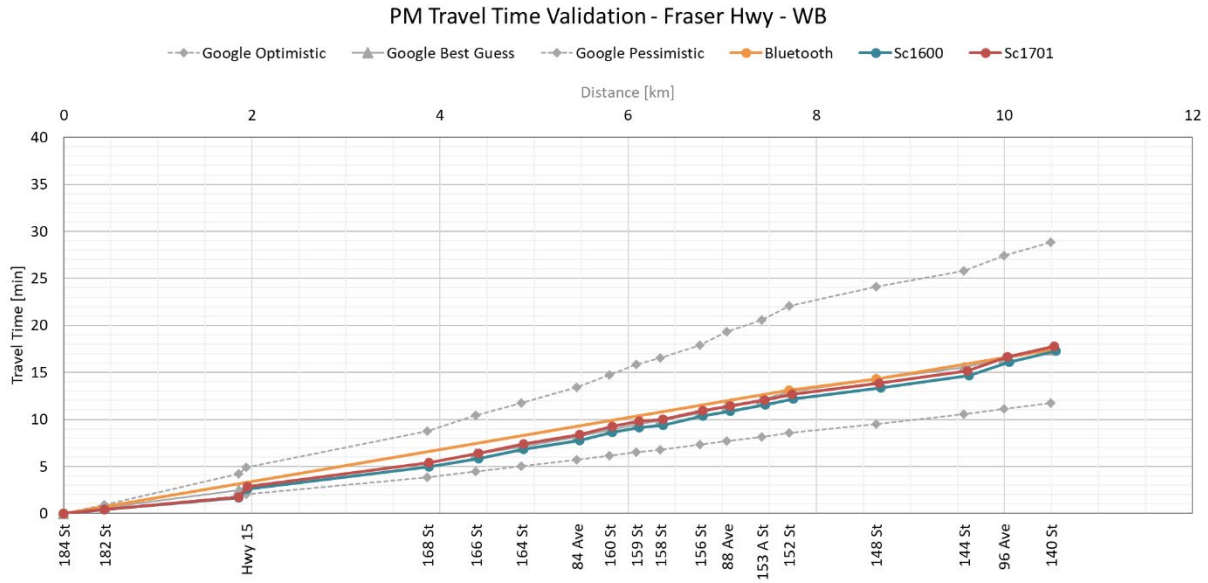
140 St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Google Best Guess
Google Pessimistic
Bluetooth
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Travel Time [min]
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184 St
182 St
Hwy 15
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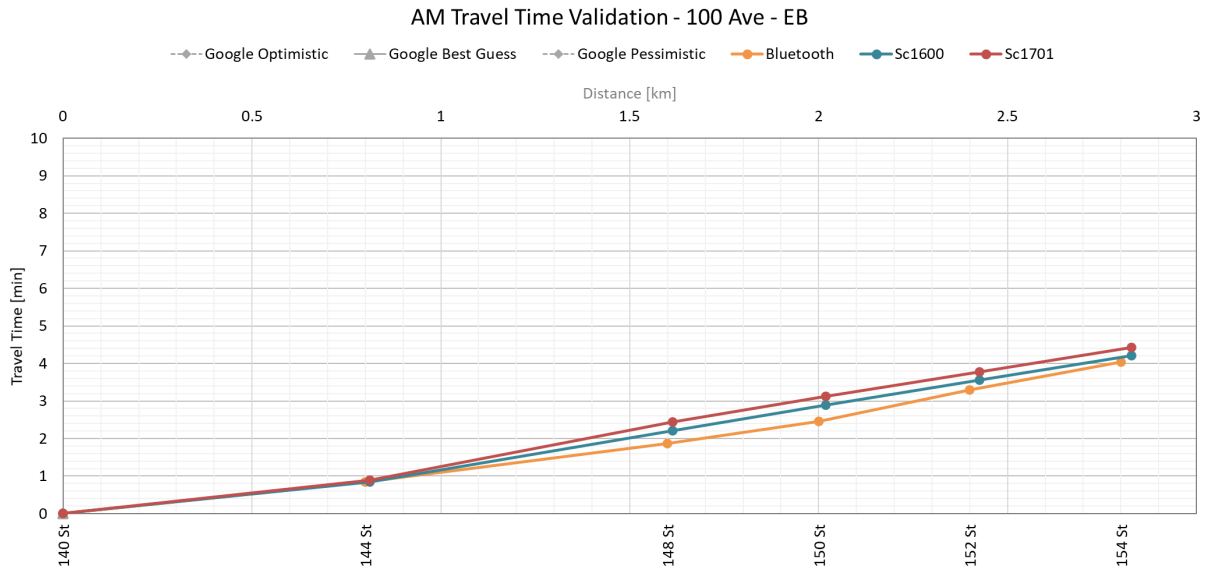
96 Ave
140 St


AM Travel Time Validation - 100 Ave - EB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
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Travel Time [min]
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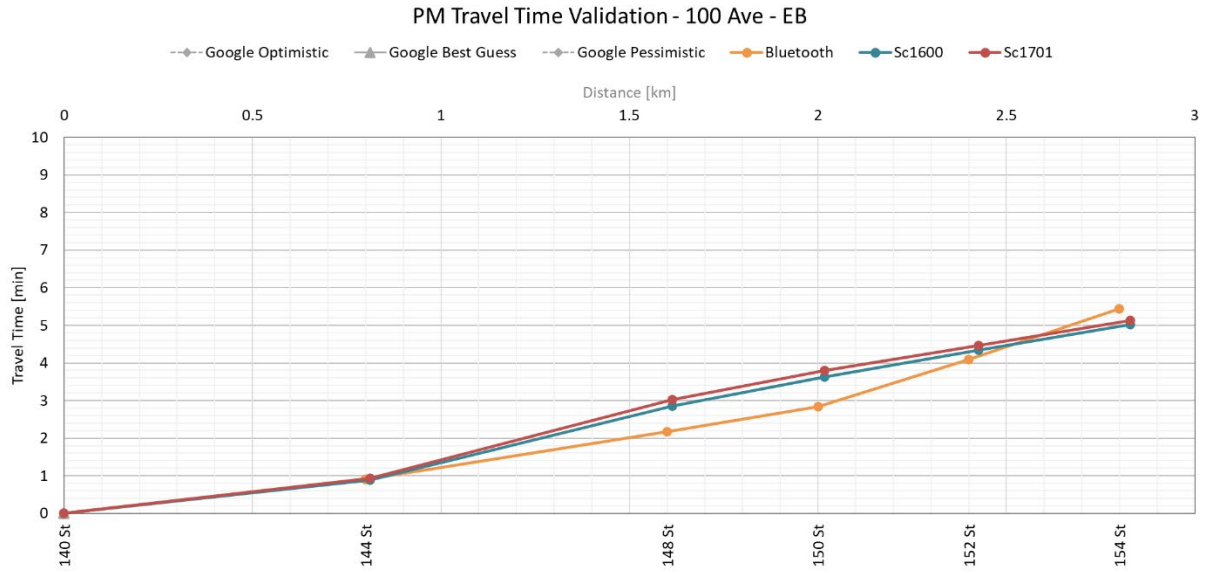
148 St
150 St
152 St
154 St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Bluetooth
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Sc1701
Distance [km]
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Travel Time [min]
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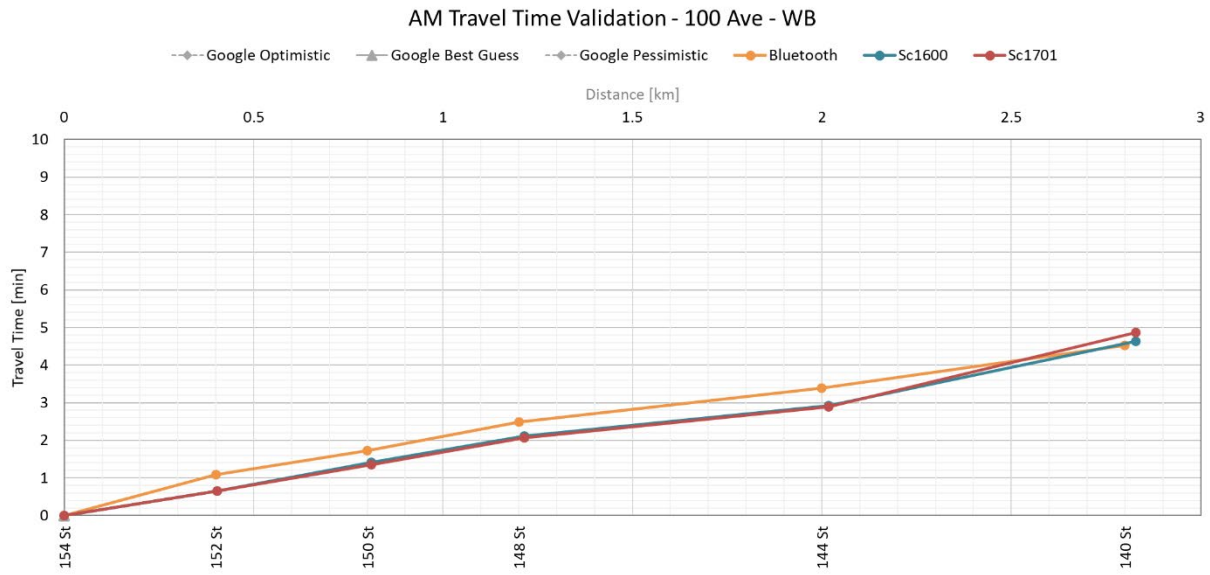
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Bluetooth
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Distance [km]
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Travel Time [min]
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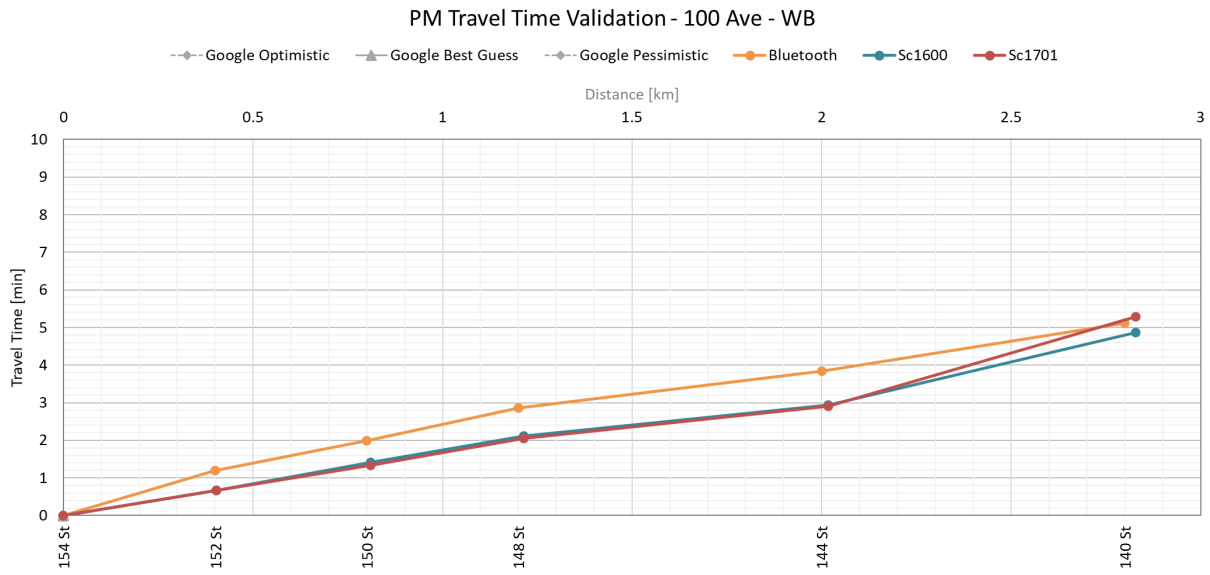
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Bluetooth
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Travel Time [min]
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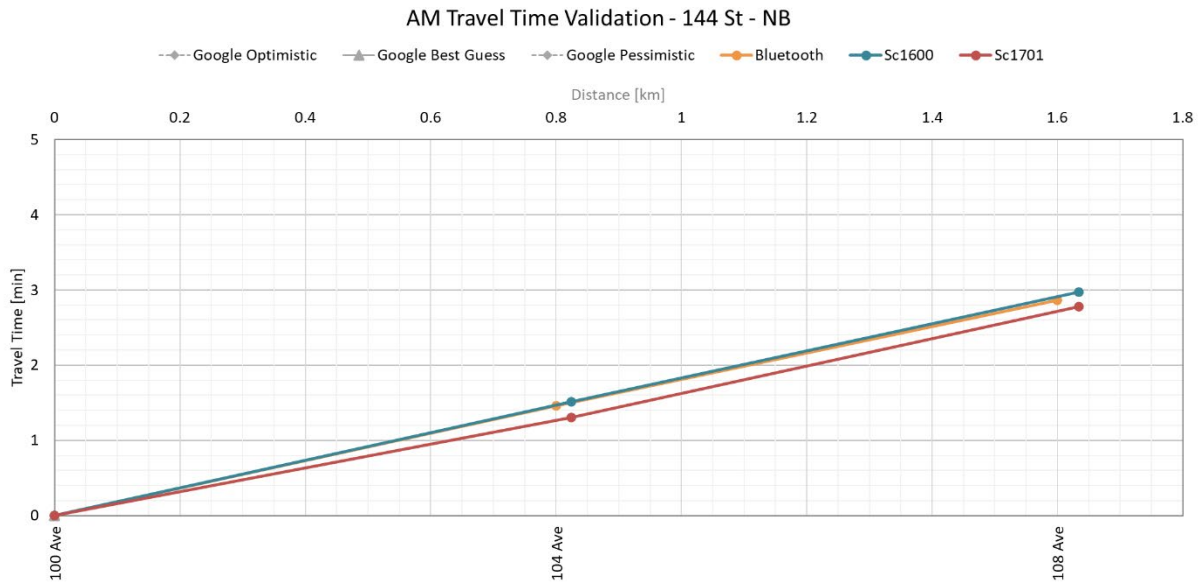
AM Travel Time Validation - 144 St - NB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
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1.8
Travel Time [min]
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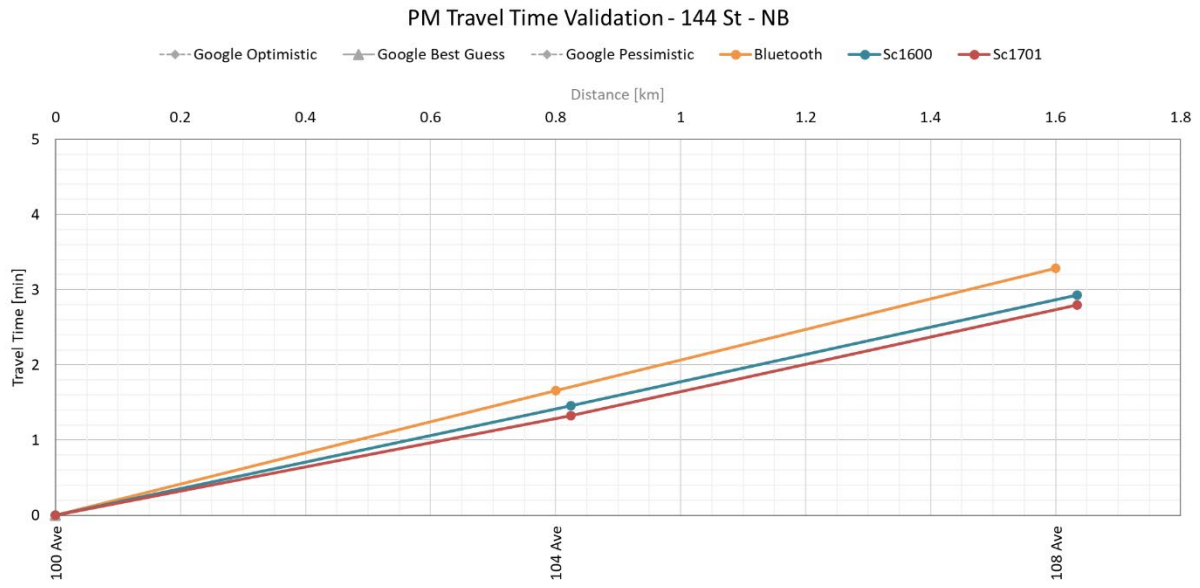
100 Ave
104 Ave
108 Ave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Bluetooth
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Sc1701
Distance [km]
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0.6
0.8
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1.8
Travel Time [min]
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100 Ave
104 Ave
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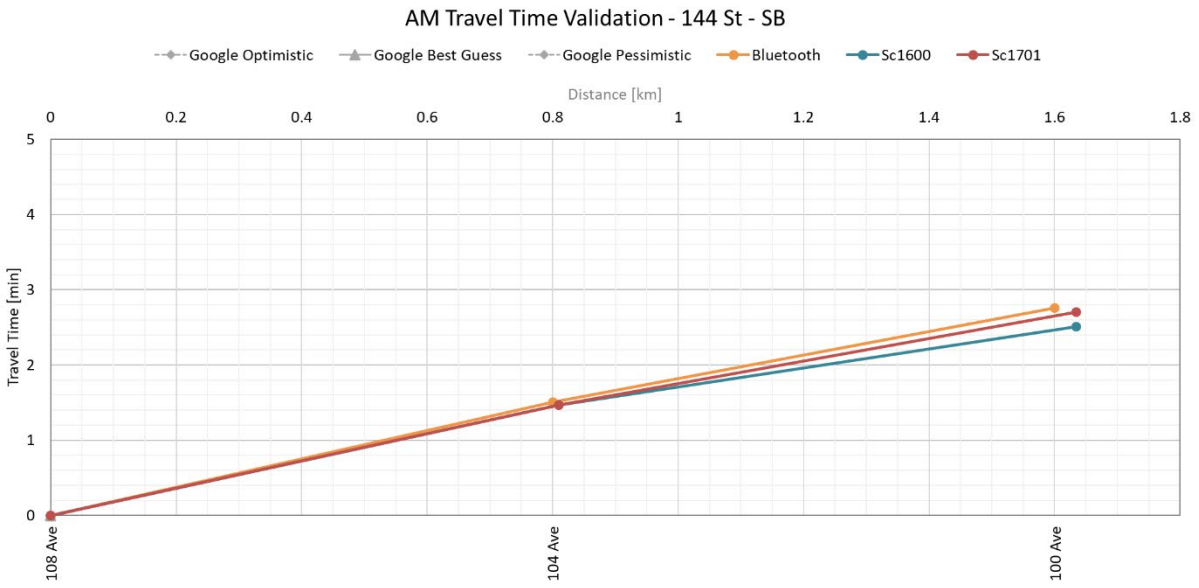
AM Travel Time Validation - 144 St - SB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
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Sc1701
Distance [km]
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Travel Time [min]
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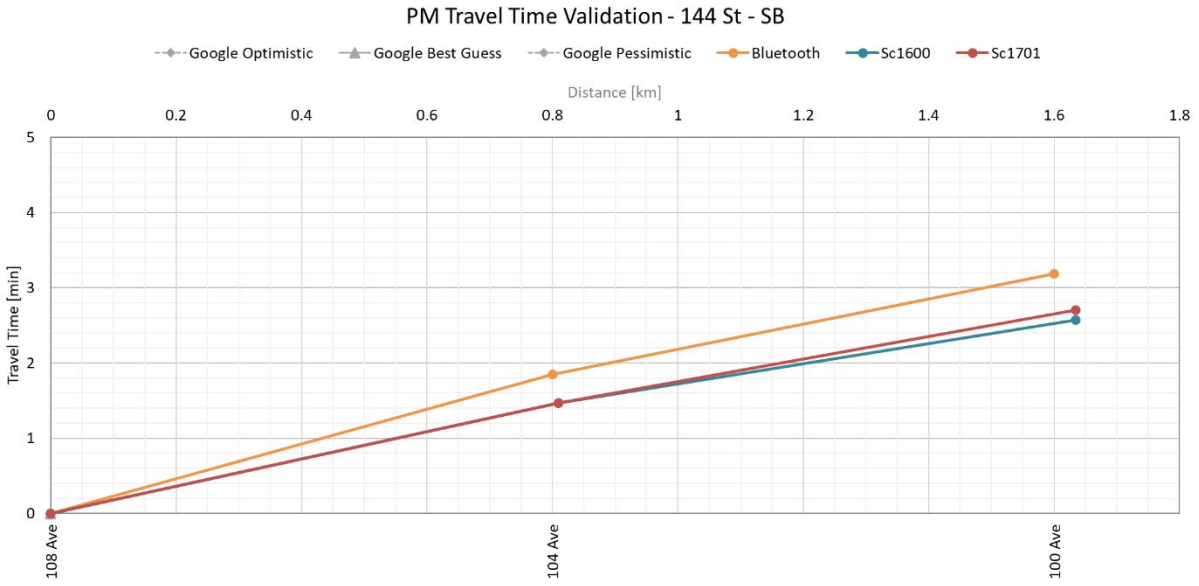
108 Ave
104 Ave
100 Ave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Google Best Guess
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Bluetooth
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Sc1701
Distance [km]
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Travel Time [min]
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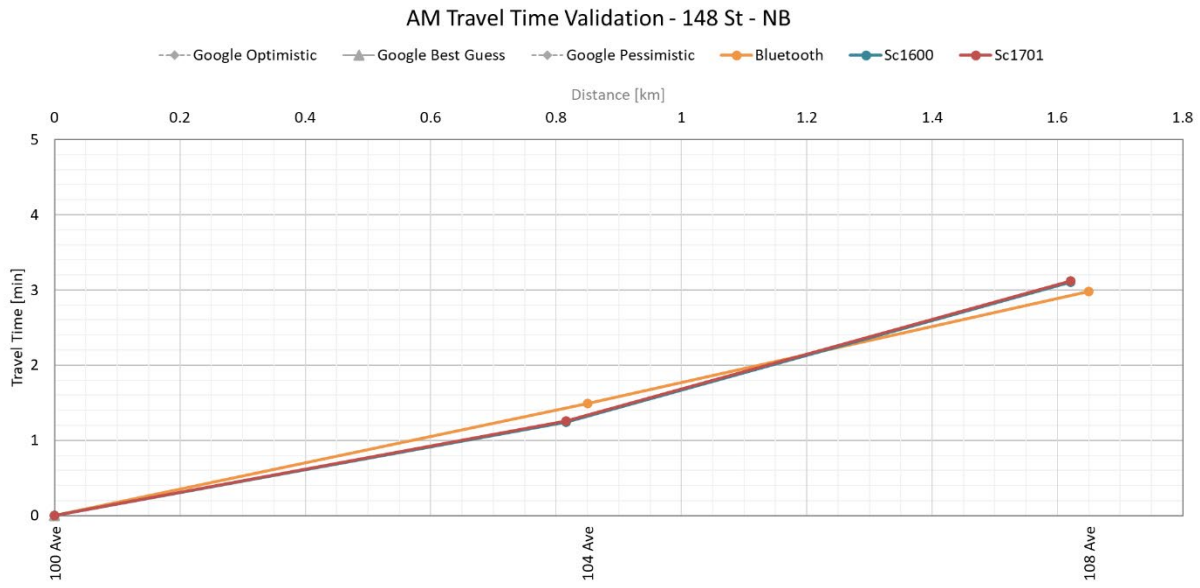
108 Ave
104 Ave
100 Ave


AM Travel Time Validation - 148 St - NB
Google Optimistic
Google Best Guess
Google Pessimistic
Bluetooth
Sc1600
Sc1701
Distance [km]
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0.4
0.6
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Travel Time [min]
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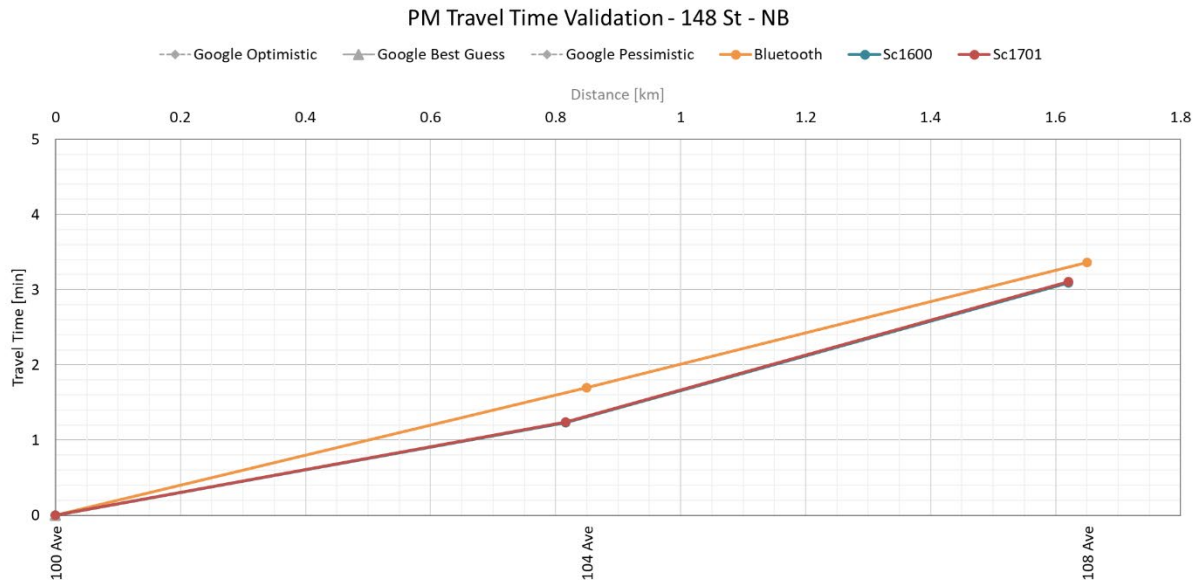
100 Ave
104 Ave
108 Ave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Google Best Guess
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Bluetooth
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Sc1701
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Travel Time [min]
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100 Ave
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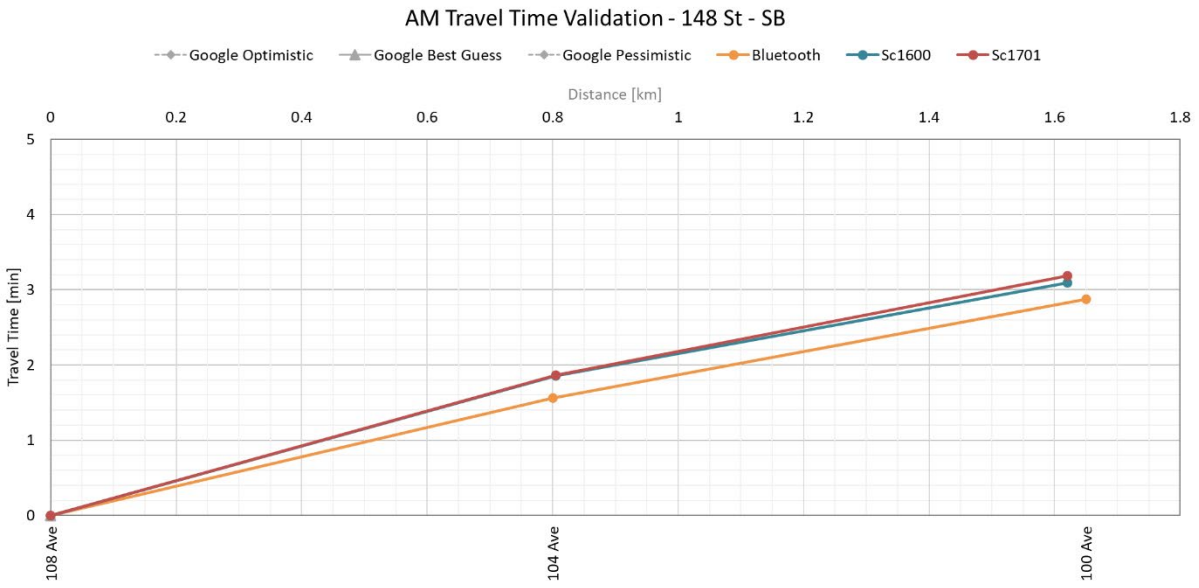
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Google Best Guess
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Bluetooth
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Sc1701
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Travel Time [min]
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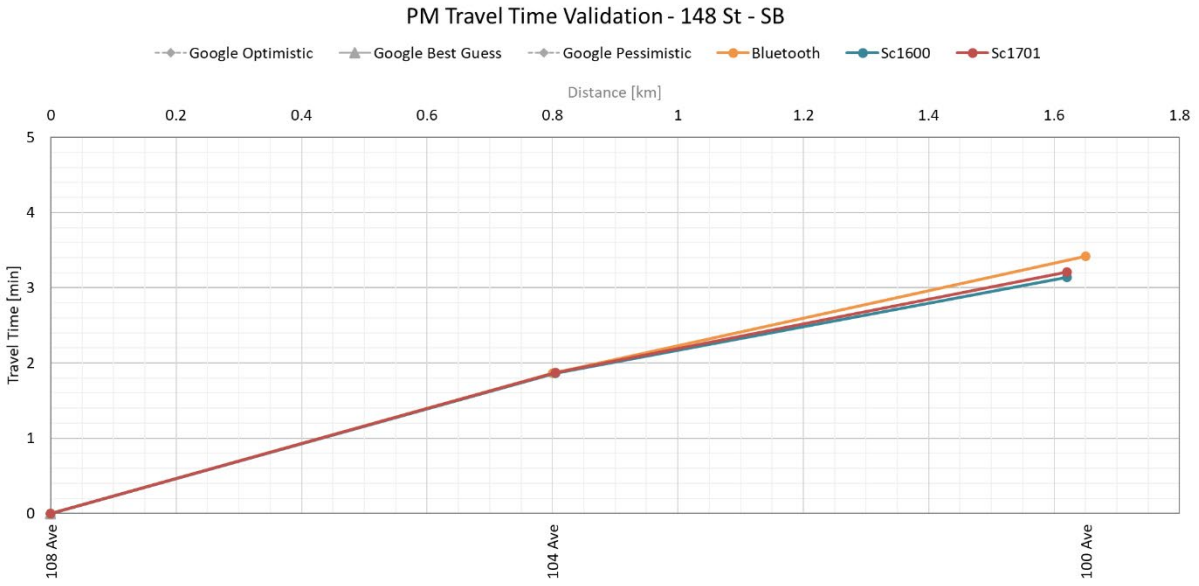
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Sc1701
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Travel Time [min]
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108 Ave
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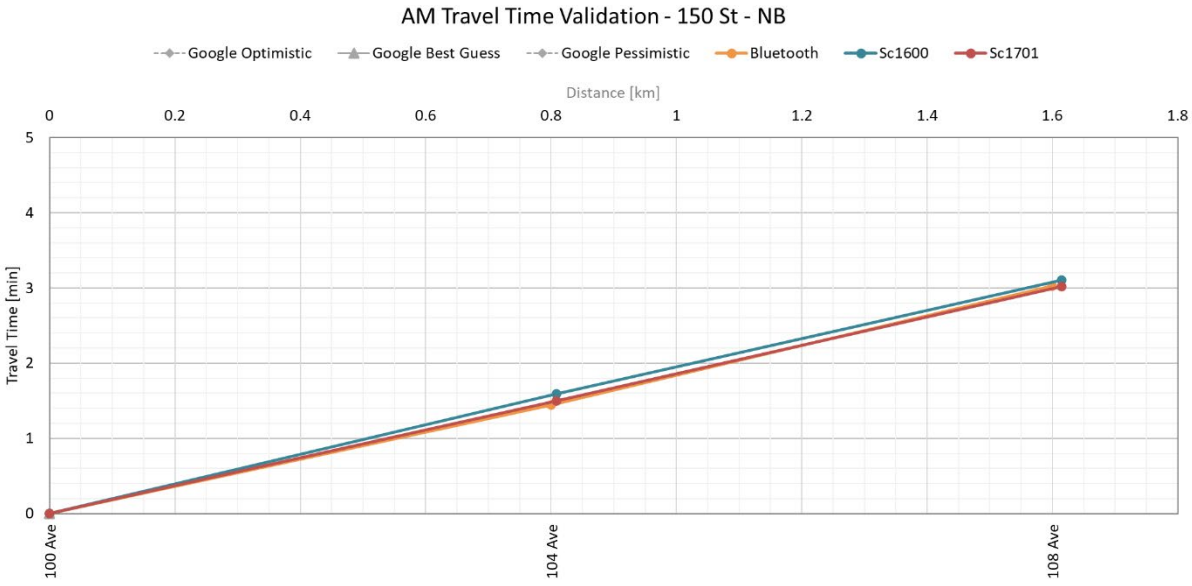
AM Travel Time Validation - 150 St - NB
Google Optimistic
Google Best Guess
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Bluetooth
Sc1600
Sc1701
Distance [km]
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Travel Time [min]
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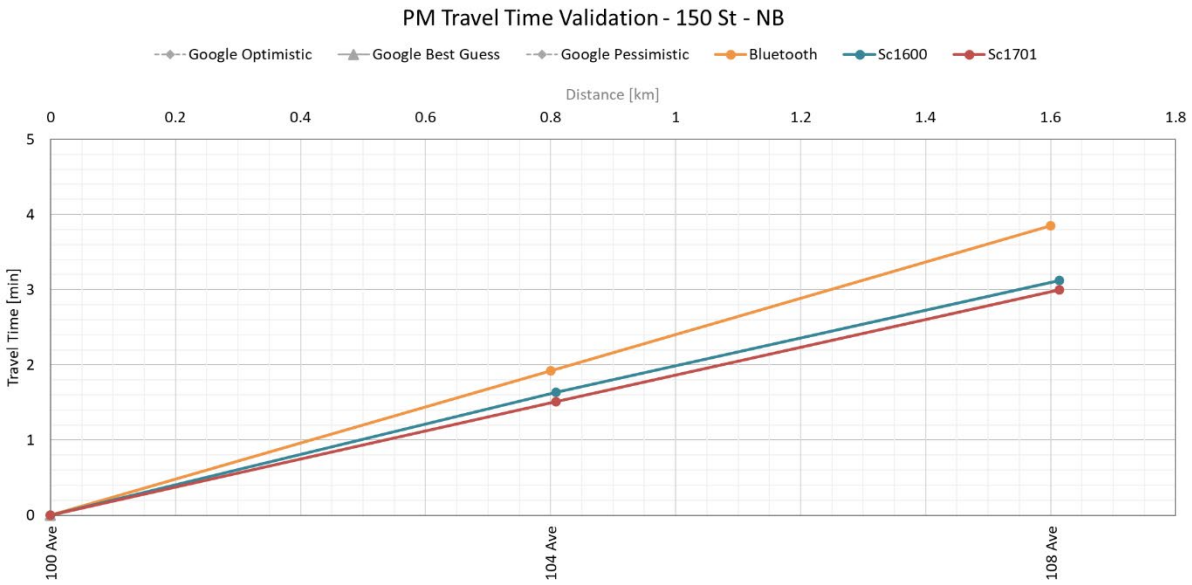
108 Ave


PM Travel Time Validation - 150 St - NB
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Bluetooth
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Sc1701
Distance [km]
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Travel Time [min]
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100 Ave
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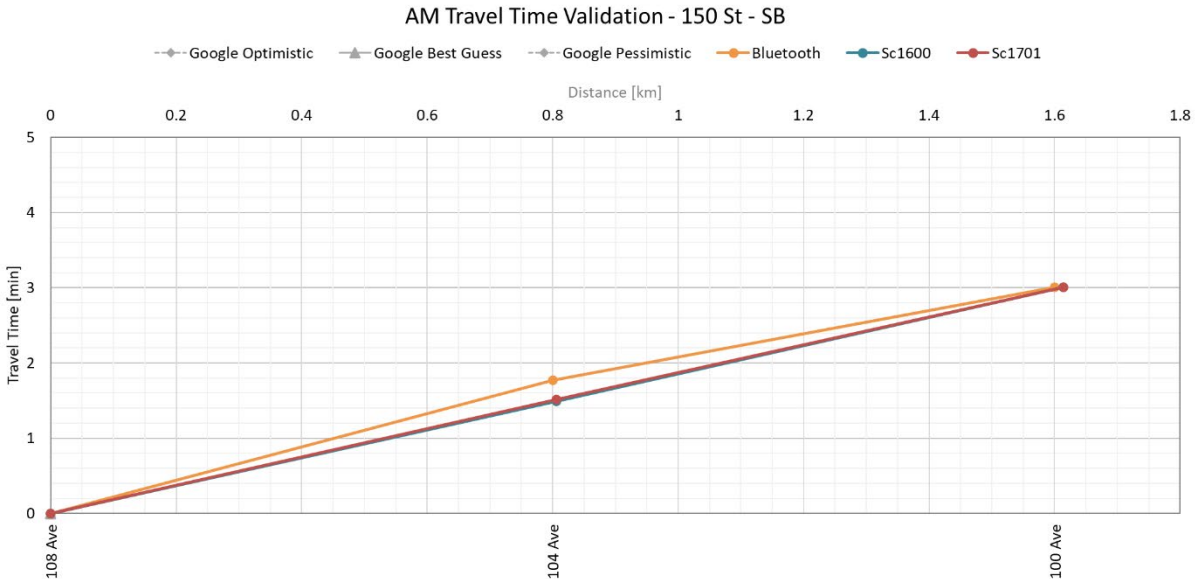
108 Ave


AM Travel Time Validation - 150 St - SB
Google Optimistic
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Bluetooth
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Sc1701
Distance [km]
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Travel Time [min]
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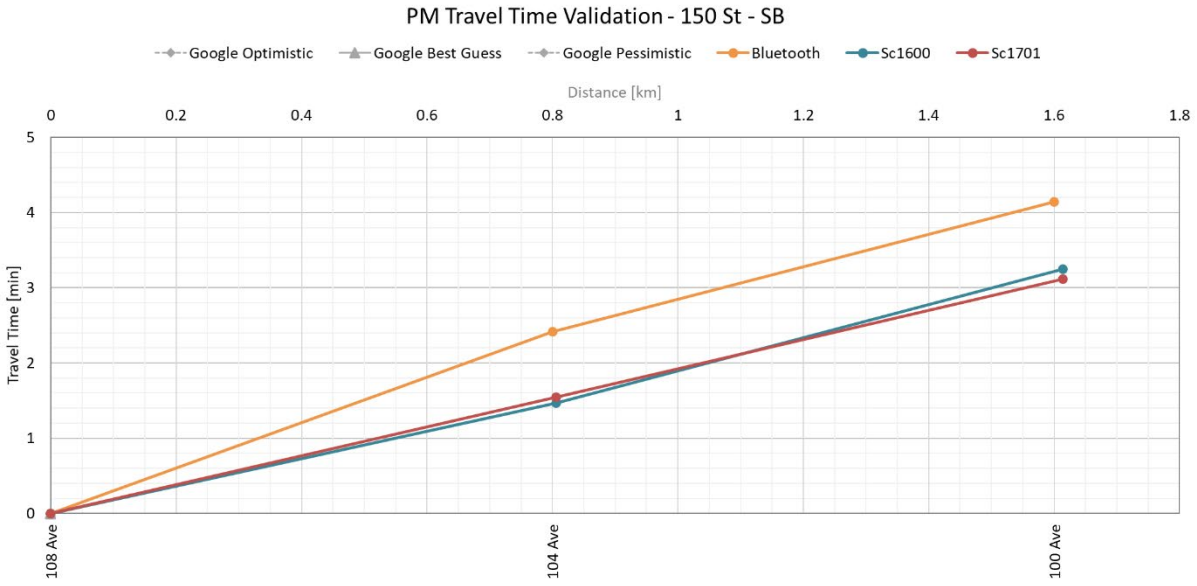
PM Travel Time Validation - 150 St - SB
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Distance [km]
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Travel Time [min]
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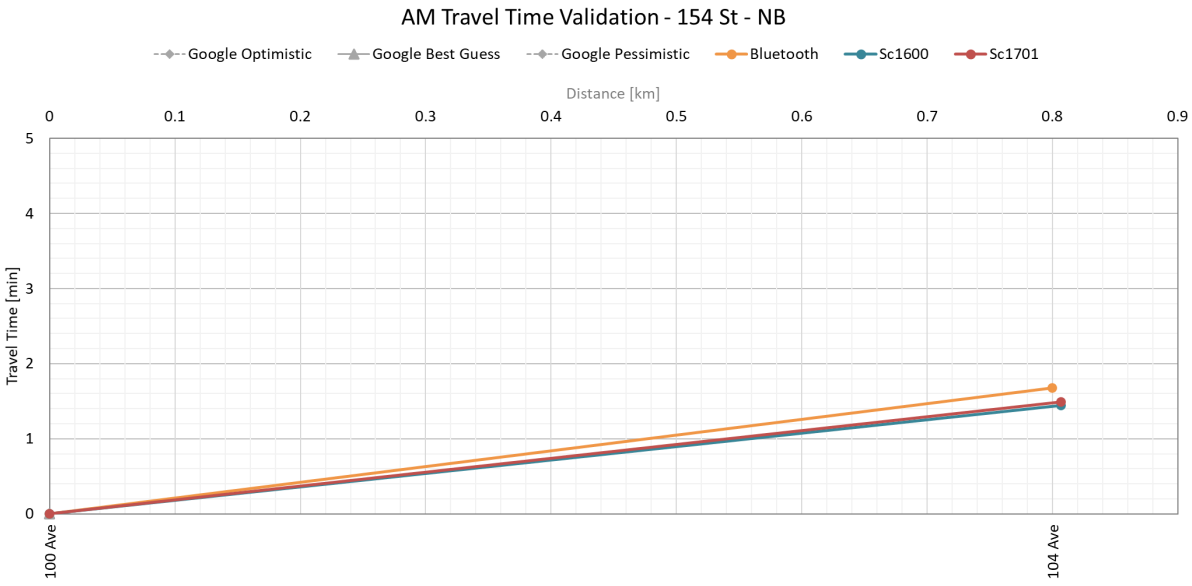
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Google Best Guess
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Sc1600
Sc1701
Distance [km]
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Travel Time [min]
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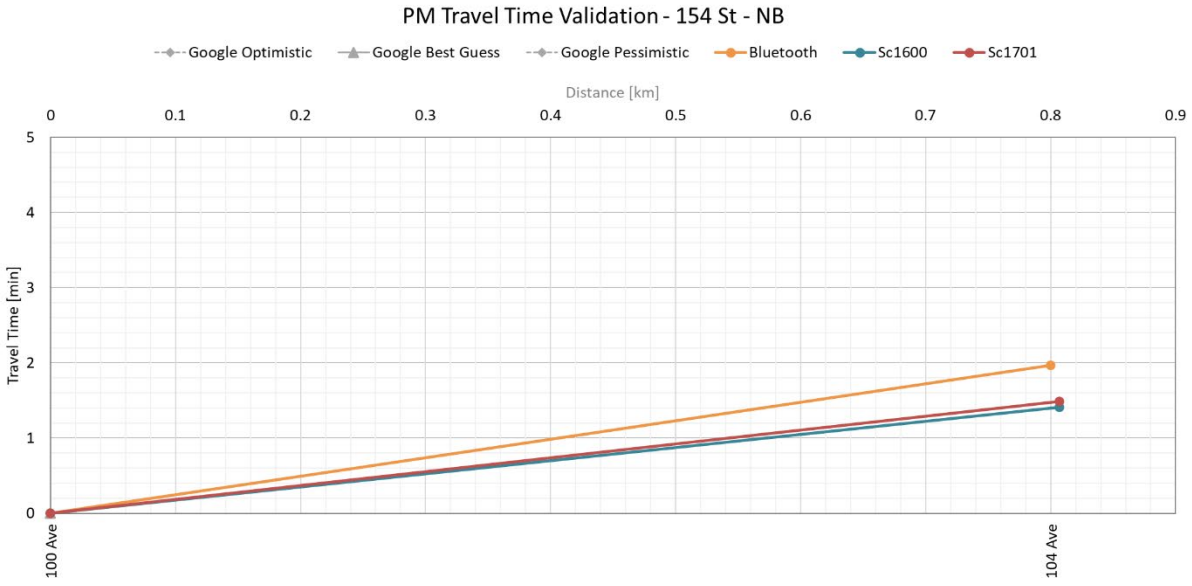
104 Ave


PM Travel Time Validation - 154 St - NB
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Google Best Guess
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Bluetooth
Sc1600
Sc1701
Distance [km]
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Travel Time [min]
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100 Ave
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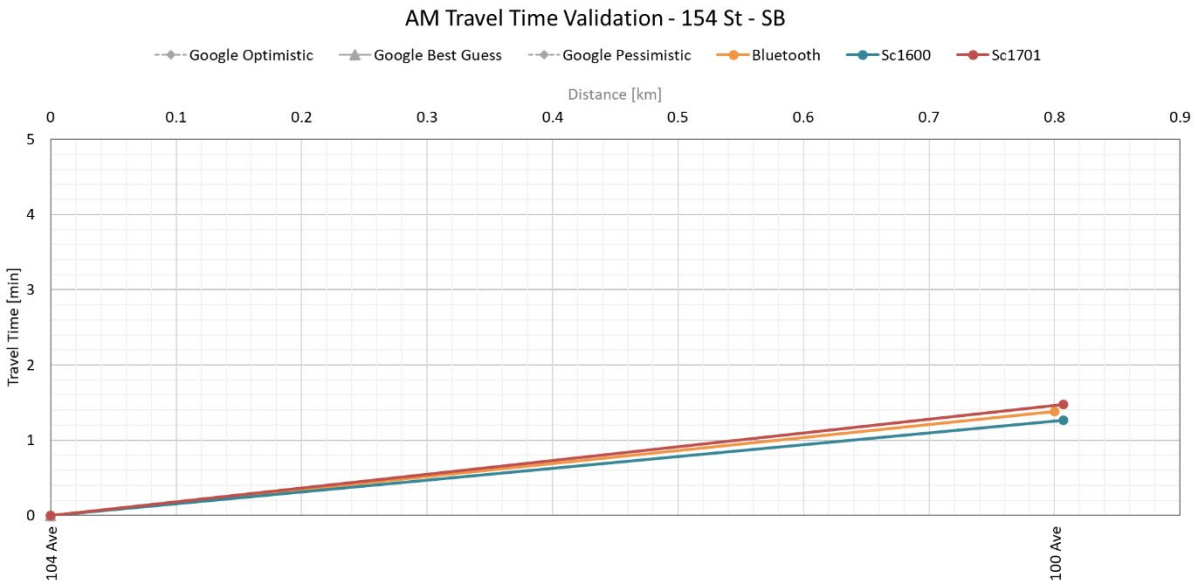
AM Travel Time Validation - 154 St - SB
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Google Best Guess
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Bluetooth
Sc1600
Sc1701
Distance [km]
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Travel Time [min]
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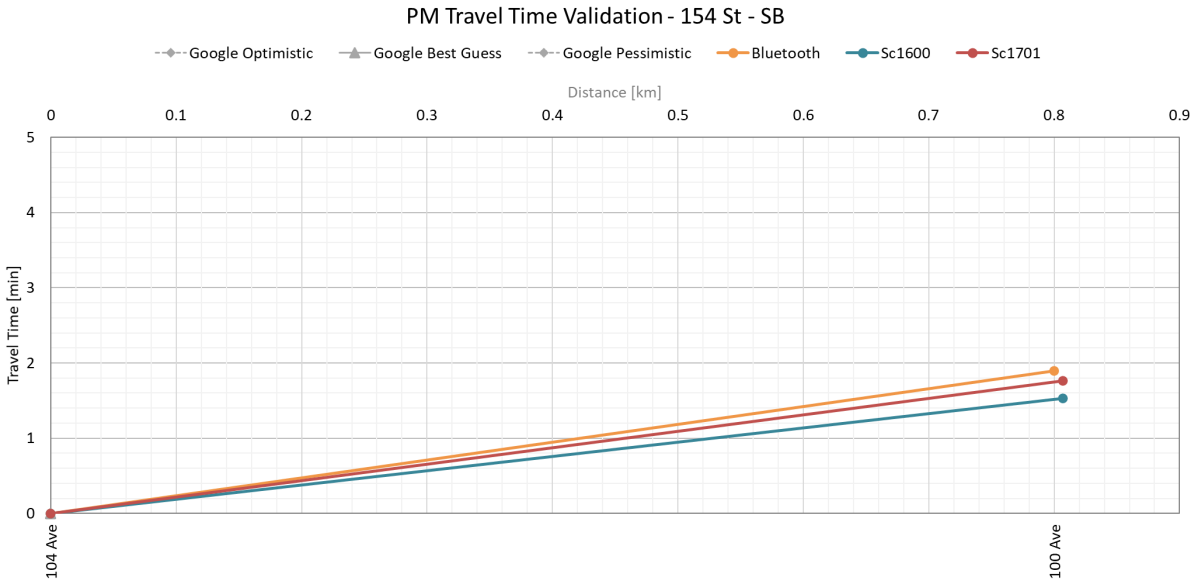
PM Travel Time Validation - 154 St - SB
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Google Best Guess
Google Pessimistic
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Sc1701
Distance [km]
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Travel Time [min]
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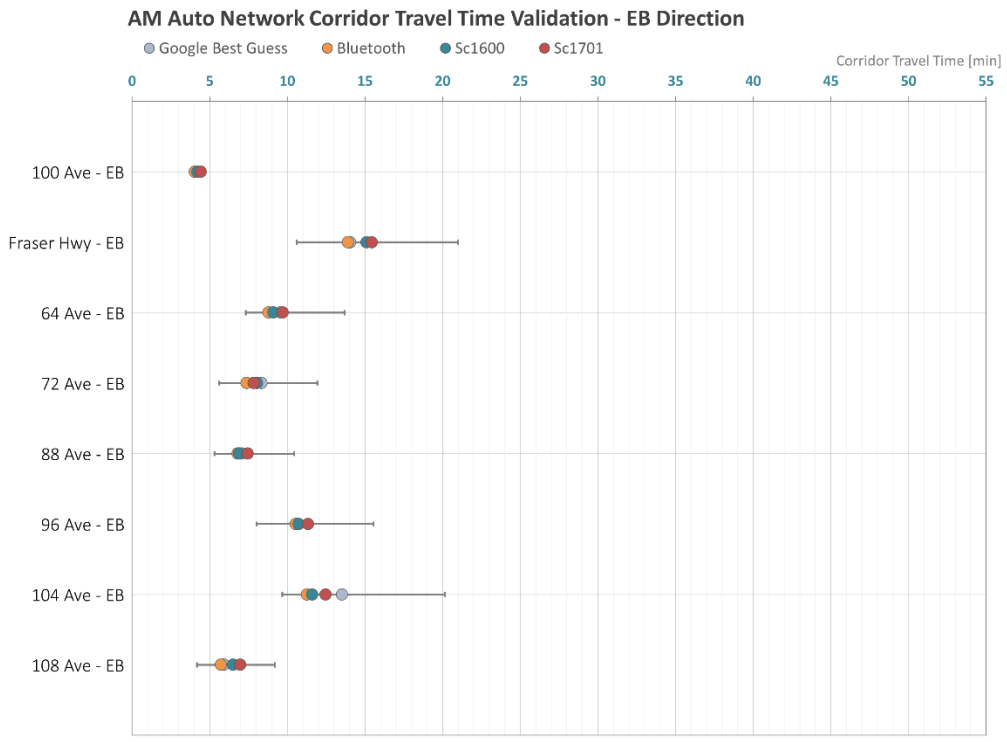
AM Auto Network Corridor Travel Time Validation - EB Direction
Google Best Guess
Bluetooth
Sc1600
Sc1701
Corridor Travel Time [min]
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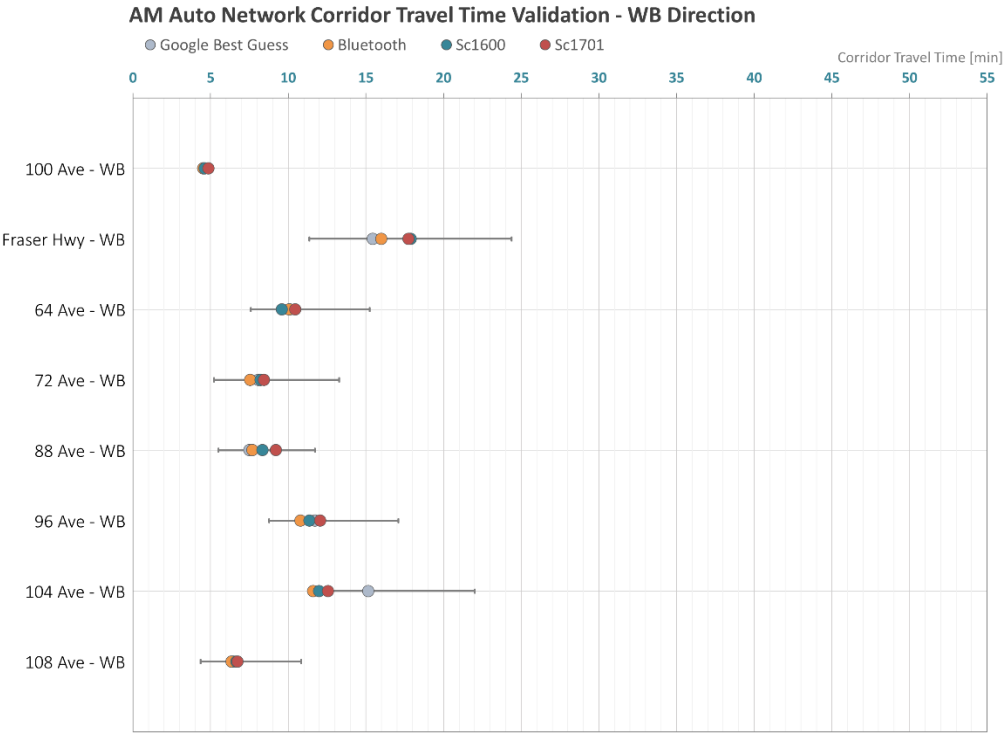
100 Ave - EB
Fraser Hwy - EB
64 Ave - EB
72 Ave - EB
88 Ave - EB
96 Ave - EB
104 Ave - EB
108 Ave - EB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Google Best Guess
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Fraser Hwy - WB
64 Ave - WB
72 Ave - WB
88 Ave - WB
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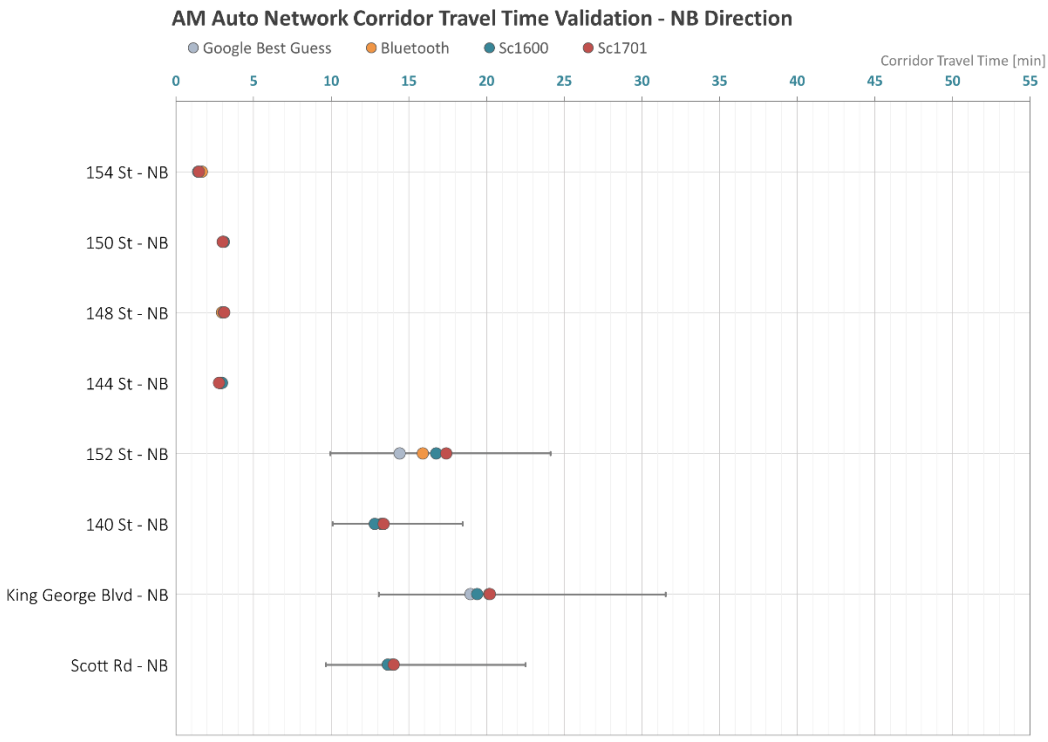
108 Ave - WB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Bluetooth
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Sc1701
Corridor Travel Time [min]
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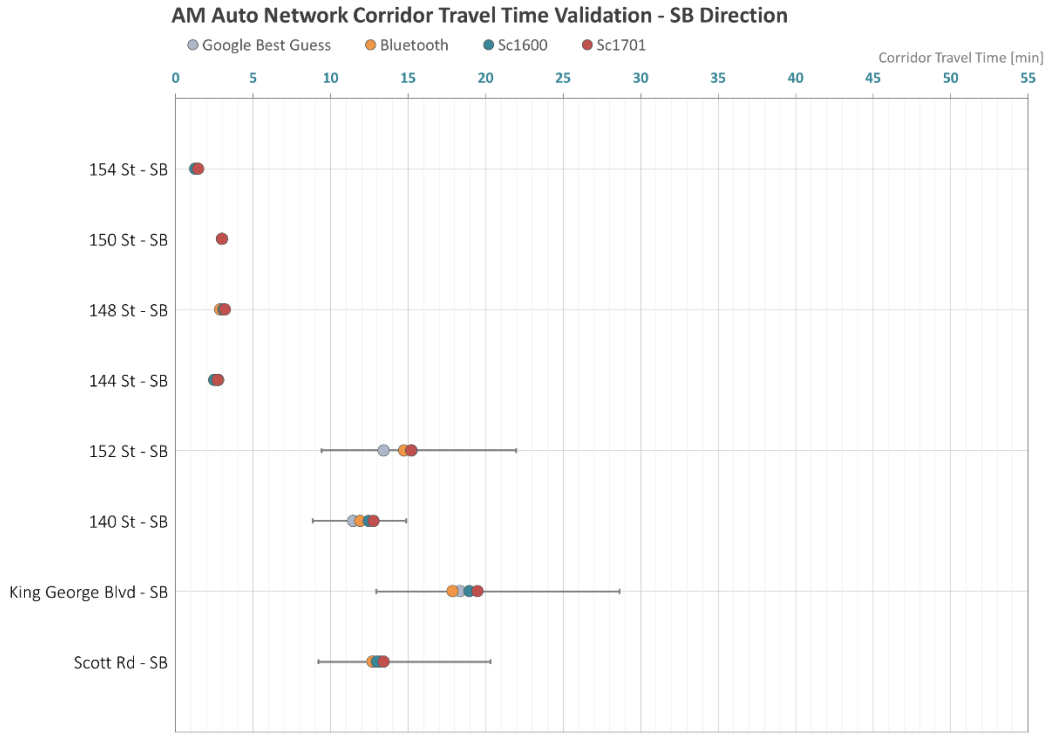
150 St - NB
148 St - NB
144 St - NB
152 St - NB
140 St - NB
King George Blvd - NB
Scott Rd - NB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Corridor Travel Time [min]
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154 St - SB
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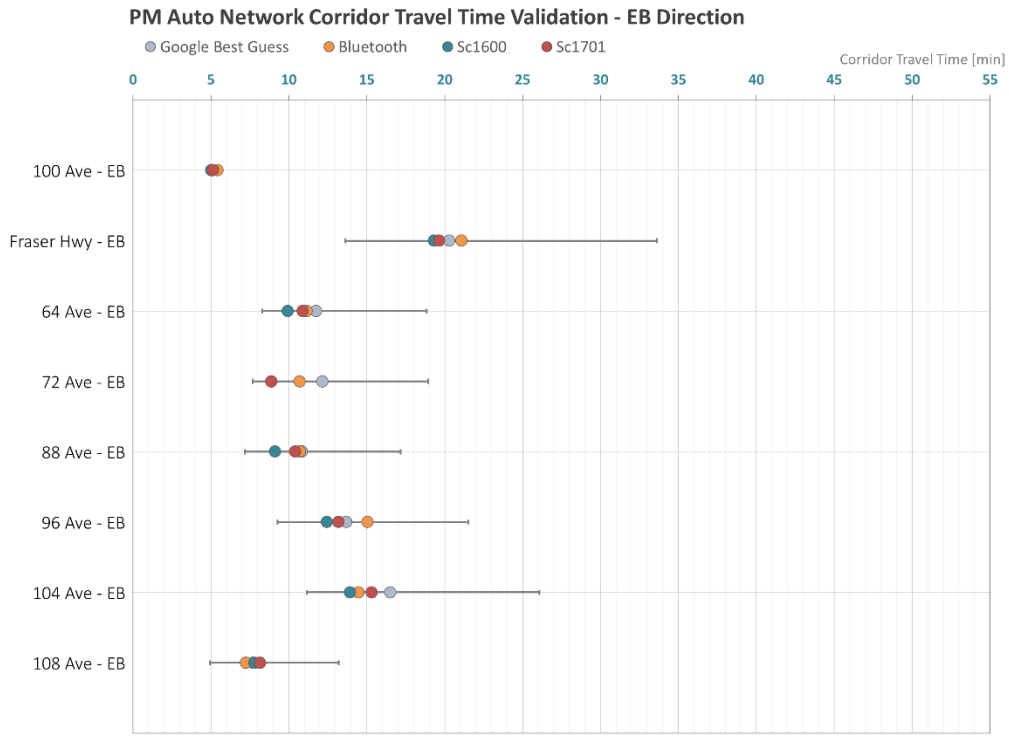
148 St - SB
144 St - SB
152 St - SB
140 St - SB
King George Blvd - SB
Scott Rd - SB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Google Best Guess
Bluetooth
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Corridor Travel Time [min]
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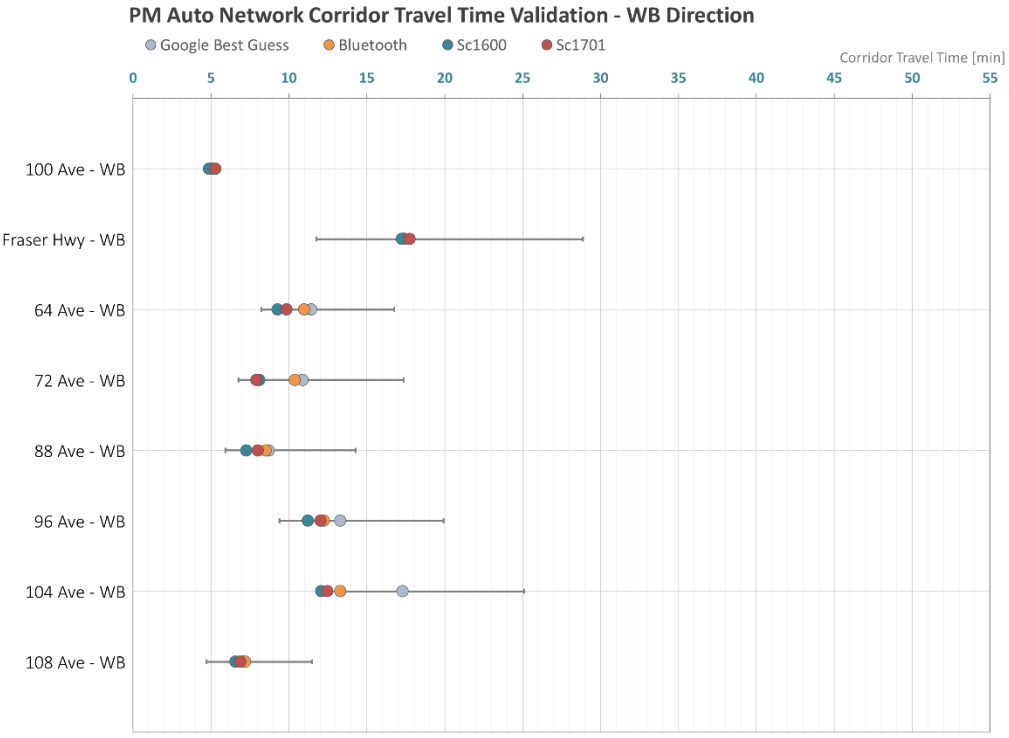
100 Ave - EB
Fraser Hwy - EB
64 Ave - EB
72 Ave - EB
88 Ave - EB
96 Ave - EB
104 Ave - EB
108 Ave - EB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Google Best Guess
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Corridor Travel Time [min]
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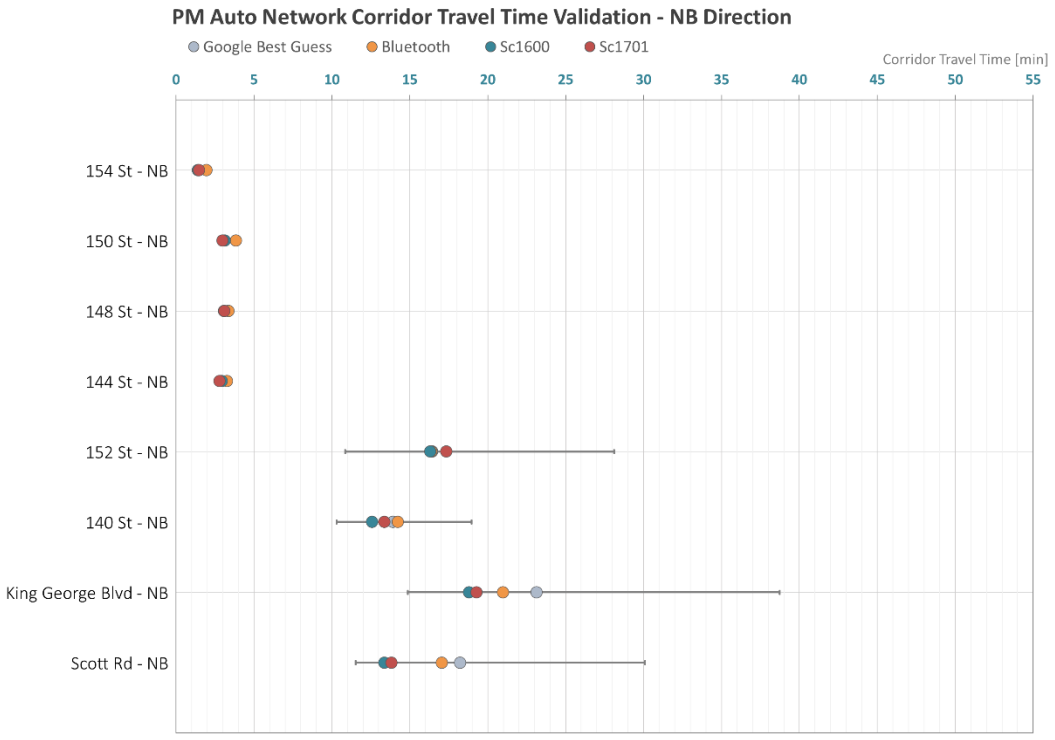
100 Ave - WB
Fraser Hwy - WB
64 Ave - WB
72 Ave - WB
88 Ave - WB
96 Ave - WB
104 Ave - WB
108 Ave - WB


PM Auto Network Corridor Travel Time Validation - NB Direction
Google Best Guess
Bluetooth
Sc1600
Sc1701
Corridor Travel Time [min]
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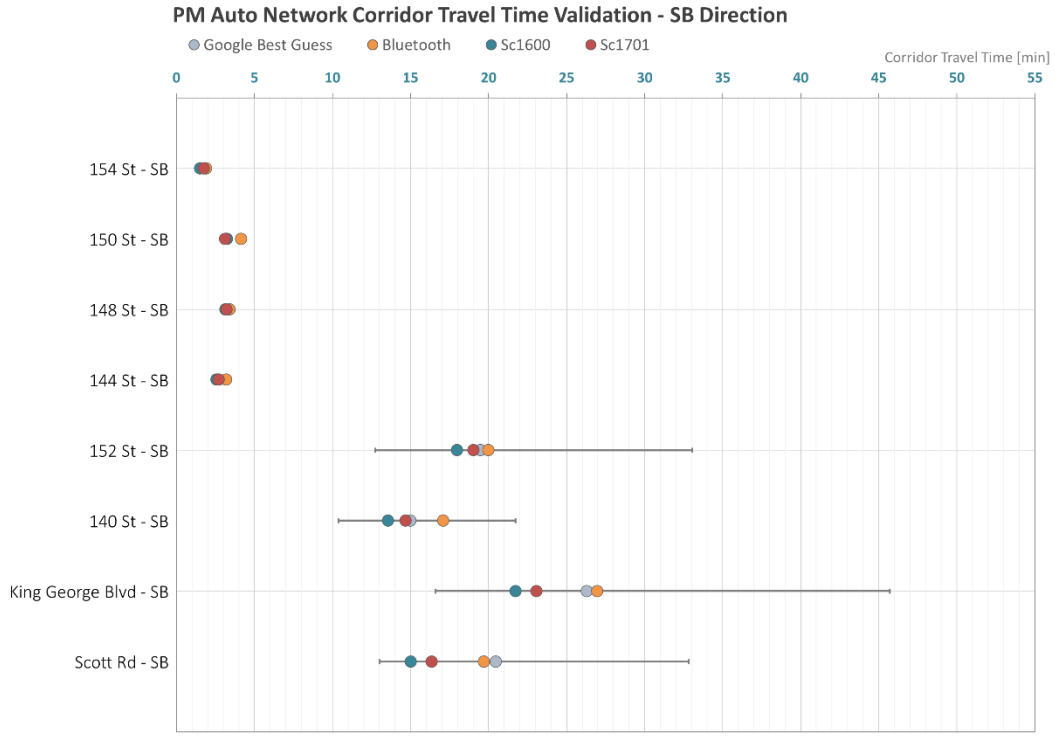
154 St - NB
150 St - NB
148 St - NB
144 St - NB
152 St - NB
140 St - NB
King George Blvd - NB
Scott Rd - NB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Google Best Guess
Bluetooth
Sc1600
Sc1701
Corridor Travel Time [min]
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154 St - SB
150 St - SB
148 St - SB
144 St - SB
152 St - SB
140 St - SB
King George Blvd - SB
Scott Rd - SB

APPENDIX H

10 Year Service Plan Projects

Program	Proj ID	Project Name	Project Location	Priority
n/a	n/a	Arterial Intersection Improvements	080 Ave & 132 St	Completed
n/a	n/a	Arterial New Constrction	072 Ave: Fraser Hwy - 180 St	Long Term (7 - 10 Yrs)
n/a	n/a	Arterial New Construction	105A Ave: 137 St (Whalley Blvd) - 144 St	Completed
n/a	n/a	Arterial Widening - 5 Lane	100 Ave: King George Blvd - 140 St	Completed
n/a	n/a	New Arterial Construction	084 Ave: 124 St - 128 St	Long Term (7 - 10 Yrs)
n/a	n/a	New Collector	105 Ave: 148 St - 150 St	Short Term (1 - 3 Yrs)
n/a	n/a	New Collector	105A/104A Ave : 140 St - 144 St	Completed
n/a	n/a	New Roundabout	104A Ave / 144 St	Completed
n/a	n/a	New Roundabout	105 Ave / 148 St	Short Term (1 - 3 Yrs)
n/a	n/a	Traffic Signal Conversion	084 Ave & 146 St	Short Term (1 - 3 Yrs)
n/a	n/a	Traffic Signal: New	072 Ave & 150 St	Short Term (1 - 3 Yrs)
n/a	n/a	Traffic Signal: New	072 Ave / 184 St	Long Term (7 - 10 Yrs)
n/a	n/a	Traffic Signal: New	105A Ave / 140 St	Completed
n/a	n/a	Traffic Signals: New	024 Ave / 164 St	Completed
n/a	n/a	Traffic Signals: New	080 Ave / Harvie Rd	Long Term (7 - 10 Yrs)
n/a	n/a	Traffic Signals: New	100 Ave / 138 St	Short Term (1 - 3 Yrs)
n/a	n/a	Traffic Signals: New	108 Ave / 128 St	Long Term (7 - 10 Yrs)
1000	14240	Arterial New Construction	192 St Div: Fraser Hwy - 68 Ave	Short Term (1 - 5 Yrs)
1000	7405	Arterial New Construction	Whalley Blvd: 96 Ave - Fraser Hwy	Short Term (1 - 5 Yrs)
1002	10627	Arterial Widening - 5 Lane	016 Ave: Hwy 99 - 168 St	Long Term (6 - 10 Yrs)
1019	10636	Arterial Ultimate Widening	016 Ave: Hwy 99 - 168 St (2 to 5 Lanes)	NCP Driven
1002	17277	Arterial Widening - 5 Lane	024 Ave: 164 St - 168 St	Long Term (6 - 10 Yrs)
1002	10048	Arterial Widening - 5 Lane	032 Ave: 154 St - 160 St	Short Term (1 - 5 Yrs)
1002	16696	Arterial Widening - 5 Lane	064 Ave: 152 St - 164 St	Long Term (6 - 10 Yrs)
1002	7409	Arterial Widening - 5 Lane	064 Ave: 177 St - 184 St	Long Term (6 - 10 Yrs)
1002	7417	Arterial Widening - 5 Lane	064 Ave: 184 St - 188 St	Short Term (1 - 5 Yrs)
1002	14243	Arterial Widening - 5 Lane	064 Ave: 188 St - Fraser Hwy	Short Term (1 - 5 Yrs)
1002	17273	Arterial Widening - 5 Lane	072 Ave: 180 St - 184 St	Next (11 - 20 Yrs)
1002	17274	Arterial Widening - 5 Lane	072 Ave: 184 St - 187 St	Long Term (6 - 10 Yrs)
1002	17275	Arterial Widening - 5 Lane	072 Ave: 187 St - 191 St	Long Term (6 - 10 Yrs)
1002	8311	Arterial Widening - 5 Lane	080 Ave: 122 St - 128 St	Long Term (6 - 10 Yrs)
1002	7439	Arterial Widening - 5 Lane	080 Ave: 132 St - King George Blvd.	Short Term (1 - 5 Yrs)
1002	8794	Arterial Widening - 5 Lane	088 Ave: 156 St - 160 St	Long Term (6 - 10 Yrs)
1002	7411	Arterial Widening - 5 Lane	100 Ave: 154 St - 156 St	Long Term (6 - 10 Yrs)
1002	15501	Arterial Widening - 5 Lane	110 Ave: Scott Rd - 128 St	Long Term (6 - 10 Yrs)
1002	18125	Arterial Widening - 5 Lane	132 St: 072 Ave - 076 Ave	Long Term (6 - 10 Yrs)
1002	18126	Arterial Widening - 5 Lane	132 St: 076 Ave - 081 Ave	Long Term (6 - 10 Yrs)
1002	11737	Arterial Widening - 5 Lane	140 St: 088 Ave - 092 Ave	Short Term (1 - 5 Yrs)
1002	15500	Arterial Widening - 5 Lane	140 St: 100 Ave - 105A Ave	Short Term (1 - 5 Yrs)
1002	7446	Arterial Widening - 5 Lane	152 St: 040 Ave - 5000 Blk	Short Term (1 - 5 Yrs)
1002	11738	Arterial Widening - 5 Lane	160 St: 092 Ave - 096 Ave	Long Term (6 - 10 Yrs)
1002	15632	Arterial Widening - 5 Lane	160 St: 26 Ave - 32 Ave	Short Term (1 - 5 Yrs)
1002	16140	Arterial Widening - 5 Lane	160 St: 88 Ave - 92 Ave	Long Term (6 - 10 Yrs)
1002	9318	Arterial Widening - 5 Lane	160 St: Fraser Hwy - 88 Ave	Short Term (1 - 5 Yrs)
1002	10534	Arterial Widening - 5 Lane	Fraser Hwy: 138 St - 140 St	Short Term (1 - 5 Yrs)
1002	10535	Arterial Widening - 5 Lane	Fraser Hwy: 140 St - 148 St	Short Term (1 - 5 Yrs)

Program	Proj ID	Project Name	Project Location	Priority
1012	17283	Intersection Improvements	024 Ave / 156 St	Short Term (1 - 5 Yrs)
1012	13005	Roundabout	032 Ave / 140 St	Short Term (1 - 5 Yrs)
1012	11757	Roundabout	060 Ave / 132 St	Short Term (1 - 5 Yrs)
1012	13003	Roundabout	060 Ave / 142 St	Short Term (1 - 5 Yrs)
1012	15581	Roundabout	060 Ave / 148 St	Short Term (1 - 5 Yrs)
1012	7066	Intersection Improvements	064 Ave / 168 St	Long Term (6 - 10 Yrs)
1012	17286	Roundabout	066 Ave / 124 St	Short Term (1 - 5 Yrs)
1012	13006	Roundabout	068 Ave / 130 St	Short Term (1 - 5 Yrs)
1012	13007	Roundabout	068 Ave / 134 St	Short Term (1 - 5 Yrs)
1012	18135	Roundabout	070 Ave & 137 St	Long Term (6 - 10 Yrs)
1012	17885	Roundabout	076 Ave - 146 St	Short Term (1 - 5 Yrs)
1012	17884	Roundabout	076 Ave - 148 St	Short Term (1 - 5 Yrs)
1012	17285	Intersection Improvements	082 Ave / 128 St	Short Term (1 - 5 Yrs)
1012	13462	Arterial Intersection Improvements	086 Ave / Scott Rd	Short Term (1 - 5 Yrs)
1012	16499	Arterial Intersection Improvements	104 Ave & 154 St	Short Term (1 - 5 Yrs)
1012	16498	Arterial Intersection Improvements	104 Ave & 156 St	Short Term (1 - 5 Yrs)
1012	15562	Roundabout	104 Ave / 164 St	Short Term (1 - 5 Yrs)
1012	16495	Arterial Intersection Improvements	108 Ave & 144 Street	Short Term (1 - 5 Yrs)
1012	16496	Arterial Intersection Improvements	108 Ave & 146 St	Short Term (1 - 5 Yrs)
1012	16739	Arterial Intersection Improvements	108 Ave & 150 Street	Short Term (1 - 5 Yrs)
1012	16497	Arterial Intersection Improvements	108 Ave & Oriole Dr	Short Term (1 - 5 Yrs)
1012	18082	Intersection Improvement	168 St @ 57A Ave	Long Term (6 - 10 Yrs)
1012	18081	Intersection Improvements	168 St @ 60 Ave	Long Term (6 - 10 Yrs)
1012	17972	Intersection Improvements	58 Ave & 132 St	Short Term (1 - 5 Yrs)
1012	18053	Arterial Intersection Improvements	72 Avenue and 146 Street	Short Term (1 - 5 Yrs)
1012	7621	Roundabout	Crescent Rd / 128 St	Long Term (6 - 10 Yrs)
1012	7639	Roundabout	Crescent Rd / 140 St	Long Term (6 - 10 Yrs)
1012	17284	Intersection Improvements	Fraser Highway / 184 St	Long Term (6 - 10 Yrs)
1012	17287	Intersection Improvements	Fraser Hwy & 80 Ave & 168 St	Short Term (1 - 5 Yrs)
1017	14285	Traffic Signal	024 Ave / 188 St	NCP Driven
1017	14286	Traffic Signal	024 Ave / 190 St	NCP Driven
1017	14287	Traffic Signal	024 Ave / 194A St	NCP Driven
1017	10590	Arterial Widening - 5 Lane	024 Ave: 188 St - 190 St	NCP Driven
1017	10591	Arterial Widening - 5 Lane	024 Ave: 190 St - 192 St	NCP Driven
1017	10592	Arterial Widening - 5 Lane	024 Ave: 192 St - 194 St	NCP Driven
1017	10593	New Arterial Construction	024 Ave: 194 St - 196 St	NCP Driven
1017	14290	Traffic Signal	028 Ave / 192 St	NCP Driven
1017	14291	Traffic Signal	028 Ave / 194A St	NCP Driven
1017	10606	Arterial Widening - 5 Lane	032 Ave: 176 St - 184 St	NCP Driven
1017	10607	Arterial Widening - 5 Lane	032 Ave: 184 St - 188 St	NCP Driven
1017	10585	Arterial Widening (South Side)	032 Ave: 188 St - 192 St	NCP Driven
1017	10587	Arterial Widening - 5 Lane	192 St: 028 Ave - 032 Ave	NCP Driven
1017	14282	Collector Widening	194A St: 026 Ave - 028 Ave	NCP Driven
1018	7494	New Crossing	152 St / Nicomekl	Long Term (6 - 10 Yrs)
1019	10635	Traffic Signal: New	016 Ave / 164A St	NCP Driven
1019	14300	Traffic Signal	028 Ave / Croydon Dr	NCP Driven

Program	Proj ID	Project Name	Project Location	Priority
1019	10623	Collector Upsizing (5 Lane)	164 St Realignment: 016 Ave - 020 Ave	NCP Driven
1019	15521	Collector Widening	Croydon Dr: 028 Ave - 032 Ave	NCP Driven
1019	13043	Collector Upsizing (2 to 3 Lanes)	Croydon Dr: 2500 Blk to 28 Ave	NCP Driven
1019	13042	Collector Ultimate Widening	Croydon Dr: 2500 Blk to 28 Ave	NCP Driven
1030	12997	New Collector Road	070 Ave: King George Blvd - 137A St	Long Term (6 - 10 Yrs)
1030	15529	New Collector Road	084 Ave : Fraser Hwy - 162 St	Long Term (6 - 10 Yrs)
1102	17296	Traffic Signals: New	020 Ave / 168 St	Short Term (1 - 5 Yrs)
1102	15540	Traffic Signals: New	024 Ave / 166 St	Long Term (6 - 10 Yrs)
1102	17297	Traffic Signals: New with widening	024 Ave / 170 St	Long Term (6 - 10 Yrs)
1102	17298	Traffic Signals: New with widening	024 Ave / 172 St	Long Term (6 - 10 Yrs)
1102	16528	New Traffic Signal	025 Ave / 168 St	Short Term (1 - 5 Yrs)
1102	16529	New Traffic Signal	026 Ave / 168 St	Short Term (1 - 5 Yrs)
1102	15541	Traffic Signals: New	030 Ave / 160 St	Short Term (1 - 5 Yrs)
1102	15543	Traffic Signals: New with widening	058 Ave / 168 St	Long Term (6 - 10 Yrs)
1102	15544	Traffic Signals: Ped	062 Ave / 132 St	Short Term (1 - 5 Yrs)
1102	15546	Traffic Signals: Conversion	064 Ave / 180 St	Short Term (1 - 5 Yrs)
1102	15547	Traffic Signals: New with widening	064 Ave / 181A St	Short Term (1 - 5 Yrs)
1102	15548	Traffic Signals: New with widening	064 Ave / 186 St	Short Term (1 - 5 Yrs)
1102	15549	Traffic Signals: New with widening	064 Ave / 190 St	Short Term (1 - 5 Yrs)
1102	15550	Traffic Signals: New with widening	064 Ave / Clayton Wood	Short Term (1 - 5 Yrs)
1102	10842	Traffic Signals: New	065 Ave / 192 St Div	Short Term (1 - 5 Yrs)
1102	11761	Traffic Signals: New	068 Ave / 144 St	Short Term (1 - 5 Yrs)
1102	15590	Traffic Signals: New	070 Ave / King George Blvd.	Long Term (6 - 10 Yrs)
1102	17301	Traffic Signals: New with widening	072 Ave / 182 St	Long Term (6 - 10 Yrs)
1102	17302	Traffic Signals: New with widening	072 Ave / 187 St	Long Term (6 - 10 Yrs)
1102	16146	Traffic Signal: New	072 Ave / Fraser Hwy	Long Term (6 - 10 Yrs)
1102	15553	Traffic Signals: New with widening	080 Ave / 122 St	Short Term (1 - 5 Yrs)
1102	15554	Traffic Signals: New with widening	080 Ave / 125 St	Short Term (1 - 5 Yrs)
1102	15555	Traffic Signals: New with widening	080 Ave / 134 St	Short Term (1 - 5 Yrs)
1102	17307	Traffic Signals: New with widening	084 Ave / 124 St	Long Term (6 - 10 Yrs)
1102	17489	Traffic Signals: Rebuild with Widening	088 Ave / 140 St	Short Term (1 - 5 Yrs)
1102	7648	Traffic Signals: New	088 Ave / 192 St	Short Term (1 - 5 Yrs)
1102	7649	Traffic Signals: New	088 Ave / Harvie Rd	Short Term (1 - 5 Yrs)
1102	15557	Traffic Signals: New with widening	090 Ave / 140 St	Short Term (1 - 5 Yrs)
1102	15558	Traffic Signals: New with widening	090 Ave / 160 St	Long Term (6 - 10 Yrs)
1102	17490	Traffic Signals: Rebuild with Widening	092 Ave / 140 St	Short Term (1 - 5 Yrs)
1102	15559	Traffic Signals: New with widening	094 Ave / 160 St	Long Term (6 - 10 Yrs)
1102	16673	New Traffic Signal	103 Ave & 140 St	Short Term (1 - 5 Yrs)
1102	10986	Traffic Signals: New with widening	103 Ave / City Parkway	Short Term (1 - 5 Yrs)
1102	7620	Traffic Signals: New	110 Ave / 126A St	Long Term (6 - 10 Yrs)
1102	10099	Traffic Signals: New	Fraser Hwy / 192 St Div.	Short Term (1 - 5 Yrs)
1102	15572	Traffic Signals: New with widening	Whalley Blvd / Bentley	Long Term (6 - 10 Yrs)
1102	15573	Traffic Signals: New with widening	Whalley Blvd / Grosvenor	Long Term (6 - 10 Yrs)

APPENDIX I

Vistro Model Inputs – 2017 Base Scenario

2017 Base Scenario - AM Peak Hour Volumes												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	44	404	380	104	234	82	65	237	15	50	388	44
108 Avenue / 140 Street	114	93	138	218	117	44	32	681	52	25	899	102
102 Avenue / 140 Street	63	451			307	71	61		113			
104 Avenue / 140 Street	209	233	46	11	172	11	66	568	39	89	906	46
105A Avenue / 140 Street	0	345			194	0	0		0			
103 Avenue / 140 Street		446	65	17	284					94		41
103 Avenue / 142 Street				12		43	58	33			38	16
104 Avenue / 142 Street	25		67					594	7	24	978	
103 Avenue / 144 Street	35	102	51	0	63	0	0	6	40	15	19	13
104 Avenue / 144 Street	78	2	35	90	15	24	34	658	0	48	914	3
104A Avenue / 144 Street		14	25	9	106					23		9
108 Avenue / 144 Street	11	1	11	0	3	21	13	992	100	13	893	0
100 Avenue / 144 Street				48		70	60	647			393	128
100 Avenue / Green Timbers Park Access	0		0					695	0	0	521	
104 Avenue / 146 Street	17		58					758	25	40	948	
103 Avenue / 146 Street	13	48			15	0	0		11			
110 Avenue / 148 Street	18	218			309	1	2		33			
108 Avenue / 148 Street	164	60	197	174	90	77	20	877	87	49	728	156
105 Avenue / 148 Street	31	397	29	11	239	10	11	1	26	63	1	22
104 Avenue / 148 Street	91	304	289	81	161	86	34	578	204	1	811	120
100 Avenue / 148 Street	161	300	248	58	309	25	353	223	120	303	335	33
102A Avenue / 148 Street		614	72	37	329					64		70
100 Avenue / 150 Street				78		265	89	440			406	133
104 Avenue / 150 Street	95	105	99	86	38	69	168	750	30	87	768	60
101 Avenue / 150 Street		152	70	0	159					184		56
102A Avenue / 150 Street	37	194	46	58	51	47	84	16	35	23	7	21
105 Avenue / 150 Street	20	118	195	19	61	2	13	18	46	86	5	44
108 Avenue / 150 Street	77		89					1,251	45	3	830	
101 Avenue / 152 Street	81	1,072	90	1	472	184	34	3	28	55	45	2
102A Avenue / 152 Street	60	1,010	39	78	621	58	26	2	23	13	2	49
100 Avenue / 152 Street	167	940	88	18	535	2	266	185	67	157	370	37
104 Avenue / 152 Street	53	968	64	41	595	255	323	516	96	66	609	89
105 Avenue / 152 Street	3	1,320	56	0	731	17	146	14	74	86	14	38
108 Avenue / 152 Street	2	1,469	1	23	719	503	992	295	28	2	328	269
101 Avenue / 153 Street				20		98	93	1			4	71
102A Avenue / 153 Street	40		91					11	40	59	1	
100 Avenue / 154 Street	7	25	25	92	8	118	31	255	5	27	439	118
101 Avenue / 154 Street	69	105			199	7	2		18			
102A Avenue / 154 Street	5	192	0	0	118	95	102	0	16	0	0	0
104 Avenue / 154 Street	112	74	108	349	61	10	41	580	0	151	641	521
105 Avenue / 154 Street	61	575			316	27	33		104			
100 Avenue / 156 Street	119	383	9	5	240	188	104	165	103	11	277	59
105A Avenue / 156 Street	43	584			302	5	8		92			
104 Avenue / 156 Street	188	338	19	21	110	264	274	762	0	322	862	14
104 Avenue / 157 Street				9		20	12	789			1,178	7
108 Avenue / Oriole Drive	35	1	29	105	1	85	64	1,162	22	16	812	79

2017 Base Scenario - AM Heavy Vehicle Percentages (%)												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	1.0	1.2	0.0	0.1	0.9	0.5	0.8	0.0	3.6	0.4	0.0	0.5
108 Avenue / 140 Street	8.3	1.3	10.0	0.7	0.6	1.9	2.2	2.9	3.7	4.2	1.2	0.3
102 Avenue / 140 Street	0.0	1.2			0.9	0.0	0.0		0.0			
104 Avenue / 140 Street	0.3	1.8	2.5	14.5	0.6	13.4	18.5	4.8	1.3	1.4	2.0	13.7
105A Avenue / 140 Street	0.0	7.1			1.9	0.0	0.0		0.0			
103 Avenue / 140 Street		1.2	0.3	2.2	0.8					0.3		1.3
103 Avenue / 142 Street				0.0		0.0	0.0	0.0			0.0	0.0
104 Avenue / 142 Street	0.7		0.3					5.0	2.2	0.4	2.7	
103 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.7	0.6	4.5	0.0	0.0	2.9	0.0
104A Avenue / 144 Street		0.0	0.6	0.0	0.0					0.7		0.0
108 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.0	1.5	3.3	0.0	0.0	1.4	0.0
100 Avenue / 144 Street				0.0		0.0	0.0	0.0			0.0	0.0
100 Avenue / Green Timbers Park Access	0.0		0.0					0.0	0.0	0.0	0.0	
104 Avenue / 146 Street	3.9		2.7					4.3	2.4	2.1	2.7	
103 Avenue / 146 Street	0.0	0.6			1.2	0.0	0.0		0.0			
110 Avenue / 148 Street	1.6	0.3			0.5	0.1	0.0		2.0			
108 Avenue / 148 Street	0.1	0.0	0.1	0.9	0.0	0.7	1.1	3.9	0.1	0.1	1.7	0.5
105 Avenue / 148 Street	0.7	0.0	0.4	0.0	0.0	0.0	0.0	0.0	1.3	0.2	0.0	0.0
104 Avenue / 148 Street	0.6	0.0	0.0	0.5	0.0	0.1	0.2	5.2	0.7	0.0	3.4	0.2
100 Avenue / 148 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102A Avenue / 148 Street		0.0	0.0	2.0	0.0					0.0		0.7
100 Avenue / 150 Street				0.0		0.0	0.0	0.0			0.0	0.0
104 Avenue / 150 Street	0.9	0.0	4.5	0.5	0.0	1.0	0.2	4.0	0.6	3.4	3.1	0.3
101 Avenue / 150 Street		0.0	0.0	0.7	0.0					0.0		0.5
102A Avenue / 150 Street	0.0	0.0	0.0	3.6	0.0	2.8	2.5	0.0	0.0	0.0	0.1	13.6
105 Avenue / 150 Street	0.9	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.0	0.0
108 Avenue / 150 Street	0.1		0.2					3.0	0.3	1.5	1.6	
101 Avenue / 152 Street	1.6	2.8	1.5	100.0	3.3	1.1	8.4	0.1	4.5	2.4	0.0	100.0
102A Avenue / 152 Street	1.3	3.4	1.7	1.4	2.9	2.2	7.9	0.3	3.3	4.5	0.2	3.5
100 Avenue / 152 Street	0.0	3.5	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 152 Street	4.4	3.2	9.7	15.7	2.6	4.9	6.4	2.4	1.9	4.8	1.9	3.5
105 Avenue / 152 Street	13.4	3.9	2.4	100.0	4.5	4.2	0.7	0.1	1.2	1.7	0.0	2.4
108 Avenue / 152 Street	100.0	3.4	4.8	0.7	3.6	2.2	2.8	0.1	21.5	11.9	0.1	0.1
101 Avenue / 153 Street				0.0		3.5	2.7	3.0			2.4	0.0
102A Avenue / 153 Street	0.0		0.0					0.0	0.0	0.0	0.0	
100 Avenue / 154 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101 Avenue / 154 Street	0.0	0.0			0.0	1.5	2.0		0.0			
102A Avenue / 154 Street	0.0	0.5	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 154 Street	0.6	0.0	0.4	0.0	0.0	0.0	0.0	4.1	100.0	0.4	2.6	0.0
105 Avenue / 154 Street	0.0	0.0			0.0	0.0	0.0		0.0			
100 Avenue / 156 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105A Avenue / 156 Street	1.4	0.0			0.0	0.0	0.0		0.8			
104 Avenue / 156 Street	0.0	0.0	0.0	1.3	0.0	0.2	0.1	3.1	0.0	0.0	2.0	2.7
104 Avenue / 157 Street				1.2		0.2	0.3	3.0			1.5	1.1
108 Avenue / Oriole Drive	0.3	0.0	0.7	1.0	0.0	0.5	0.6	3.1	0.4	0.8	1.5	0.9

2017 Base Scenario - PM Peak Hour Volumes												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	57	403	407	135	635	46	90	340	61	191	471	25
108 Avenue / 140 Street	120	131	276	197	165	39	47	988	139	18	641	216
102 Avenue / 140 Street	42	476			450	63	68		366			
104 Avenue / 140 Street	105	271	65	20	298	4	189	958	115	41	762	67
105A Avenue / 140 Street	0	526			323	0	0		0			
103 Avenue / 140 Street		424	121	41	414					99		17
103 Avenue / 142 Street				8		60	70	30			74	28
104 Avenue / 142 Street	10		45					979	26	69	823	
103 Avenue / 144 Street	61	128	77	0	139	0	0	11	26	17	41	24
104 Avenue / 144 Street	88	1	63	104	2	52	39	1,030	0	136	778	4
104A Avenue / 144 Street		11	33	11	131					27		7
108 Avenue / 144 Street	10	2	6	0	3	15	56	1,238	113	26	883	1
100 Avenue / 144 Street				26		156	106	747			534	161
100 Avenue / Green Timbers Park Access	0		0					773	0	0	695	
104 Avenue / 146 Street	22		139					1,143	54	61	897	
103 Avenue / 146 Street	12	32			44	0	0		28			
110 Avenue / 148 Street	30	254			392	7	2		26			
108 Avenue / 148 Street	162	107	171	340	94	63	49	1,128	120	52	725	207
105 Avenue / 148 Street	32	454	81	26	254	11	11	1	36	47	1	13
104 Avenue / 148 Street	52	297	216	85	168	84	111	869	302	2	822	160
100 Avenue / 148 Street	171	224	241	94	303	44	364	335	74	225	479	15
102A Avenue / 148 Street		514	89	100	372					69		51
100 Avenue / 150 Street				145		289	127	543			431	211
104 Avenue / 150 Street	158	128	168	61	47	81	176	850	146	165	745	147
101 Avenue / 150 Street		276	62	97	242					193		127
102A Avenue / 150 Street	74	247	50	76	196	86	86	26	65	141	4	121
105 Avenue / 150 Street	55	101	294	44	50	1	1	15	45	94	24	31
108 Avenue / 150 Street	43		7					1,539	54	9	910	
101 Avenue / 152 Street	103	900	157	1	793	118	102	29	132	97	87	1
102A Avenue / 152 Street	71	932	0	115	734	76	120	8	138	40	5	74
100 Avenue / 152 Street	257	954	111	82	794	146	170	369	150	247	238	37
104 Avenue / 152 Street	120	875	132	35	744	332	381	583	115	65	606	9
105 Avenue / 152 Street	0	1,145	119	0	937	53	95	25	83	91	5	35
108 Avenue / 152 Street	1	1,270	4	44	926	519	1,071	462	55	9	445	180
101 Avenue / 153 Street				93		177	172	15			8	60
102A Avenue / 153 Street	41		100					39	63	109	2	
100 Avenue / 154 Street	7	21	18	268	10	89	85	469	8	27	426	194
101 Avenue / 154 Street	57	245			277	11	18		89			
102A Avenue / 154 Street	21	172	0	0	277	135	164	0	73	0	0	0
104 Avenue / 154 Street	107	120	109	422	189	9	36	714	0	223	564	556
105 Avenue / 154 Street	74	637			514	55	22		105			
100 Avenue / 156 Street	129	276	14	42	229	142	154	442	159	14	377	22
105A Avenue / 156 Street	106	622			491	11	7		50			
104 Avenue / 156 Street	143	216	93	8	181	315	466	780	0	232	885	46
104 Avenue / 157 Street				7		19	20	860			1,145	16
108 Avenue / Oriole Drive	30	0	31	0	0	0	0	1,596	42	32	955	0

2017 Base Scenario - PM Heavy Vehicle Percentages (%)												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	0.4	0.5	0.0	0.1	0.1	0.4	0.3	0.0	0.3	0.0	0.0	0.4
108 Avenue / 140 Street	3.0	0.5	2.0	0.3	0.2	0.8	0.7	1.2	0.5	2.1	1.0	0.1
102 Avenue / 140 Street	0.0	0.5			0.2	0.0	0.0		0.0			
104 Avenue / 140 Street	0.3	0.5	1.2	2.5	0.1	10.2	3.5	1.2	0.2	1.6	1.5	3.6
105A Avenue / 140 Street	0.0	1.9			0.4	0.0	0.0		0.0			
103 Avenue / 140 Street		0.5	0.1	0.5	0.2					0.1		1.4
103 Avenue / 142 Street				0.0		0.0	0.0	0.0			0.0	0.0
104 Avenue / 142 Street	0.7		0.2					1.3	0.3	0.1	1.8	
103 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.2	0.2	1.2	0.0	0.0	1.9	0.0
104A Avenue / 144 Street		0.0	0.2	0.0	0.0					0.3		0.0
108 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.4	0.0	0.0	0.8	0.0
100 Avenue / 144 Street				0.0		0.0	0.0	0.0			0.0	0.0
100 Avenue / Green Timbers Park Access	0.0		0.0					0.0	0.0	0.0	0.0	
104 Avenue / 146 Street	1.2		0.5					1.1	0.5	0.8	1.6	
103 Avenue / 146 Street	0.0	0.4			0.2	0.0	0.0		0.0			
110 Avenue / 148 Street	0.6	0.1			0.2	0.0	0.0		1.1			
108 Avenue / 148 Street	0.0	0.0	0.1	0.3	0.0	0.5	0.4	1.6	0.0	0.0	1.0	0.3
105 Avenue / 148 Street	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0
104 Avenue / 148 Street	0.5	0.0	0.0	0.2	0.0	0.1	0.1	1.5	0.1	0.0	1.8	0.1
100 Avenue / 148 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102A Avenue / 148 Street		0.0	0.0	0.3	0.0					0.0		0.6
100 Avenue / 150 Street				0.0		0.0	0.0	0.0			0.0	0.0
104 Avenue / 150 Street	0.1	0.0	1.2	0.2	0.0	0.4	0.1	1.4	0.1	0.9	2.0	0.1
101 Avenue / 150 Street		0.0	0.0	0.2	0.0					0.0		0.1
102A Avenue / 150 Street	0.0	0.0	0.0	1.4	0.0	0.9	1.0	0.0	0.0	0.0	0.0	1.0
105 Avenue / 150 Street	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0
108 Avenue / 150 Street	0.1		1.1					1.2	0.1	0.2	0.8	
101 Avenue / 152 Street	0.5	1.5	0.4	100.0	0.9	1.5	1.3	0.0	0.4	0.5	0.0	100.0
102A Avenue / 152 Street	0.5	1.7	100.0	0.5	1.2	1.0	0.7	0.0	0.2	0.6	0.0	0.8
100 Avenue / 152 Street	0.0	1.6	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 152 Street	1.2	1.5	1.5	8.5	1.0	2.3	2.1	1.0	0.5	3.2	1.3	41.7
105 Avenue / 152 Street	100.0	1.9	0.5	100.0	2.0	0.7	0.3	0.0	0.5	0.8	0.0	0.7
108 Avenue / 152 Street	100.0	1.7	6.0	0.2	1.6	1.3	1.4	0.0	8.1	3.1	0.0	0.1
101 Avenue / 153 Street				0.0		0.8	0.8	0.3			0.4	0.0
102A Avenue / 153 Street	0.0		0.0					0.0	0.0	0.0	0.0	
100 Avenue / 154 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101 Avenue / 154 Street	0.0	0.0			0.0	0.3	0.2		0.0			
102A Avenue / 154 Street	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 154 Street	0.3	0.0	0.2	0.0	0.0	0.0	0.0	1.6	100.0	0.2	2.0	0.0
105 Avenue / 154 Street	0.0	0.0			0.0	0.0	0.0		0.0			
100 Avenue / 156 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105A Avenue / 156 Street	0.3	0.0			0.0	0.0	0.0		0.5			
104 Avenue / 156 Street	0.0	0.0	0.0	1.1	0.0	0.1	0.0	1.5	0.0	0.0	1.3	0.5
104 Avenue / 157 Street				0.7		0.1	0.1	1.4			1.0	0.3
108 Avenue / Oriole Drive	0.1	0.0	0.3	0.0	0.0	0.0	0.0	1.2	0.1	0.2	0.8	0.0

APPENDIX J

Vistro Model Inputs – Future Scenarios

2050 Base Scenario - AM Peak Hour Volumes												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	66	669	346	155	506	36	102	347	2	434	446	69
108 Avenue / 140 Street	160	151	71	252	152	81	51	787	56	308	1,197	217
102 Avenue / 140 Street	208	632	-	-	520	249	44	-	176	-	-	-
104 Avenue / 140 Street	289	164	171	219	283	229	36	733	108	67	899	18
105A Avenue / 140 Street	-	217	1	-	513	3	22	181	189	29	55	144
103 Avenue / 140 Street	-	568	108	22	436	-	-	-	-	333	-	56
103 Avenue / 142 Street	-	-	-	150	-	281	68	44	-	-	63	36
104 Avenue / 142 Street	23	-	52	-	-	-	-	921	163	239	915	-
103 Avenue / 144 Street	69	117	71	-	463	5	-	9	185	55	25	16
104 Avenue / 144 Street	65	67	1	260	112	122	186	748	80	276	994	83
104A Avenue / 144 Street	100	112	124	180	277	-	2	120	59	157	128	14
108 Avenue / 144 Street	19	22	87	4	44	129	37	780	366	47	1,438	-
100 Avenue / 144 Street	-	-	-	390	-	313	54	766	-	-	598	204
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	1,157	-	-	802	-
108 Avenue / 146 Street	114	-	78	43	4	49	17	665	190	158	1,323	21
104 Avenue / 146 Street	34	-	52	-	-	-	-	915	51	87	1,318	-
103 Avenue / 146 Street	19	26	-	-	42	-	-	-	21	-	-	-
110 Avenue / 148 Street	19	418	-	-	339	127	52	-	36	-	-	-
108 Avenue / 148 Street	159	85	38	138	207	30	14	542	229	117	1,313	338
105 Avenue / 148 Street	89	185	168	203	289	2	5	229	110	369	181	97
104 Avenue / 148 Street	159	260	58	218	292	234	112	591	171	99	1,013	70
100 Avenue / 148 Street	177	329	300	152	336	47	148	718	291	156	577	55
102A Avenue / 148 Street	-	342	163	122	440	-	-	-	-	95	-	183
100 Avenue / 150 Street	-	-	-	111	-	117	318	820	-	-	671	111
104 Avenue / 150 Street	5	45	84	34	7	3	35	716	3	84	1,173	63
101 Avenue / 150 Street	-	160	269	135	137	-	-	-	-	102	-	112
102A Avenue / 150 Street	148	53	66	43	6	45	110	37	178	41	19	10
105 Avenue / 150 Street	63	25	55	114	21	12	6	577	9	27	476	14
108 Avenue / 150 Street	41	-	10	-	-	-	-	485	166	4	1,598	-
101 Avenue / 152 Street	93	1,121	207	10	554	47	207	84	98	70	136	33
102A Avenue / 152 Street	84	1,173	96	4	571	30	25	3	37	2	26	33
100 Avenue / 152 Street	202	1,035	112	70	630	22	345	388	83	316	558	41
104 Avenue / 152 Street	46	974	127	7	569	389	268	442	22	14	885	79
105 Avenue / 152 Street	121	1,161	40	1	789	322	444	216	50	126	137	34
108 Avenue / 152 Street	3	1,616	7	40	1,098	1,144	308	57	9	4	455	480
101 Avenue / 153 Street	-	-	-	31	-	175	292	9	-	-	63	67
102A Avenue / 153 Street	5	-	126	-	-	-	-	76	2	106	25	-
100 Avenue / 154 Street	8	24	36	155	24	263	195	364	6	14	646	242
101 Avenue / 154 Street	64	369	-	-	418	66	11	-	24	-	-	-
102A Avenue / 154 Street	20	365	-	-	385	175	192	-	28	-	-	-
104 Avenue / 154 Street	38	392	83	313	80	22	105	454	17	463	920	645
105 Avenue / 154 Street	151	973	18	2	94	26	16	6	287	33	45	42
100 Avenue / 156 Street	159	460	28	4	270	276	210	226	120	15	508	157
105A Avenue / 156 Street	35	659	-	-	536	6	8	-	9	-	-	-
104 Avenue / 156 Street	253	437	137	12	151	345	206	644	1	399	1,441	52
104 Avenue / 157 Street	-	-	-	10	-	26	25	769	-	-	1,866	19
108 Avenue / Oriole Drive	28	-	7	70	1	219	116	574	28	12	1,520	106

2050 Base Scenario - AM Heavy Vehicle Percentages (%)												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	0.7	0.6	0.0	0.1	0.8	1.6	0.9	0.0	20.7	0.0	0.0	0.2
108 Avenue / 140 Street	22.6	0.7	54.5	0.2	0.9	0.7	1.3	2.1	13.5	30.5	0.7	0.1
102 Avenue / 140 Street	0.0	0.8	-	-	1.0	0.0	0.0	-	0.0	-	-	-
104 Avenue / 140 Street	0.6	1.5	3.2	2.0	0.8	54.0	83.7	6.1	2.0	0.9	1.8	16.2
105A Avenue / 140 Street	-	18.7	0.0	-	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103 Avenue / 140 Street	-	0.9	0.3	3.6	0.9	-	-	-	-	0.2	-	3.9
103 Avenue / 142 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 142 Street	3.5	-	2.3	-	-	-	-	5.2	2.1	0.4	2.5	-
103 Avenue / 144 Street	0.0	0.0	0.0	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
104 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.7	0.6	5.4	0.0	0.0	2.5	0.0
104A Avenue / 144 Street	0.0	0.0	1.3	0.0	0.0	-	0.0	0.0	0.0	1.2	0.0	0.0
108 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.2	0.6	4.2	0.0	0.0	2.1	-
100 Avenue / 144 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	0.0	-	-	0.0	-
108 Avenue / 146 Street	0.4	-	0.7	0.8	0.0	0.6	1.4	4.6	0.2	0.2	2.3	1.0
104 Avenue / 146 Street	33.4	-	2.8	-	-	-	-	4.2	11.4	1.2	2.1	-
103 Avenue / 146 Street	0.0	4.5	-	-	1.7	-	-	-	0.0	-	-	-
110 Avenue / 148 Street	1.0	0.2	-	-	0.8	0.0	0.0	-	0.9	-	-	-
108 Avenue / 148 Street	0.0	0.0	0.1	1.0	0.0	2.2	1.5	4.5	0.1	0.1	3.1	0.3
105 Avenue / 148 Street	0.8	0.0	0.7	0.0	0.1	0.1	0.0	0.0	2.8	0.4	0.0	0.0
104 Avenue / 148 Street	0.5	0.0	0.0	12.8	0.0	0.4	0.3	6.5	0.2	0.0	2.4	0.2
100 Avenue / 148 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102A Avenue / 148 Street	-	0.0	0.0	0.7	0.0	-	-	-	-	0.0	-	0.8
100 Avenue / 150 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 150 Street	0.2	0.0	2.4	0.4	0.0	1.1	1.6	7.8	55.6	8.6	3.4	0.4
101 Avenue / 150 Street	-	0.0	0.1	1.0	0.0	-	-	-	-	0.0	-	0.1
102A Avenue / 150 Street	0.0	0.0	0.0	7.9	0.1	3.3	0.6	0.0	0.0	0.0	0.0	9.1
105 Avenue / 150 Street	0.8	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.0	1.4	0.0	0.0
108 Avenue / 150 Street	0.0	-	0.1	-	-	-	-	4.7	0.0	0.0	3.3	-
101 Avenue / 152 Street	0.9	4.6	1.4	100.0	3.0	2.0	15.0	0.2	2.5	4.3	0.0	100.0
102A Avenue / 152 Street	1.5	5.4	11.6	0.8	3.4	2.2	11.3	0.2	2.2	1.0	0.0	3.7
100 Avenue / 152 Street	0.0	5.1	0.0	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 152 Street	48.2	5.3	3.3	100.0	3.0	29.4	12.6	3.1	3.6	2.0	2.2	4.6
105 Avenue / 152 Street	4.9	6.4	16.7	100.0	4.6	0.7	0.6	0.0	5.3	2.9	0.0	1.2
108 Avenue / 152 Street	100.0	4.0	100.0	1.0	2.8	3.6	4.0	1.7	100.0	78.7	0.3	0.2
101 Avenue / 153 Street	-	-	-	0.0	-	4.6	2.3	5.4	-	-	0.3	0.0
102A Avenue / 153 Street	0.0	-	0.0	-	-	-	-	0.0	0.0	0.0	0.0	-
100 Avenue / 154 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101 Avenue / 154 Street	0.0	0.0	-	-	0.0	0.3	3.6	-	0.0	-	-	-
102A Avenue / 154 Street	0.0	1.1	-	-	0.4	0.0	0.0	-	0.0	-	-	-
104 Avenue / 154 Street	5.0	0.0	0.6	0.8	0.0	1.2	0.3	4.0	100.0	0.2	2.4	0.1
105 Avenue / 154 Street	0.1	0.0	2.7	0.1	0.2	0.0	0.0	0.0	0.2	2.6	0.0	0.0
100 Avenue / 156 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105A Avenue / 156 Street	0.0	0.4	-	-	0.7	0.0	0.0	-	0.0	-	-	-
104 Avenue / 156 Street	0.0	0.0	0.0	8.4	0.0	0.3	0.4	4.3	0.0	0.0	2.1	4.5
104 Avenue / 157 Street	-	-	-	5.6	-	1.1	0.8	4.1	-	-	1.7	2.4
108 Avenue / Oriole Drive	0.6	-	1.1	1.3	0.0	0.7	0.8	3.6	0.4	0.5	2.7	0.8

2050 Base Scenario - PM Peak Hour Volumes												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	63	799	351	244	967	102	204	531	107	319	503	140
108 Avenue / 140 Street	233	182	343	304	308	46	53	1,100	127	303	768	236
102 Avenue / 140 Street	193	950	-	-	910	99	181	-	403	-	-	-
104 Avenue / 140 Street	278	410	177	236	650	73	170	991	201	36	578	45
105A Avenue / 140 Street	4	497	124	52	676	10	121	307	247	39	54	140
103 Avenue / 140 Street	-	718	413	108	779	-	-	-	-	230	-	184
103 Avenue / 142 Street	-	-	-	40	-	176	192	223	-	-	180	58
104 Avenue / 142 Street	45	-	115	-	-	-	-	1,208	32	118	560	-
103 Avenue / 144 Street	211	132	72	43	542	-	47	68	147	62	31	-
104 Avenue / 144 Street	44	65	43	333	158	44	11	1,057	196	231	632	160
104A Avenue / 144 Street	134	99	4	242	294	-	10	193	216	43	100	19
108 Avenue / 144 Street	57	23	48	4	16	114	135	933	488	67	1,144	7
100 Avenue / 144 Street	-	-	-	440	-	277	50	882	-	-	674	364
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	1,260	-	-	1,038	-
104 Avenue / 146 Street	81	-	168	-	-	-	-	1,307	14	93	943	-
103 Avenue / 146 Street	22	70	-	-	29	-	9	-	40	-	-	-
108 Avenue / 146 Street	128	1	89	17	-	31	26	748	98	99	1,060	51
110 Avenue / 148 Street	35	272	-	-	577	81	45	-	50	-	-	-
108 Avenue / 148 Street	77	103	8	283	315	44	24	460	272	72	1,088	284
105 Avenue / 148 Street	53	153	248	307	294	15	3	245	105	313	90	55
104 Avenue / 148 Street	101	210	36	205	310	197	200	957	216	163	737	68
100 Avenue / 148 Street	253	237	222	204	261	72	77	1,017	166	111	713	109
102A Avenue / 148 Street	-	293	60	217	472	-	-	-	-	65	-	101
100 Avenue / 150 Street	-	-	-	291	-	337	344	1,100	-	-	632	199
104 Avenue / 150 Street	5	25	30	1	2	3	60	1,069	-	26	1,079	131
101 Avenue / 150 Street	-	284	259	89	356	-	-	-	-	272	-	80
102A Avenue / 150 Street	126	41	114	17	11	-	22	33	129	245	35	28
105 Avenue / 150 Street	82	21	74	30	1	9	13	622	2	6	282	17
108 Avenue / 150 Street	16	-	13	-	-	-	-	554	22	10	1,350	-
101 Avenue / 152 Street	171	1,078	264	2	666	44	141	119	134	104	84	77
102A Avenue / 152 Street	90	1,094	33	38	573	62	125	14	139	1	1	20
100 Avenue / 152 Street	232	1,019	269	105	756	43	342	709	246	272	555	176
104 Avenue / 152 Street	137	910	107	38	554	392	367	573	50	68	806	131
105 Avenue / 152 Street	114	1,219	75	25	914	99	407	218	83	67	65	65
108 Avenue / 152 Street	65	1,608	18	122	1,135	966	374	68	24	54	417	285
101 Avenue / 153 Street	-	-	-	175	-	221	327	58	-	-	54	53
102A Avenue / 153 Street	1	-	327	-	-	-	-	21	34	119	16	-
100 Avenue / 154 Street	37	38	34	194	18	253	358	700	24	58	722	138
101 Avenue / 154 Street	89	446	-	-	306	18	74	-	159	-	-	-
102A Avenue / 154 Street	51	291	-	-	169	159	374	-	70	-	-	-
104 Avenue / 154 Street	68	334	220	407	124	117	52	660	6	198	820	567
105 Avenue / 154 Street	218	700	35	4	251	22	36	11	336	61	18	25
100 Avenue / 156 Street	136	283	17	172	271	293	337	457	104	17	490	125
105A Avenue / 156 Street	76	685	-	-	551	11	4	-	1	-	-	-
104 Avenue / 156 Street	267	303	175	4	196	313	374	729	184	355	1,005	84
104 Avenue / 157 Street	-	-	-	22	-	39	26	883	-	-	1,405	18
108 Avenue / Oriole Drive	26	-	9	-	-	-	-	657	15	22	1,418	-

2050 Base Scenario - PM Heavy Vehicle Percentages (%)												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	0.3	0.3	0.0	0.0	0.2	0.6	0.3	0.0	0.2	0.0	0.0	0.1
108 Avenue / 140 Street	0.9	0.3	12.1	0.1	0.2	0.6	0.8	1.1	7.6	4.1	0.4	0.1
102 Avenue / 140 Street	0.0	0.4	-	-	0.3	0.0	0.0	-	0.0	-	-	-
104 Avenue / 140 Street	0.5	0.3	0.7	14.0	0.2	9.1	30.4	2.0	0.6	0.7	2.5	1.1
105A Avenue / 140 Street	0.0	1.7	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103 Avenue / 140 Street	-	0.4	0.1	1.8	0.3	-	-	-	-	0.1	-	2.5
103 Avenue / 142 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 142 Street	1.7	-	0.5	-	-	-	-	2.4	0.6	0.2	2.1	-
103 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-
104 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.5	0.1	2.5	0.0	0.0	2.1	0.0
104A Avenue / 144 Street	0.0	0.0	0.1	0.0	0.0	-	0.0	0.0	0.0	0.4	0.0	0.0
108 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.9	0.0	0.0	0.4	0.0
100 Avenue / 144 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	0.0	-	-	0.0	-
104 Avenue / 146 Street	1.8	-	0.5	-	-	-	-	2.0	2.9	1.0	1.7	-
103 Avenue / 146 Street	0.0	0.6	-	-	1.0	-	0.0	-	0.0	-	-	-
108 Avenue / 146 Street	0.2	0.0	0.2	0.6	-	0.4	0.3	2.1	0.2	0.2	0.4	0.2
110 Avenue / 148 Street	0.3	0.1	-	-	0.2	0.0	0.0	-	0.4	-	-	-
108 Avenue / 148 Street	0.0	0.0	0.0	0.3	0.0	1.9	0.6	2.1	0.0	0.0	0.6	0.7
105 Avenue / 148 Street	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.1	0.0
104 Avenue / 148 Street	0.1	0.0	0.0	0.2	0.0	0.1	0.2	2.5	0.1	0.0	2.4	0.2
100 Avenue / 148 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102A Avenue / 148 Street	-	0.0	0.0	0.2	0.0	-	-	-	-	0.0	-	0.4
100 Avenue / 150 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 150 Street	0.1	0.0	2.1	0.5	0.0	76.4	0.3	2.6	-	1.9	2.3	0.2
101 Avenue / 150 Street	-	0.0	0.0	0.1	0.0	-	-	-	-	0.0	-	0.1
102A Avenue / 150 Street	0.0	0.0	0.0	1.9	0.0	-	0.8	0.0	0.0	0.0	0.0	1.1
105 Avenue / 150 Street	0.1	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.4	1.3	0.0	0.0
108 Avenue / 150 Street	0.1	-	5.6	-	-	-	-	1.3	0.2	0.4	0.6	-
101 Avenue / 152 Street	0.6	1.8	0.6	100.0	1.4	4.6	1.3	0.0	0.4	0.8	0.0	100.0
102A Avenue / 152 Street	0.5	2.2	0.2	0.4	2.1	1.9	1.2	0.0	0.3	0.6	0.0	0.6
100 Avenue / 152 Street	0.0	2.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 152 Street	1.9	1.7	5.3	100.0	1.5	2.5	12.3	1.3	1.1	96.4	1.5	7.1
105 Avenue / 152 Street	4.2	3.2	8.2	100.0	2.1	1.1	0.2	0.0	2.2	4.3	0.0	0.9
108 Avenue / 152 Street	16.4	2.0	100.0	0.3	1.9	0.5	1.2	0.4	100.0	60.1	0.1	0.1
101 Avenue / 153 Street	-	-	-	0.0	-	0.9	1.0	0.3	-	-	0.1	0.0
102A Avenue / 153 Street	0.0	-	0.0	-	-	-	-	0.0	0.0	0.0	0.0	-
100 Avenue / 154 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101 Avenue / 154 Street	0.0	0.0	-	-	0.0	0.1	0.3	-	0.0	-	-	-
102A Avenue / 154 Street	0.0	0.3	-	-	0.2	0.0	0.0	-	0.0	-	-	-
104 Avenue / 154 Street	2.5	0.0	0.1	0.3	0.0	0.4	0.1	1.8	100.0	0.2	2.0	0.4
105 Avenue / 154 Street	0.2	0.0	0.7	0.0	0.1	0.0	0.0	0.0	0.2	0.7	0.0	0.0
100 Avenue / 156 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105A Avenue / 156 Street	0.0	0.2	-	-	0.2	0.0	0.0	-	0.0	-	-	-
104 Avenue / 156 Street	0.0	0.0	0.0	21.0	0.0	0.1	0.1	1.8	0.0	0.0	2.0	1.6
104 Avenue / 157 Street	-	-	-	1.1	-	0.3	0.4	1.7	-	-	1.6	1.4
108 Avenue / Oriole Drive	0.1	-	0.4	-	-	-	-	1.2	0.1	0.5	0.6	-

Full Buildout Base Scenario - AM Peak Hour Volumes												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	94	881	185	318	1,002	143	212	376	45	406	631	219
108 Avenue / 140 Street	222	331	152	229	353	103	82	653	276	245	1,097	144
102 Avenue / 140 Street	369	943	-	-	1,136	318	114	-	354	-	-	-
104 Avenue / 140 Street	315	328	293	392	625	73	44	839	185	308	1,246	49
105A Avenue / 140 Street	-	413	6	103	768	4	45	204	260	93	63	247
103 Avenue / 140 Street	-	804	253	62	1,037	-	-	-	-	474	-	132
103 Avenue / 142 Street	-	-	-	387	-	289	126	248	-	-	138	231
104 Avenue / 142 Street	284	-	120	-	-	-	-	1,111	312	149	1,118	-
103 Avenue / 144 Street	162	20	51	15	136	7	25	167	442	178	201	19
104 Avenue / 144 Street	6	26	31	302	91	159	144	1,121	-	66	1,147	283
104A Avenue / 144 Street	181	203	69	56	214	-	11	141	161	195	222	53
108 Avenue / 144 Street	115	56	82	2	23	142	44	720	234	13	890	1
100 Avenue / 144 Street	-	-	-	501	-	180	6	819	-	-	949	227
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	1,258	-	-	1,175	-
104 Avenue / 146 Street	62	-	303	-	-	-	-	1,334	10	142	1,434	-
103 Avenue / 146 Street	55	57	-	-	12	-	14	-	17	-	-	-
108 Avenue / 146 Street	186	1	212	72	4	43	17	477	198	209	675	27
110 Avenue / 148 Street	56	893	-	-	560	81	78	-	80	-	-	-
108 Avenue / 148 Street	202	433	77	184	338	60	43	414	303	159	750	473
105 Avenue / 148 Street	104	390	186	285	499	13	38	172	236	439	47	288
104 Avenue / 148 Street	116	311	50	304	534	312	191	1,109	237	191	1,148	201
100 Avenue / 148 Street	231	348	212	158	444	151	43	836	379	213	793	35
102A Avenue / 148 Street	-	365	60	197	728	-	-	-	-	95	-	153
100 Avenue / 150 Street	-	-	-	379	-	533	241	965	-	-	558	202
104 Avenue / 150 Street	18	23	2	32	74	42	185	1,106	57	205	1,481	120
101 Avenue / 150 Street	-	229	214	184	634	-	-	-	-	278	-	47
102A Avenue / 150 Street	123	41	109	50	246	40	9	26	361	89	14	5
105 Avenue / 150 Street	80	19	202	17	13	7	5	578	55	101	461	7
108 Avenue / 150 Street	24	-	12	-	-	-	-	602	13	6	1,290	-
101 Avenue / 152 Street	30	1,090	253	14	795	96	215	90	76	147	197	34
102A Avenue / 152 Street	72	1,116	75	100	772	78	37	17	38	97	22	30
100 Avenue / 152 Street	131	1,069	196	61	931	25	323	691	329	192	604	21
104 Avenue / 152 Street	84	989	28	82	864	727	278	695	57	28	996	97
105 Avenue / 152 Street	74	1,254	36	46	1,139	97	495	254	274	260	173	99
108 Avenue / 152 Street	45	1,766	37	56	1,206	965	368	70	44	32	328	541
101 Avenue / 153 Street	-	-	-	103	-	288	253	104	-	-	96	143
102A Avenue / 153 Street	15	-	297	-	-	-	-	77	33	79	24	-
100 Avenue / 154 Street	8	37	41	312	14	149	253	657	12	48	659	590
101 Avenue / 154 Street	177	703	-	-	393	62	79	-	112	-	-	-
102A Avenue / 154 Street	61	852	-	-	91	126	602	-	262	-	-	-
104 Avenue / 154 Street	377	778	299	310	38	3	40	702	7	172	787	421
105 Avenue / 154 Street	336	897	6	2	89	42	43	10	306	12	49	67
100 Avenue / 156 Street	311	449	17	48	450	337	296	460	196	18	649	71
105A Avenue / 156 Street	33	817	-	-	726	7	25	-	107	-	-	-
104 Avenue / 156 Street	173	492	151	58	381	395	344	899	68	385	831	14
104 Avenue / 157 Street	-	-	-	13	-	23	45	1,063	-	-	1,262	17
108 Avenue / Oriole Drive	61	1	16	85	1	253	114	536	25	15	1,144	107

Full Buildout Base Scenario - AM Heavy Vehicle Percentages (%)												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	0.5	0.6	0.1	0.1	0.5	0.3	0.3	0.0	1.1	0.0	0.0	0.1
108 Avenue / 140 Street	4.6	0.3	1.7	0.4	0.5	2.6	3.0	1.6	2.3	2.4	1.1	0.4
102 Avenue / 140 Street	0.0	0.7	-	-	0.5	0.0	0.0	-	0.0	-	-	-
104 Avenue / 140 Street	0.8	0.7	1.0	2.0	0.3	3.9	5.3	5.7	1.7	0.9	2.4	16.1
105A Avenue / 140 Street	-	3.1	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103 Avenue / 140 Street	-	0.8	0.2	4.2	0.6	-	-	-	-	0.1	-	0.9
103 Avenue / 142 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 142 Street	0.5	-	0.5	-	-	-	-	5.2	0.4	0.5	3.5	-
103 Avenue / 144 Street	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
104 Avenue / 144 Street	0.5	0.0	0.0	0.0	0.0	0.5	0.7	4.7	-	0.0	3.6	0.0
104A Avenue / 144 Street	0.0	0.0	1.1	0.0	0.0	-	0.0	0.0	0.0	0.5	0.0	0.0
108 Avenue / 144 Street	0.0	0.0	0.0	0.4	0.0	0.3	0.6	1.7	0.0	0.0	1.6	0.0
100 Avenue / 144 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	0.0	-	-	0.0	-
104 Avenue / 146 Street	4.5	-	1.0	-	-	-	-	3.2	33.2	1.7	3.2	-
103 Avenue / 146 Street	0.0	0.5	-	-	1.5	-	0.0	-	0.0	-	-	-
108 Avenue / 146 Street	0.1	0.0	0.2	0.6	0.0	0.7	1.6	2.2	0.3	0.3	2.0	1.0
110 Avenue / 148 Street	1.2	0.3	-	-	1.0	0.0	0.0	-	1.9	-	-	-
108 Avenue / 148 Street	0.1	0.0	0.1	1.8	0.0	3.2	1.0	2.0	0.2	0.1	1.7	0.5
105 Avenue / 148 Street	0.6	0.0	0.4	0.0	0.1	0.2	0.1	0.0	0.4	0.3	0.0	0.0
104 Avenue / 148 Street	0.6	0.0	1.3	0.5	0.0	0.5	0.3	4.1	0.4	0.1	4.1	0.8
100 Avenue / 148 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102A Avenue / 148 Street	-	0.0	0.0	0.7	0.0	-	-	-	-	0.0	-	1.0
100 Avenue / 150 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 150 Street	20.2	0.1	37.7	1.2	0.0	0.8	0.9	3.7	100.0	3.4	3.2	2.1
101 Avenue / 150 Street	-	0.0	0.0	1.2	0.0	-	-	-	-	0.0	-	1.2
102A Avenue / 150 Street	0.2	0.2	0.6	5.7	0.0	2.6	11.8	0.0	0.2	1.9	0.6	49.0
105 Avenue / 150 Street	1.7	0.2	0.9	0.0	0.2	0.0	0.0	0.0	1.3	0.6	0.0	0.0
108 Avenue / 150 Street	0.4	-	1.7	-	-	-	-	2.0	0.3	0.9	1.4	-
101 Avenue / 152 Street	4.4	6.2	1.3	7.9	3.7	1.5	2.0	0.1	3.7	1.8	0.0	11.0
102A Avenue / 152 Street	1.6	6.2	0.6	2.3	3.7	2.0	7.3	0.1	2.7	0.9	0.1	4.3
100 Avenue / 152 Street	0.0	7.2	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 152 Street	12.7	6.1	6.4	12.6	3.4	4.3	6.5	2.4	4.1	3.7	2.2	2.8
105 Avenue / 152 Street	4.9	6.0	2.5	2.2	4.7	2.3	0.7	0.0	2.0	1.0	0.0	0.9
108 Avenue / 152 Street	4.3	3.9	46.1	2.0	4.3	1.7	1.6	0.3	18.8	73.6	0.2	0.2
101 Avenue / 153 Street	-	-	-	0.0	-	1.8	2.1	0.4	-	-	1.1	0.0
102A Avenue / 153 Street	2.7	-	0.2	-	-	-	-	0.1	2.2	0.1	0.0	-
100 Avenue / 154 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101 Avenue / 154 Street	0.0	0.0	-	-	0.0	0.3	0.4	-	0.0	-	-	-
102A Avenue / 154 Street	0.0	0.2	-	-	0.5	0.3	0.2	-	0.0	-	-	-
104 Avenue / 154 Street	0.5	0.0	0.5	0.0	0.0	1.9	0.2	3.3	3.8	0.4	2.8	0.0
105 Avenue / 154 Street	0.0	0.0	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.7	0.0	0.0
100 Avenue / 156 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105A Avenue / 156 Street	0.9	0.3	-	-	0.7	0.0	0.0	-	0.6	-	-	-
104 Avenue / 156 Street	0.0	0.0	0.0	6.2	0.0	0.4	0.3	3.0	0.0	0.0	2.6	13.2
104 Avenue / 157 Street	-	-	-	5.1	-	1.6	0.7	2.9	-	-	2.1	3.4
108 Avenue / Oriole Drive	0.2	0.1	0.8	1.7	0.0	0.4	0.6	2.0	0.3	0.6	1.4	1.0

Full Buildout Base Scenario - PM Peak Hour Volumes												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	66	1,056	323	192	716	78	302	670	110	304	494	183
108 Avenue / 140 Street	392	289	149	153	427	13	19	709	240	15	226	39
102 Avenue / 140 Street	269	1,163	-	-	576	129	252	-	410	-	-	-
104 Avenue / 140 Street	356	366	448	256	300	10	11	1,120	135	71	677	253
105A Avenue / 140 Street	7	536	-	190	419	-	5	400	131	15	33	362
103 Avenue / 140 Street	-	954	403	90	417	-	-	-	-	288	-	276
103 Avenue / 142 Street	-	-	-	382	-	301	129	225	-	-	310	83
104 Avenue / 142 Street	67	-	72	-	-	-	-	1,295	387	230	937	-
103 Avenue / 144 Street	154	497	200	33	362	100	91	183	288	206	149	44
104 Avenue / 144 Street	327	153	152	152	145	322	473	922	75	303	623	31
104A Avenue / 144 Street	78	14	564	9	92	1	-	471	119	408	415	14
108 Avenue / 144 Street	5	-	11	2	12	13	17	550	54	36	212	1
100 Avenue / 144 Street	-	-	-	468	-	388	240	765	-	-	587	615
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	1,232	-	-	1,202	-
104 Avenue / 146 Street	34	-	241	-	-	-	-	1,104	31	249	922	-
103 Avenue / 146 Street	22	20	-	-	34	18	17	-	47	-	-	-
108 Avenue / 146 Street	183	1	214	16	1	14	15	257	175	238	52	34
110 Avenue / 148 Street	32	301	-	-	660	13	2	-	9	-	-	-
108 Avenue / 148 Street	131	159	7	353	227	93	33	320	135	11	201	232
105 Avenue / 148 Street	199	292	110	63	268	96	72	631	110	169	530	57
104 Avenue / 148 Street	82	250	41	174	207	167	92	1,020	134	-	922	284
100 Avenue / 148 Street	299	305	285	96	140	5	34	994	204	178	965	137
102A Avenue / 148 Street	-	399	10	107	234	-	-	-	-	7	-	20
100 Avenue / 150 Street	-	-	-	420	-	456	418	937	-	-	824	407
104 Avenue / 150 Street	212	175	158	245	153	16	82	1,083	70	183	1,102	188
101 Avenue / 150 Street	-	679	145	57	611	-	-	-	-	300	-	99
102A Avenue / 150 Street	248	335	116	76	243	86	136	7	204	189	6	157
105 Avenue / 150 Street	145	142	134	91	210	378	106	511	144	84	352	28
108 Avenue / 150 Street	95	-	65	-	-	-	-	443	230	350	502	-
101 Avenue / 152 Street	135	1,087	356	26	775	55	58	14	91	247	14	3
102A Avenue / 152 Street	86	880	183	392	631	96	227	22	203	85	13	227
100 Avenue / 152 Street	328	1,078	159	121	785	208	314	670	316	167	695	279
104 Avenue / 152 Street	186	990	113	102	776	470	334	896	257	86	931	388
105 Avenue / 152 Street	334	1,318	18	33	1,040	233	363	41	297	91	33	43
108 Avenue / 152 Street	219	1,406	44	16	1,178	699	442	40	46	83	117	47
101 Avenue / 153 Street	-	-	-	135	-	261	367	1	-	-	4	45
102A Avenue / 153 Street	144	-	51	-	-	-	-	53	197	77	7	-
100 Avenue / 154 Street	83	28	61	263	15	143	181	743	25	62	1,029	212
101 Avenue / 154 Street	58	363	-	-	316	3	2	-	134	-	-	-
102A Avenue / 154 Street	109	49	-	-	62	167	98	-	154	-	-	-
104 Avenue / 154 Street	19	43	79	180	17	20	112	960	39	174	1,483	205
105 Avenue / 154 Street	151	175	33	15	123	30	20	11	116	-	16	11
100 Avenue / 156 Street	342	417	16	105	279	323	412	527	128	20	754	156
105A Avenue / 156 Street	95	701	-	-	1,152	29	12	-	84	-	-	-
104 Avenue / 156 Street	373	383	229	29	286	921	345	737	137	312	637	69
104 Avenue / 157 Street	-	-	-	19	-	34	43	952	-	-	1,040	14
108 Avenue / Oriole Drive	4	-	32	-	-	-	-	667	12	39	521	-

Full Buildout Base Scenario - PM Heavy Vehicle Percentages (%)												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	0.3	0.2	0.0	0.0	0.2	0.3	0.1	0.0	0.1	0.0	0.0	0.1
108 Avenue / 140 Street	0.5	0.2	1.2	0.1	0.1	4.6	3.4	0.5	0.8	1.9	0.5	0.1
102 Avenue / 140 Street	0.0	0.2	-	-	0.3	0.0	0.0	-	0.0	-	-	-
104 Avenue / 140 Street	0.4	0.2	0.3	0.4	0.1	0.4	1.3	2.2	0.5	1.2	1.3	0.8
105A Avenue / 140 Street	0.0	0.8	-	0.0	0.4	-	0.0	0.0	0.0	0.0	0.0	0.0
103 Avenue / 140 Street	-	0.2	0.0	0.6	0.3	-	-	-	-	0.1	-	0.6
103 Avenue / 142 Street	-	-	-	0.0	-	0.0	0.2	0.0	-	-	0.0	0.0
104 Avenue / 142 Street	0.3	-	1.2	-	-	-	-	3.0	0.1	0.2	1.4	-
103 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.2	0.1	3.6	0.0	0.0	1.8	0.0
104A Avenue / 144 Street	0.0	0.1	0.1	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0
108 Avenue / 144 Street	0.0	-	0.1	0.3	0.0	0.5	0.4	0.7	0.0	0.0	0.4	0.0
100 Avenue / 144 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	0.0	-	-	0.0	-
104 Avenue / 146 Street	0.4	-	0.3	-	-	-	-	2.3	0.9	0.3	1.5	-
103 Avenue / 146 Street	0.0	0.3	-	-	0.2	0.0	0.0	-	0.0	-	-	-
108 Avenue / 146 Street	0.1	0.0	0.1	0.5	0.0	0.3	0.3	1.0	0.1	0.1	1.8	0.2
110 Avenue / 148 Street	0.3	0.1	-	-	0.2	0.0	0.0	-	0.8	-	-	-
108 Avenue / 148 Street	0.0	0.0	0.1	0.3	0.0	0.4	0.4	1.0	0.0	0.5	0.4	0.3
105 Avenue / 148 Street	0.2	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.0	0.0
104 Avenue / 148 Street	0.2	0.0	0.1	0.2	0.0	0.2	0.5	2.0	0.2	-	1.6	0.1
100 Avenue / 148 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102A Avenue / 148 Street	-	0.0	0.0	0.3	0.0	-	-	-	-	0.0	-	0.4
100 Avenue / 150 Street	-	-	-	0.1	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 150 Street	0.2	0.0	0.5	0.2	0.0	0.4	0.8	1.7	0.4	1.2	1.5	0.2
101 Avenue / 150 Street	-	0.0	0.0	0.1	0.0	-	-	-	-	0.0	-	0.1
102A Avenue / 150 Street	0.0	0.0	0.0	1.2	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.7
105 Avenue / 150 Street	0.2	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.1
108 Avenue / 150 Street	0.0	-	0.1	-	-	-	-	0.8	0.1	0.0	0.4	-
101 Avenue / 152 Street	0.4	1.2	0.4	1.2	1.6	1.6	2.4	0.1	0.4	0.3	0.1	1.4
102A Avenue / 152 Street	0.5	1.5	0.1	0.3	1.8	0.8	0.7	0.0	0.3	0.2	0.0	0.4
100 Avenue / 152 Street	0.0	1.4	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 152 Street	1.0	1.2	1.6	2.2	1.7	3.8	2.8	0.9	0.4	2.0	1.0	1.1
105 Avenue / 152 Street	0.5	2.1	0.7	0.9	2.7	0.6	0.6	0.1	0.9	0.7	0.0	1.0
108 Avenue / 152 Street	2.5	1.7	0.9	0.4	2.3	0.1	0.5	0.5	22.0	0.7	0.0	0.3
101 Avenue / 153 Street	-	-	-	0.0	-	0.6	0.6	0.7	-	-	2.1	0.0
102A Avenue / 153 Street	0.3	-	0.0	-	-	-	-	0.0	0.4	0.0	0.1	-
100 Avenue / 154 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101 Avenue / 154 Street	0.0	0.0	-	-	0.0	0.1	0.1	-	0.0	-	-	-
102A Avenue / 154 Street	0.0	0.6	-	-	0.1	0.0	0.0	-	0.0	-	-	-
104 Avenue / 154 Street	1.3	0.0	0.4	0.3	0.0	1.2	0.1	1.3	0.1	0.2	1.1	0.0
105 Avenue / 154 Street	0.1	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.2	-	0.2	0.0
100 Avenue / 156 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105A Avenue / 156 Street	0.2	0.2	-	-	0.2	0.0	0.0	-	0.3	-	-	-
104 Avenue / 156 Street	0.0	0.0	0.0	11.0	0.0	0.1	0.1	1.8	0.0	0.0	1.6	1.2
104 Avenue / 157 Street	-	-	-	1.1	-	0.3	0.3	1.6	-	-	1.2	1.5
108 Avenue / Oriole Drive	0.1	-	0.2	-	-	-	-	0.6	0.1	0.1	0.3	-

Full Buildout with Road Widening Scenario - AM Peak Hour Volumes												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	94	856	210	326	1,054	118	172	416	45	438	667	251
108 Avenue / 140 Street	166	333	161	174	409	103	82	682	247	480	1,345	184
102 Avenue / 140 Street	394	885	-	-	1,128	299	98	-	370	-	-	-
104 Avenue / 140 Street	310	388	254	515	703	97	28	869	170	229	1,084	54
105A Avenue / 140 Street	-	469	-	140	989	8	44	146	319	46	234	147
103 Avenue / 140 Street	-	800	182	45	1,058	-	-	-	-	416	-	152
103 Avenue / 142 Street	-	-	-	366	-	212	159	157	-	-	118	236
104 Avenue / 142 Street	290	-	177	-	-	-	-	1,227	307	90	875	-
103 Avenue / 144 Street	167	183	128	18	363	-	27	125	372	178	188	33
104 Avenue / 144 Street	75	122	45	334	146	81	120	1,368	11	224	844	154
104A Avenue / 144 Street	121	191	84	29	274	-	5	103	136	170	306	50
108 Avenue / 144 Street	158	112	112	39	88	164	98	803	189	49	1,378	35
100 Avenue / 144 Street	-	-	-	458	-	441	83	862	-	-	801	394
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	1,258	-	-	1,195	-
104 Avenue / 146 Street	18	-	309	-	-	-	-	1,579	4	95	1,204	-
103 Avenue / 146 Street	52	54	-	-	8	-	8	-	21	-	-	-
108 Avenue / 146 Street	176	-	110	50	1	93	36	819	91	31	1,194	17
110 Avenue / 148 Street	16	828	-	-	502	186	180	-	70	-	-	-
108 Avenue / 148 Street	197	322	39	172	323	2	25	459	395	113	1,043	498
106A Avenue / 148 St	48	403	-	-	679	52	117	-	108	-	-	-
105 Avenue / 148 Street	99	170	133	318	390	24	25	127	269	404	86	281
104 Avenue / 148 Street	36	232	44	299	520	244	196	1,214	331	34	1,020	24
100 Avenue / 148 Street	366	242	238	286	472	172	52	834	371	262	657	10
102A Avenue / 148 Street	-	226	79	135	749	-	-	-	-	190	-	157
100 Avenue / 150 Street	-	-	-	312	-	364	260	983	-	-	565	149
104 Avenue / 150 Street	8	2	-	317	93	167	255	1,197	4	117	902	220
101 Avenue / 150 Street	-	203	206	146	514	-	-	-	-	222	-	46
102A Avenue / 150 Street	145	7	93	29	153	32	3	50	327	91	15	2
104A Ave / 150 Street	73	230	151	39	208	18	63	1	133	237	1	105
105 Avenue / 150 Street	173	33	167	17	59	24	6	407	93	112	334	8
108 Avenue / 150 Street	29	-	2	-	-	-	-	573	25	16	1,597	-
101 Avenue / 152 Street	96	945	219	20	875	60	163	74	104	103	129	48
102A Avenue / 152 Street	64	1,028	63	99	774	67	47	61	-	299	34	171
100 Avenue / 152 Street	51	894	144	103	812	79	266	613	301	109	584	100
104 Avenue / 152 Street	182	971	9	20	733	524	398	864	188	20	700	54
105 Avenue / 152 Street	80	1,294	48	21	976	114	422	120	98	271	102	172
108 Avenue / 152 Street	72	1,684	21	40	1,054	1,133	359	74	11	44	425	463
101 Avenue / 153 Street	-	-	-	109	-	141	244	63	-	-	102	84
102A Avenue / 153 Street	60	-	229	-	-	-	-	97	32	24	84	-
100 Avenue / 154 Street	6	22	25	231	10	76	128	605	12	44	711	760
101 Avenue / 154 Street	156	755	-	-	238	31	34	-	109	-	-	-
102A Avenue / 154 Street	105	824	-	-	43	55	514	-	151	-	-	-
104 Avenue / 154 Street	257	849	232	274	29	18	23	865	5	66	514	325
105 Avenue / 154 Street	379	817	1	3	107	31	49	6	195	19	52	76
100 Avenue / 156 Street	370	389	17	44	408	471	246	344	156	18	674	46
105A Avenue / 156 Street	38	791	-	-	726	7	25	-	89	-	-	-
104 Avenue / 156 Street	88	454	140	58	440	318	362	944	65	447	631	12
104 Avenue / 157 Street	-	-	-	12	-	21	44	1,097	-	-	1,153	16
108 Avenue / Oriole Drive	55	1	20	105	1	224	121	521	26	16	1,452	109

Full Buildout with Road Widening Scenario - AM Heavy Vehicle Percentages (%)												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	0.5	0.6	0.1	0.0	0.5	0.3	0.3	0.0	1.1	0.0	0.0	0.1
108 Avenue / 140 Street	4.0	0.3	1.6	0.5	0.5	2.6	3.0	1.4	3.7	1.0	0.9	0.4
102 Avenue / 140 Street	0.0	0.7	-	-	0.5	0.0	0.0	-	0.0	-	-	-
104 Avenue / 140 Street	0.8	0.8	0.9	1.7	0.3	0.4	4.2	5.7	1.7	0.8	2.4	10.1
105A Avenue / 140 Street	-	3.5	-	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103 Avenue / 140 Street	-	0.7	0.2	2.4	0.5	-	-	-	-	0.1	-	1.5
103 Avenue / 142 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 142 Street	0.7	-	0.5	-	-	-	-	4.1	0.8	0.5	3.2	-
103 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
104 Avenue / 144 Street	0.0	0.0	0.0	0.1	0.0	0.8	0.7	3.8	0.0	0.0	3.2	0.1
104A Avenue / 144 Street	0.0	0.0	0.9	0.0	0.0	-	0.0	0.0	0.0	0.5	0.0	0.1
108 Avenue / 144 Street	0.1	0.0	0.1	0.1	0.0	0.5	0.4	1.3	0.1	0.2	1.1	0.0
100 Avenue / 144 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	0.0	-	-	0.0	-
104 Avenue / 146 Street	1.5	-	1.2	-	-	-	-	3.0	9.9	2.0	2.4	-
103 Avenue / 146 Street	0.0	0.4	-	-	1.2	-	0.0	-	0.0	-	-	-
108 Avenue / 146 Street	0.2	-	0.1	0.5	0.0	0.7	0.9	1.2	0.2	0.6	1.2	2.2
110 Avenue / 148 Street	2.3	0.3	-	-	1.2	0.1	0.0	-	0.3	-	-	-
108 Avenue / 148 Street	0.2	0.0	0.2	2.1	0.0	84.6	3.4	1.9	0.1	0.1	1.2	0.5
106A Avenue / 148 St	0.1	0.0	-	-	0.0	0.4	0.2	-	0.1	-	-	-
105 Avenue / 148 Street	1.5	0.1	0.3	0.0	0.1	0.1	0.0	0.0	0.5	0.2	0.0	0.0
104 Avenue / 148 Street	1.0	0.0	3.0	0.6	0.0	0.2	0.3	3.8	0.2	0.0	3.0	1.9
100 Avenue / 148 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102A Avenue / 148 Street	-	0.0	0.0	0.6	0.0	-	-	-	-	0.0	-	1.3
100 Avenue / 150 Street	-	-	-	0.4	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 150 Street	6.2	0.2	-	1.8	0.0	1.4	0.9	3.7	32.3	1.8	3.1	1.7
101 Avenue / 150 Street	-	0.0	0.0	0.9	0.2	-	-	-	-	0.1	-	1.3
102A Avenue / 150 Street	0.2	0.1	0.5	6.7	0.0	3.2	8.3	0.1	0.2	2.6	2.3	39.8
104A Ave / 150 Street	1.1	0.7	1.8	0.1	1.8	0.0	0.0	0.2	0.7	1.5	0.3	0.0
105 Avenue / 150 Street	0.3	1.3	0.4	0.2	0.9	0.0	0.0	0.1	0.6	2.3	0.1	0.1
108 Avenue / 150 Street	0.7	-	7.1	-	-	-	-	2.0	1.2	2.7	1.0	-
101 Avenue / 152 Street	2.5	5.7	1.0	8.3	3.7	2.4	2.1	0.0	3.1	1.8	0.0	4.6
102A Avenue / 152 Street	1.8	6.0	0.9	3.4	5.0	3.4	7.8	2.1	-	0.9	0.0	1.5
100 Avenue / 152 Street	0.0	6.4	0.0	0.0	3.9	0.0	0.2	0.0	0.2	0.0	0.0	0.0
104 Avenue / 152 Street	4.5	5.3	9.0	5.4	4.5	4.5	7.3	2.4	4.0	90.3	1.8	6.0
105 Avenue / 152 Street	2.1	6.0	2.0	2.0	5.2	1.2	0.3	0.0	1.2	1.7	0.0	0.8
108 Avenue / 152 Street	5.9	4.0	7.4	1.3	4.6	1.2	1.8	0.5	32.0	5.8	0.1	0.2
101 Avenue / 153 Street	-	-	-	0.0	-	1.3	0.9	0.3	-	-	0.2	0.0
102A Avenue / 153 Street	0.8	-	0.0	-	-	-	-	0.1	1.0	0.2	0.0	-
100 Avenue / 154 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101 Avenue / 154 Street	0.0	0.0	-	-	0.0	0.4	0.4	-	0.0	-	-	-
102A Avenue / 154 Street	0.0	0.2	-	-	0.5	0.2	0.1	-	0.1	-	-	-
104 Avenue / 154 Street	0.3	0.0	0.3	0.2	0.0	1.9	0.2	3.0	1.9	0.4	3.1	0.0
105 Avenue / 154 Street	0.0	0.0	1.0	0.0	0.2	0.0	0.1	0.1	0.2	1.0	0.0	0.0
100 Avenue / 156 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105A Avenue / 156 Street	0.8	0.3	-	-	0.7	0.0	0.0	-	0.2	-	-	-
104 Avenue / 156 Street	0.0	0.0	0.0	5.8	0.0	0.4	0.2	2.9	0.0	0.0	2.6	13.2
104 Avenue / 157 Street	-	-	-	5.1	-	1.6	0.7	2.8	-	-	2.0	3.4
108 Avenue / Oriole Drive	0.2	0.1	0.9	1.9	0.0	0.4	0.7	2.1	0.3	0.6	1.0	1.0

Full Buildout with Road Widening Scenario - PM Peak Hour Volumes												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	66	1,000	366	124	887	164	232	683	103	306	542	241
108 Avenue / 140 Street	98	312	242	356	618	22	31	1,365	224	304	701	180
102 Avenue / 140 Street	285	1,189	-	-	915	158	383	-	370	-	-	-
104 Avenue / 140 Street	340	490	590	446	810	75	81	1,056	130	27	682	23
105A Avenue / 140 Street	1	484	108	165	971	5	68	344	357	3	185	100
103 Avenue / 140 Street	-	1,244	329	133	834	-	-	-	-	296	-	176
103 Avenue / 142 Street	-	-	-	420	-	219	39	180	-	-	166	67
104 Avenue / 142 Street	2	-	22	-	-	-	-	1,439	414	44	620	-
103 Avenue / 144 Street	110	406	157	13	186	65	29	168	402	138	59	21
104 Avenue / 144 Street	184	76	197	448	157	113	37	1,292	-	107	475	62
104A Avenue / 144 Street	42	46	88	264	331	7	7	289	187	219	238	47
108 Avenue / 144 Street	56	8	15	43	163	171	98	919	519	100	1,063	1
100 Avenue / 144 Street	-	-	-	502	-	194	240	700	-	-	769	433
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	1,104	-	-	1,201	-
104 Avenue / 146 Street	124	-	294	-	-	-	-	1,771	165	189	520	-
103 Avenue / 146 Street	11	28	-	-	48	-	34	-	31	-	-	-
108 Avenue / 146 Street	85	1	72	42	1	48	55	792	130	104	1,052	60
110 Avenue / 148 Street	73	459	-	-	1,059	306	21	-	25	-	-	-
108 Avenue / 148 Street	195	223	22	385	628	47	19	464	352	86	974	396
106A Avenue / 148 St	84	367	-	-	817	128	51	-	60	-	-	-
105 Avenue / 148 Street	346	369	241	372	401	50	18	224	168	178	297	105
104 Avenue / 148 Street	184	446	50	231	365	101	270	1,471	324	42	578	240
100 Avenue / 148 Street	308	452	240	217	257	105	85	875	144	157	954	252
102A Avenue / 148 Street	-	565	101	213	518	-	-	-	-	61	-	209
100 Avenue / 150 Street	-	-	-	340	-	357	350	982	-	-	1,043	351
104 Avenue / 150 Street	113	335	77	208	126	74	423	1,260	50	214	779	392
101 Avenue / 150 Street	-	546	155	102	519	-	-	-	-	178	-	221
102A Avenue / 150 Street	212	368	117	70	172	148	90	35	214	219	47	144
104A Ave / 150 Street	183	620	324	84	120	51	49	1	104	184	1	88
105 Avenue / 150 Street	165	100	468	214	91	67	40	607	120	46	447	20
108 Avenue / 150 Street	85	-	13	-	-	-	-	484	290	49	1,338	-
101 Avenue / 152 Street	226	1,345	268	40	894	75	137	33	225	224	54	91
102A Avenue / 152 Street	100	905	496	285	715	106	116	82	186	108	10	28
100 Avenue / 152 Street	335	1,315	175	205	913	225	293	718	312	212	834	232
104 Avenue / 152 Street	124	751	46	27	645	385	349	821	351	111	875	19
105 Avenue / 152 Street	80	933	27	26	710	191	749	206	202	145	300	30
108 Avenue / 152 Street	55	1,443	38	286	922	855	320	75	5	1	553	300
101 Avenue / 153 Street	-	-	-	98	-	171	167	39	-	-	38	147
102A Avenue / 153 Street	7	-	59	-	-	-	-	423	57	29	66	-
100 Avenue / 154 Street	62	65	56	264	20	166	133	888	21	75	1,050	502
101 Avenue / 154 Street	143	527	-	-	387	42	16	-	92	-	-	-
102A Avenue / 154 Street	107	309	-	-	281	235	450	-	261	-	-	-
104 Avenue / 154 Street	126	473	117	305	253	88	41	802	50	216	814	590
105 Avenue / 154 Street	294	774	35	8	424	153	47	29	185	36	42	22
100 Avenue / 156 Street	423	339	16	75	300	323	418	531	143	22	936	57
105A Avenue / 156 Street	97	714	-	-	1,099	28	11	-	1	-	-	-
104 Avenue / 156 Street	176	381	232	9	288	728	341	800	84	326	887	90
104 Avenue / 157 Street	-	-	-	25	-	44	43	998	-	-	1,344	20
108 Avenue / Oriole Drive	48	-	25	-	-	-	-	830	41	35	1,470	-

Full Buildout with Road Widening Scenario - PM Heavy Vehicle Percentages (%)												
Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
100 Avenue / 140 Street	0.3	0.2	0.0	0.0	0.2	0.3	0.1	0.0	0.1	0.0	0.0	0.1
108 Avenue / 140 Street	0.7	0.1	0.7	0.1	0.1	4.9	3.4	0.4	1.2	1.5	0.5	0.2
102 Avenue / 140 Street	0.0	0.2	-	-	0.2	0.0	0.0	-	0.0	-	-	-
104 Avenue / 140 Street	0.4	0.2	0.2	0.6	0.2	3.4	1.4	2.2	0.4	0.5	0.9	0.8
105A Avenue / 140 Street	0.0	0.5	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103 Avenue / 140 Street	-	0.2	0.1	0.3	0.2	-	-	-	-	0.1	-	0.6
103 Avenue / 142 Street	-	-	-	0.1	-	0.0	0.1	0.0	-	-	0.0	0.0
104 Avenue / 142 Street	0.8	-	1.6	-	-	-	-	3.0	0.1	0.7	1.0	-
103 Avenue / 144 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
104 Avenue / 144 Street	0.0	0.0	0.1	0.0	0.0	0.5	0.3	3.2	-	0.0	1.4	0.0
104A Avenue / 144 Street	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
108 Avenue / 144 Street	0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.5	0.0	0.0	0.7	0.0
100 Avenue / 144 Street	-	-	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
100 Avenue / Green Timbers Park Access	-	-	-	-	-	-	-	0.0	-	-	0.0	-
104 Avenue / 146 Street	0.5	-	0.4	-	-	-	-	1.5	1.4	0.3	1.0	-
103 Avenue / 146 Street	0.0	0.3	-	-	0.2	-	0.0	-	0.0	-	-	-
108 Avenue / 146 Street	0.1	0.0	0.1	0.5	0.0	0.4	0.3	0.5	0.1	0.1	0.7	0.2
110 Avenue / 148 Street	0.2	0.1	-	-	0.2	0.0	0.0	-	0.6	-	-	-
108 Avenue / 148 Street	0.1	0.0	0.3	0.4	0.1	0.6	0.9	0.8	0.0	0.1	0.7	0.2
106A Avenue / 148 St	0.1	0.0	-	-	0.1	0.1	0.1	-	0.1	-	-	-
105 Avenue / 148 Street	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.3	0.1	0.0	0.0
104 Avenue / 148 Street	0.4	0.0	0.2	0.3	0.0	0.1	0.1	1.7	0.1	0.0	1.1	0.3
100 Avenue / 148 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102A Avenue / 148 Street	-	0.0	0.0	0.1	0.0	-	-	-	-	0.0	-	0.5
100 Avenue / 150 Street	-	-	-	0.1	-	0.0	0.0	0.0	-	-	0.0	0.0
104 Avenue / 150 Street	0.1	0.0	0.8	0.9	0.0	0.4	0.2	2.0	0.2	0.9	1.1	0.6
101 Avenue / 150 Street	-	0.0	0.0	0.1	0.0	-	-	-	-	0.1	-	0.1
102A Avenue / 150 Street	0.0	0.0	0.1	1.4	0.0	0.5	0.5	0.0	0.0	0.1	0.3	0.9
104A Ave / 150 Street	0.2	0.2	0.5	0.1	0.4	0.0	0.0	0.1	0.4	0.7	0.1	0.1
105 Avenue / 150 Street	0.2	0.2	0.1	0.1	0.2	0.0	0.0	0.0	0.3	0.2	0.0	0.0
108 Avenue / 150 Street	0.4	-	3.6	-	-	-	-	1.0	0.1	0.1	0.6	-
101 Avenue / 152 Street	0.3	1.2	0.3	1.3	1.6	1.5	1.6	0.0	0.3	0.4	0.0	2.1
102A Avenue / 152 Street	0.4	1.6	0.2	0.3	1.8	1.0	0.9	0.0	0.2	0.5	0.0	2.3
100 Avenue / 152 Street	0.0	1.4	0.0	0.0	1.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0
104 Avenue / 152 Street	1.5	1.3	4.5	5.7	1.9	0.5	2.9	1.4	0.6	1.2	1.1	3.3
105 Avenue / 152 Street	0.4	2.2	0.5	1.7	2.0	0.4	0.2	0.0	0.5	0.2	0.0	1.1
108 Avenue / 152 Street	2.2	1.4	0.6	0.1	1.7	0.6	1.0	0.3	7.4	0.7	0.1	0.2
101 Avenue / 153 Street	-	-	-	0.0	-	0.6	0.4	0.1	-	-	0.1	0.0
102A Avenue / 153 Street	0.6	-	0.3	-	-	-	-	0.1	0.0	0.3	0.0	-
100 Avenue / 154 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101 Avenue / 154 Street	0.0	0.0	-	-	0.0	0.5	0.1	-	0.0	-	-	-
102A Avenue / 154 Street	0.0	0.1	-	-	0.3	0.2	0.2	-	0.0	-	-	-
104 Avenue / 154 Street	0.2	0.0	0.7	0.3	0.0	0.1	0.1	1.9	0.4	0.6	1.8	0.1
105 Avenue / 154 Street	0.2	0.0	0.2	0.0	0.1	0.1	0.1	0.0	0.2	0.4	0.0	0.0
100 Avenue / 156 Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105A Avenue / 156 Street	0.1	0.2	-	-	0.2	0.0	0.0	-	0.0	-	-	-
104 Avenue / 156 Street	0.0	0.0	0.0	12.4	0.0	0.1	0.1	1.9	0.0	0.0	1.7	1.1
104 Avenue / 157 Street	-	-	-	1.1	-	0.3	0.3	1.7	-	-	1.2	1.5
108 Avenue / Oriole Drive	0.1	-	0.2	-	-	-	-	0.6	0.1	0.1	0.6	-

APPENDIX K

Vistro Model Detail Results – Future with Improvement Scenarios

2050 with Improvements Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.52	0.49	0.36	0.57	0.80		0.16	0.53	0.09	0.55	0.79	0.81	-
	Delay (s/veh)	32.82	35.94	35.11	29.41	43.39		14.27	21.23	16.33	15.85	27.14	28.20	26.56
	LOS	C	D	D	C	D		B	C	B	B	C	C	C
	95% Queue (m)	44.12	42.49	19.83	61.56	70.18		5.50	76.88	9.79	45.29	143.82	145.84	-
105A Avenue / 140 Street (Signalized)	v/c Ratio	0.00	0.12	0.12	0.00	0.27	0.27	0.09	0.44	0.55	0.11	0.55		-
	Delay (s/veh)	0.00	6.42	6.42	0.00	7.10	7.10	21.32	17.83	19.07	20.43	19.05		12.37
	LOS	A	A	A	A	A	A	C	B	B	C	B		B
	95% Queue (m)	0.00	6.33	6.33	0.00	16.33	16.30	3.33	24.59	27.03	4.26	28.41		-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.69	0.33	0.40	0.46	0.54	0.55	0.17	0.59	0.59	0.17	0.58	0.58	-
	Delay (s/veh)	37.37	32.86	33.90	25.21	35.82	36.12	16.97	28.58	28.68	17.05	27.38	27.39	30.11
	LOS	D	C	C	C	D	D	B	C	C	B	C	C	C
	95% Queue (m)	81.59	48.99	52.53	56.03	80.83	72.17	6.73	106.57	103.01	12.81	110.58	109.99	-
103 Avenue / 140 Street (Signalized)	v/c Ratio	-	0.36	0.38	0.04	0.21	-	-	-	-	0.81	-	0.15	-
	Delay (s/veh)	-	11.38	11.55	6.17	6.41	-	-	-	-	29.20	-	20.39	14.12
	LOS	-	B	B	A	A	-	-	-	-	C	-	C	B
	95% Queue (m)	-	38.92	39.71	1.63	16.03	-	-	-	-	67.25	-	9.16	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.26	0.27	-	-	0.30	0.32	0.17	-	0.75	-	-	-	-
	Delay (s/veh)	5.07	4.55	-	-	9.99	10.73	23.22	-	31.53	-	-	-	10.04
	LOS	A	A	-	-	A	B	C	-	C	-	-	-	B
	95% Queue (m)	11.30	16.05	-	-	25.74	26.71	7.56	-	37.17	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.15	0.58	0.44	0.40	0.45	0.45	0.21	0.29	0.29	0.73	0.39	0.39	-
	Delay (s/veh)	21.12	33.76	20.21	25.40	32.62	32.66	19.27	30.41	30.41	32.40	28.58	28.63	29.56
	LOS	C	C	C	C	C	C	B	C	C	C	C	C	C
	95% Queue (m)	15.43	94.38	77.00	39.72	78.69	77.46	22.60	51.53	51.46	107.05	70.73	68.28	-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.54	-	0.29	-	-	-	-	0.56	0.21	0.35	0.39	-	-
	Delay (s/veh)	37.39	-	23.67	-	-	-	-	11.57	9.01	6.58	4.46	-	8.59
	LOS	D	-	C	-	-	-	-	B	A	A	A	-	A
	95% Queue (m)	5.89	-	8.70	-	-	-	-	45.16	13.71	10.34	17.11	-	-
103 Avenue / 142 Street (Two-way stop)	v/c Ratio	-	-	-	0.21	-	0.29	0.05	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	14.26	-	12.76	7.50	0.00	-	-	0.00	0.00	9.71
	LOS	-	-	-	B	-	B	A	A	-	-	A	A	B
	95% Queue (m)	-	-	-	21.73	-	21.73	1.08	1.08	-	-	0.00	0.00	-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.15	0.49		0.02	0.77		0.14	0.44	0.44	0.13	0.52	0.52	-
	Delay (s/veh)	43.29	38.49		38.90	45.36		12.94	5.67	5.78	10.69	6.40	6.40	10.00
	LOS	D	D		D	D		B	A	A	B	A	A	B
	95% Queue (m)	5.99	31.96		1.16	56.14		6.14	46.50	42.45	6.70	59.99	59.99	-
104A Avenue / 144 Street (Roundabout)	v/c Ratio	0.09	0.22		0.18	0.28		0.00	0.22		0.14	0.12		-
	Delay (s/veh)	5.03			5.95			6.77			4.21			5.41
	LOS	A			A			A			A			A
	95% Queue (m)	2.33	6.41		4.99	8.67		0.06	6.41		3.58	3.15		-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.22	0.30		0.57	0.81		0.43	0.46	0.46	0.50	0.55	0.56	-
	Delay (s/veh)	32.91	45.19		37.35	52.03		14.89	19.42	19.45	14.35	19.26	19.32	23.60
	LOS	C	D		D	D		B	B	B	B	B	B	C
	95% Queue (m)	18.81	24.07		78.53	83.63		27.74	86.19	84.00	42.41	107.29	105.60	-
103 Avenue / 144 Street (Signalized)	v/c Ratio	0.21	0.28		0.57			0.02		0.45	0.17			-
	Delay (s/veh)	14.19	7.21		8.91			8.91		10.76	9.49			9.35
	LOS	B	A		A			A		B	A			A
	95% Queue (m)	5.55	8.15		24.31			0.48		11.79	5.44			-

2050 with Improvements Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 144 Street (Signalized)	v/c Ratio	-	-	-	0.83	-	0.75	0.09	0.37	-	-	0.36	0.27	-
	Delay (s/veh)	-	-	-	33.19	-	29.55	7.44	8.63	-	-	13.26	12.77	17.09
	LOS	-	-	-	C	-	C	A	A	-	-	B	B	B
	95% Queue (m)	-	-	-	87.90	-	69.59	4.42	37.93	-	-	40.10	26.55	-
100 Avenue / Green Timbers Park Access (Signalized)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.48	0.48	0.00	0.31	-	-
	Delay (s/veh)	0.00	-	0.00	-	-	-	-	4.96	4.96	0.00	2.47	-	3.94
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	19.74	19.74	0.00	3.58	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.33	-	0.55	-	-	-	-	0.32	0.32	0.17	0.44	-	-
	Delay (s/veh)	52.20	-	57.37	-	-	-	-	2.55	2.57	4.70	2.81	-	4.61
	LOS	D	-	E	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	13.31	-	21.58	-	-	-	-	18.89	19.08	7.50	27.86	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.00	-	0.02	-	-	-	-
	Delay (s/veh)	7.31	0.00	-	-	0.00	0.00	9.14	-	8.55	-	-	-	2.95
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.28	0.28	-	-	0.00	0.00	0.47	-	0.47	-	-	-	-
108 Avenue / 146 Street (Signalized)	v/c Ratio	0.50	0.30		0.21	0.20		0.06	0.34	0.34	0.33	0.50	0.50	-
	Delay (s/veh)	41.65	34.15		39.07	33.23		10.54	5.70	5.74	11.24	7.27	7.28	10.32
	LOS	D	C		D	C		B	A	A	B	A	A	B
	95% Queue (m)	35.19	21.15		12.60	14.07		2.47	36.01	33.59	22.63	63.52	63.40	-
110 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.02	0.00	-	-	0.00	0.00	0.16	-	0.06	-	-	-	-
	Delay (s/veh)	8.33	0.00	-	-	0.00	0.00	18.61	-	12.97	-	-	-	1.61
	LOS	A	A	-	-	A	A	C	-	B	-	-	-	C
	95% Queue (m)	0.40	0.40	-	-	0.00	0.00	6.20	-	6.20	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.41	0.27	0.14	0.27	0.81		0.06	0.48	0.48	0.22	0.88	0.92	-
	Delay (s/veh)	28.36	33.40	32.39	25.05	44.29		17.46	19.07	19.25	11.09	33.16	36.74	29.52
	LOS	C	C	C	C	D		B	B	B	B	C	D	C
	95% Queue (m)	39.53	22.64	9.91	31.18	71.71		1.53	74.65	69.43	14.72	178.38	189.25	-
105 Avenue / 148 Street (Roundabout)	v/c Ratio	0.09	0.37		0.26	0.37		0.01	0.53		0.34	0.25		-
	Delay (s/veh)	7.24			8.33			14.14			6.19			8.40
	LOS	A			A			B			A			A
	95% Queue (m)	2.37	13.23		7.77	12.92		0.18	23.51		11.40	7.65		-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.44	0.71	0.19	0.57	0.81	0.76	0.29	0.46	0.46	0.20	0.61	0.61	-
	Delay (s/veh)	33.40	44.96	37.50	32.74	48.51	47.64	15.50	20.66	20.75	12.76	24.20	24.25	29.48
	LOS	C	D	D	C	D	D	B	C	C	B	C	C	C
	95% Queue (m)	48.16	85.44	18.40	63.06	97.51	80.78	17.86	84.39	79.56	15.54	121.28	119.32	-
102A Avenue / 148 Street (Signalized)	v/c Ratio	-	0.61		0.32	0.50	-	-	-	-	0.73	-	0.73	-
	Delay (s/veh)	-	8.38		14.23	7.61	-	-	-	-	16.33	-	16.33	10.30
	LOS	-	A		B	A	-	-	-	-	B	-	B	B
	95% Queue (m)	-	28.54		11.13	22.89	-	-	-	-	27.75	-	27.75	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.32	0.56	0.60	0.29	0.76	0.12	0.33	0.76	0.69	0.37	0.65	0.65	-
	Delay (s/veh)	18.96	31.03	32.91	18.25	44.84	29.08	21.15	38.05	40.57	22.52	37.61	37.73	34.14
	LOS	B	C	C	B	D	C	C	D	D	C	D	D	C
	95% Queue (m)	34.15	82.85	79.44	28.99	99.91	12.30	30.36	96.20	84.26	32.67	87.51	85.73	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.50	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.29	0.03		0.25	0.84		0.53	0.23	0.23	0.02	0.62	0.62	-
	Delay (s/veh)	47.03	31.79		35.65	46.68		31.50	5.14	5.15	6.73	9.24	9.33	13.49
	LOS	D	C		D	D		C	A	A	A	A	A	B
	95% Queue (m)	9.36	1.80		19.51	69.55		34.76	22.87	22.56	1.20	84.91	84.89	-

2050 with Improvements Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.31	-	0.08	-	-	-	-	0.17	0.13	0.01	0.56	-	-
	Delay (s/veh)	41.41	-	39.32	-	-	-	-	2.31	2.30	3.18	4.19	-	4.47
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	12.59	-	2.99	-	-	-	-	7.96	5.79	0.22	41.52	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.10	0.03	0.08	0.19	0.04		0.04	0.91		0.21	0.76		-
	Delay (s/veh)	11.98	9.78	10.04	13.18	9.85		27.41	31.32		30.42	21.10		23.63
	LOS	B	A	B	B	A		C	C		C	C		C
	95% Queue (m)	6.74	2.29	5.18	13.18	3.05		1.18	109.98		5.71	78.66		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.02	0.29	0.64	0.12	0.05		0.08	0.32	0.32	0.13	0.51	0.06	-
	Delay (s/veh)	39.00	48.97	56.02	40.03	43.61		6.37	10.10	10.11	5.41	11.05	7.21	13.44
	LOS	D	D	E	D	D		A	B	B	A	B	A	B
	95% Queue (m)	1.59	16.76	34.12	11.13	3.44		2.64	52.78	52.71	7.27	85.13	7.20	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.18	0.05	0.08	0.06	0.01	0.05	0.31	0.68		0.21	0.08		-
	Delay (s/veh)	7.42	5.34	5.43	6.94	5.18	5.34	19.34	21.20		23.25	15.76		13.77
	LOS	A	A	A	A	A	A	B	C		C	B		B
	95% Queue (m)	9.36	2.48	3.16	2.57	0.27	2.13	14.43	30.15		6.16	3.28		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.15	0.29	0.23	0.14	-	-	-	-	0.37	-	0.46	-
	Delay (s/veh)	-	4.51	5.11	8.49	4.49	-	-	-	-	17.92	-	18.87	8.52
	LOS	-	A	A	A	A	-	-	-	-	B	-	B	A
	95% Queue (m)	-	5.83	10.96	9.14	4.99	-	-	-	-	12.22	-	13.99	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.46	-	0.54	0.46	0.33	-	-	0.40	0.42	-
	Delay (s/veh)	-	-	-	28.84	-	30.23	7.45	4.43	-	-	10.22	10.33	9.66
	LOS	-	-	-	C	-	C	A	A	-	-	B	B	A
	95% Queue (m)	-	-	-	23.27	-	25.38	19.83	19.85	-	-	40.08	40.71	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	0.34	0.84	0.01	0.19	0.44	0.63	1.11	0.05	0.03	0.02	0.70	0.84	-
	Delay (s/veh)	73.31	25.65	16.37	35.53	14.14	10.06	100.84	21.04	20.89	31.56	34.77	40.10	26.41
	LOS	E	C	B	D	B	B	F	C	C	C	C	D	C
	95% Queue (m)	1.86	110.93	1.14	10.70	57.52	69.63	70.53	5.38	1.73	0.97	60.93	124.50	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.91	0.51	0.51	0.01	0.59	0.59	0.84	0.45	0.13	0.28	0.31	0.09	-
	Delay (s/veh)	70.60	22.81	23.57	23.23	29.60	32.00	49.78	35.50	31.86	25.55	35.78	33.54	32.05
	LOS	E	C	C	C	C	C	D	D	C	C	D	C	C
	95% Queue (m)	54.90	88.29	93.09	0.28	97.71	94.50	138.19	67.07	14.77	32.92	43.81	10.30	-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.24	0.88	0.26	0.06	0.42	0.41	0.84	0.38	0.04	0.03	0.86	0.18	-
	Delay (s/veh)	50.02	45.53	29.15	32.14	33.73	12.51	49.20	29.45	25.40	18.82	45.89	30.01	37.85
	LOS	D	D	C	C	C	B	D	C	C	B	D	C	D
	95% Queue (m)	18.20	148.38	35.85	2.31	57.38	64.69	82.70	61.22	5.61	3.03	137.94	22.87	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.79	0.50	0.50	0.01	0.17	0.17	0.10	0.17		0.02	0.49		-
	Delay (s/veh)	63.11	8.80	8.84	5.13	7.69	7.81	41.46	42.17		51.55	53.54		13.01
	LOS	E	A	A	A	A	A	D	D		D	D		B
	95% Queue (m)	35.75	78.61	77.47	0.32	23.34	24.84	8.28	13.58		0.77	23.34		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.16	0.58	0.23	0.08	0.32	0.33	0.57	0.38		0.44	0.49		-
	Delay (s/veh)	9.68	17.47	13.25	12.57	16.78	16.80	37.18	32.62		52.25	41.44		21.70
	LOS	A	B	B	B	B	B	D	C		D	D		C
	95% Queue (m)	12.19	105.88	36.23	1.84	61.12	60.11	62.56	54.46		27.36	57.76		-

2050 with Improvements Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.42	0.84	0.85	0.22	0.47	0.47	0.78	0.41	0.20	0.63	0.61	0.10	-
	Delay (s/veh)	18.63	40.54	40.96	20.11	25.80	25.82	39.54	31.81	29.74	30.05	36.14	29.20	33.63
	LOS	B	D	D	C	C	C	D	C	C	C	D	C	C
	95% Queue (m)	39.18	156.04	153.51	12.85	76.81	76.19	90.34	53.89	22.41	76.87	78.17	10.90	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.01	-	0.13	-	-	-	-	0.00	0.00	0.07	0.00	-	-
	Delay (s/veh)	11.25	-	9.22	-	-	-	-	0.00	0.00	7.52	0.00	-	5.93
	LOS	B	-	A	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	3.56	-	3.56	-	-	-	-	0.00	0.00	1.70	1.70	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.26	-	0.26	0.40		-	-	0.16		-
	Delay (s/veh)	-	-	-	9.13	-	9.13	10.96		-	-	8.34		9.84
	LOS	-	-	-	A	-	A	B		-	-	A		A
	95% Queue (m)	-	-	-	7.92	-	7.92	14.78		-	-	4.38		-
105 Avenue / 154 Street (Signalized)	v/c Ratio	0.15	0.54	0.54	0.01	0.16	0.17	0.04	0.76		0.15	0.21		-
	Delay (s/veh)	5.29	6.96	6.97	18.18	12.29	12.33	13.50	16.00		18.38	11.35		9.28
	LOS	A	A	A	B	B	B	B	B		B	B		A
	95% Queue (m)	5.32	22.39	22.26	0.21	4.70	4.65	1.45	30.59		3.75	7.05		-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.07	0.87	0.22	0.59	0.22		0.26	0.41	0.41	0.66	0.58	0.71	-
	Delay (s/veh)	24.91	47.91	34.23	30.64	32.55		14.94	31.41	31.44	21.21	24.21	21.81	27.75
	LOS	C	D	C	C	C		B	C	C	C	C	C	C
	95% Queue (m)	9.36	125.38	25.08	42.40	29.91		17.27	68.19	67.68	94.06	106.14	137.07	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.05	0.55		0.00	0.58	0.31	0.35	0.07		0.00	0.00		-
	Delay (s/veh)	11.36	8.63		0.00	8.87	7.32	11.10	8.06		0.00	0.00		8.95
	LOS	B	A		A	A	A	B	A		A	A		A
	95% Queue (m)	1.26	16.71		0.00	18.02	7.08	11.62	1.31		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.06	0.00	-	-	0.00	0.00	0.04	-	0.04	-	-	-	-
	Delay (s/veh)	8.51	0.00	-	-	0.00	0.00	19.01	-	11.59	-	-	-	1.08
	LOS	A	A	-	-	A	A	C	-	B	-	-	-	C
	95% Queue (m)	1.42	0.00	-	-	0.00	0.00	1.97	-	1.97	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.05	0.16		0.51	0.77		0.54	0.18	0.18	0.02	0.44	0.44	-
	Delay (s/veh)	26.88	17.60		23.83	24.77		17.69	6.30	6.30	8.07	7.83	7.86	12.61
	LOS	C	B		C	C		B	A	A	A	A	A	B
	95% Queue (m)	1.46	8.14		23.16	49.77		27.70	10.98	10.93	1.04	33.23	30.35	-
105A Avenue / 156 Street (Two-way stop)	v/c Ratio	0.03	0.01	-	-	0.01	0.00	0.04	-	0.02	-	-	-	-
	Delay (s/veh)	8.59	0.00	-	-	0.00	0.00	26.10	-	12.44	-	-	-	0.50
	LOS	A	A	-	-	A	A	D	-	B	-	-	-	D
	95% Queue (m)	0.80	0.80	-	-	0.00	0.00	1.49	-	1.49	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.50	0.66	0.24	0.13	0.32	0.56	0.71	0.44	0.44	0.72	0.94	0.95	-
	Delay (s/veh)	32.24	32.24	25.67	52.67	34.11	29.03	38.66	25.88	25.88	25.42	50.41	51.42	37.19
	LOS	C	C	C	D	C	C	D	C	C	C	D	D	D
	95% Queue (m)	70.89	115.50	35.37	4.75	45.87	90.21	50.62	80.57	80.53	85.57	230.45	234.31	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.27	0.58		0.02	0.47	0.56	0.76	0.30	0.19	0.03	0.46	0.46	-
	Delay (s/veh)	14.23	17.56		32.28	22.29	23.64	38.64	16.03	15.16	19.59	17.57	17.63	20.16
	LOS	B	B		C	C	C	D	B	B	B	B	B	C
	95% Queue (m)	22.77	78.24		0.96	52.49	56.26	59.29	34.34	17.39	2.54	56.76	52.85	-
104 Avenue / 157 Street (Signalized)	v/c Ratio	-	-	-	0.34	-	0.34	0.12	0.28	-	-	0.64	0.64	-
	Delay (s/veh)	-	-	-	38.59	-	38.59	11.29	2.65	-	-	5.94	5.96	5.49
	LOS	-	-	-	D	-	D	B	A	-	-	A	A	A
	95% Queue (m)	-	-	-	10.13	-	10.13	3.83	13.85	-	-	59.67	59.89	-

2050 with Improvements Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.58	0.38	0.88	0.58	0.88		0.15	0.82	0.23	0.81	0.66	0.67	-
	Delay (s/veh)	30.86	31.81	47.41	27.64	46.80		15.54	34.05	22.42	37.83	28.07	28.46	33.74
	LOS	C	C	D	C	D		B	C	C	D	C	C	C
	95% Queue (m)	61.43	50.72	107.06	72.16	108.28		8.24	137.95	29.10	71.77	118.47	112.66	-
105A Avenue / 140 Street (Signalized)	v/c Ratio	0.01	0.37	0.37	0.13	0.40	0.40	0.37	0.57	0.54	0.15	0.40		-
	Delay (s/veh)	13.36	9.77	9.80	13.97	9.97	9.97	21.99	17.78	17.67	22.19	16.37		13.30
	LOS	B	A	A	B	A	A	C	B	B	C	B		B
	95% Queue (m)	0.44	28.31	26.76	5.98	30.99	30.85	20.00	44.68	35.82	6.40	26.53		-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.67	0.60	0.60	0.64	0.81	0.81	0.39	0.78	0.78	0.14	0.44	0.44	-
	Delay (s/veh)	36.36	38.78	38.92	29.29	47.49	47.58	19.30	37.09	37.61	21.75	29.01	29.05	36.57
	LOS	D	D	D	C	D	D	B	D	D	C	C	C	D
	95% Queue (m)	81.04	95.59	88.00	65.35	122.27	118.90	36.68	171.15	165.79	7.77	84.78	83.37	-
103 Avenue / 140 Street (Signalized)	v/c Ratio	-	0.61	0.69	0.21	0.34	-	-	-	-	0.72	-	0.66	-
	Delay (s/veh)	-	15.69	17.60	8.30	5.71	-	-	-	-	29.54	-	28.65	14.78
	LOS	-	B	B	A	A	-	-	-	-	C	-	C	B
	95% Queue (m)	-	74.93	81.01	7.41	25.81	-	-	-	-	48.38	-	38.05	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.37	0.51	-	-	0.75	0.18	0.36	-	0.91	-	-	-	-
	Delay (s/veh)	12.33	10.77	-	-	22.18	15.03	18.41	-	38.37	-	-	-	19.40
	LOS	B	B	-	-	C	B	B	-	D	-	-	-	B
	95% Queue (m)	19.63	50.41	-	-	73.89	13.52	26.96	-	87.64	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.21	0.60	0.59	0.64	0.76	0.77	0.53	0.59	0.59	0.77	0.54	0.54	-
	Delay (s/veh)	23.57	32.95	35.07	30.72	40.57	40.81	29.89	41.11	41.29	42.27	36.63	36.81	37.05
	LOS	C	C	D	C	D	D	C	D	D	D	D	D	D
	95% Queue (m)	15.10	112.86	104.75	66.39	163.55	160.28	59.23	105.24	100.75	94.02	100.13	94.45	-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.28	-	0.78	-	-	-	-	0.48	0.03	0.24	0.20	-	-
	Delay (s/veh)	51.25	-	64.45	-	-	-	-	8.31	5.19	5.75	2.95	-	10.71
	LOS	D	-	E	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	17.81	-	52.37	-	-	-	-	76.73	3.04	7.91	15.98	-	-
103 Avenue / 142 Street (Two-way stop)	v/c Ratio	-	-	-	0.14	-	0.21	0.14	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	20.37	-	12.35	8.13	0.00	-	-	0.00	0.00	5.24
	LOS	-	-	-	C	-	B	A	A	-	-	A	A	C
	95% Queue (m)	-	-	-	11.80	-	11.80	3.81	3.81	-	-	0.00	0.00	-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.38	0.27		0.02	0.50		0.37	0.54	0.56	0.25	0.42	0.42	-
	Delay (s/veh)	48.37	37.85		40.96	40.75		14.21	7.79	8.20	15.80	6.29	6.29	10.67
	LOS	D	D		D	D		B	A	A	B	A	A	B
	95% Queue (m)	20.22	21.58		1.26	41.78		24.55	75.32	73.22	13.33	54.56	54.47	-
104A Avenue / 144 Street (Roundabout)	v/c Ratio	0.15	0.11		0.22	0.27		0.01	0.48		0.04	0.10		-
	Delay (s/veh)	5.14			5.55			10.16			3.90			6.71
	LOS	A			A			B			A			A
	95% Queue (m)	3.86	2.86		6.37	8.22		0.27	19.82		0.90	2.66		-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.14	0.44		0.71	0.66		0.02	0.64	0.64	0.58	0.37	0.37	-
	Delay (s/veh)	35.08	48.53		45.28	49.21		8.04	22.22	22.38	21.44	13.11	13.16	24.87
	LOS	D	D		D	D		A	C	C	C	B	B	C
	95% Queue (m)	13.69	41.64		91.13	74.41		1.28	139.17	134.18	38.91	71.24	67.55	-
103 Avenue / 144 Street (Signalized)	v/c Ratio	0.54	0.21		0.54			0.24		0.43	0.26			-
	Delay (s/veh)	17.35	5.76		7.69			15.73		16.85	17.04			11.22
	LOS	B	A		A			B		B	B			B
	95% Queue (m)	26.31	10.03		37.20			12.69		17.26	11.47			-

2050 with Improvements Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 144 Street (Signalized)	v/c Ratio	-	-	-	0.87	-	0.61	0.09	0.43	-	-	0.41	0.50	-
	Delay (s/veh)	-	-	-	36.90	-	26.24	8.37	9.99	-	-	14.60	15.84	17.99
	LOS	-	-	-	D	-	C	A	A	-	-	B	B	B
	95% Queue (m)	-	-	-	103.74	-	60.26	4.50	50.23	-	-	49.50	57.43	-
100 Avenue / Green Timbers Park Access (Signalized)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.52	0.52	0.00	0.40	-	-
	Delay (s/veh)	0.00	-	0.00	-	-	-	-	5.22	5.22	0.00	2.73	-	4.10
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	22.47	22.47	0.00	5.10	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.36	-	0.83	-	-	-	-	0.45	0.46	0.29	0.34	-	-
	Delay (s/veh)	48.69	-	62.35	-	-	-	-	5.49	5.50	12.47	4.24	-	10.30
	LOS	D	-	E	-	-	-	-	A	A	B	A	-	B
	95% Queue (m)	31.17	-	71.22	-	-	-	-	60.92	61.04	17.21	36.98	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.01	-	0.04	-	-	-	-
	Delay (s/veh)	7.29	0.00	-	-	0.00	0.00	9.46	-	8.61	-	-	-	3.47
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.32	0.32	-	-	0.00	0.00	1.17	-	1.17	-	-	-	-
108 Avenue / 146 Street (Signalized)	v/c Ratio	0.53	0.35		0.09	0.12		0.07	0.32	0.32	0.21	0.42	0.42	-
	Delay (s/veh)	41.22	34.89		38.64	32.77		8.88	5.48	5.50	9.00	6.24	6.25	9.70
	LOS	D	C		D	C		A	A	A	A	A	A	A
	95% Queue (m)	39.34	24.78		4.93	8.13		3.29	33.94	32.73	12.22	48.37	47.73	-
110 Avenue / 148 Street (Two-way stop)	v/c Ratio	0.04	0.00	-	-	0.01	0.00	0.16	-	0.10	-	-	-	-
	Delay (s/veh)	8.99	0.00	-	-	0.00	0.00	21.78	-	16.16	-	-	-	1.98
	LOS	A	A	-	-	A	A	C	-	C	-	-	-	C
	95% Queue (m)	0.89	0.89	-	-	0.00	0.00	8.10	-	8.10	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.25	0.29	0.03	0.55	0.90		0.09	0.45	0.45	0.14	0.77	0.78	-
	Delay (s/veh)	26.87	35.52	33.21	30.67	54.72		15.48	20.18	20.42	11.84	27.66	28.36	29.22
	LOS	C	D	C	C	D		B	C	C	B	C	C	C
	95% Queue (m)	18.41	30.18	2.22	73.43	117.95		3.14	78.28	71.48	10.40	153.53	149.25	-
105 Avenue / 148 Street (Roundabout)	v/c Ratio	0.06	0.47		0.33	0.33		0.00	0.66		0.27	0.12		-
	Delay (s/veh)	9.57			7.35			19.51			5.07			9.90
	LOS	A			A			C			A			A
	95% Queue (m)	1.51	19.29		10.94	11.04		0.11	37.08		8.24	3.21		-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.30	0.48	0.10	0.64	0.70	0.53	0.41	0.65	0.65	0.44	0.47	0.47	-
	Delay (s/veh)	31.62	40.51	35.95	38.14	44.49	41.26	14.88	27.11	27.38	20.40	23.14	23.17	29.45
	LOS	C	D	D	D	D	D	B	C	C	C	C	C	C
	95% Queue (m)	30.26	70.31	11.50	77.78	102.17	67.73	34.88	139.14	133.39	31.55	94.87	92.72	-
102A Avenue / 148 Street (Signalized)	v/c Ratio	-	0.68		0.26	0.47	-	-	-	-	0.75	-	0.75	-
	Delay (s/veh)	-	12.57		5.20	5.51	-	-	-	-	19.37	-	19.37	9.42
	LOS	-	B		A	A	-	-	-	-	B	-	B	A
	95% Queue (m)	-	26.63		5.93	15.08	-	-	-	-	17.77	-	17.77	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.53	0.47	0.52	0.41	0.52	0.17	0.18	0.79	0.29	0.31	0.62	0.62	-
	Delay (s/veh)	26.08	32.04	33.75	23.24	33.10	27.35	16.41	32.21	23.04	19.90	29.47	29.59	29.44
	LOS	C	C	C	C	C	C	B	C	C	B	C	C	C
	95% Queue (m)	59.94	64.29	62.93	46.24	70.57	18.16	13.19	120.82	37.34	20.19	97.90	94.60	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.30	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.20	0.10		0.00	0.00		0.00	0.22	0.22	0.03	0.46	0.46	-
	Delay (s/veh)	47.94	45.35		0.00	0.00		0.00	2.25	2.26	3.12	3.50	3.50	3.82
	LOS	D	D		A	A		A	A	A	A	A	A	A
	95% Queue (m)	9.16	3.12		0.00	0.00		0.00	11.57	11.51	1.33	32.39	32.39	-

2050 with Improvements Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.17	-	0.16	-	-	-	-	0.19	0.02	0.01	0.45	-	-
	Delay (s/veh)	46.64	-	46.60	-	-	-	-	1.83	1.48	2.66	2.78	-	3.15
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	5.63	-	4.61	-	-	-	-	7.38	0.56	0.52	24.53	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.12	0.03	0.11	0.05	0.01		0.05	0.96		0.05	0.47		-
	Delay (s/veh)	11.78	9.76	10.19	12.60	9.70		22.33	40.60		29.53	15.87		28.42
	LOS	B	A	B	B	A		C	D		C	B		C
	95% Queue (m)	8.69	1.92	7.06	3.31	0.91		2.22	131.53		1.25	42.55		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.02	0.20	0.29	0.00	0.05		0.11	0.40	0.40	0.05	0.43	0.11	-
	Delay (s/veh)	47.90	53.49	54.76	47.79	52.90		3.95	7.17	7.17	3.66	7.78	5.69	8.50
	LOS	D	D	D	D	D		A	A	A	A	A	A	A
	95% Queue (m)	1.86	10.18	12.48	0.37	2.04		3.22	62.68	62.68	1.66	67.17	13.31	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.18	0.05	0.16	0.03	0.01	0.01	0.04	0.29		0.59	0.11		-
	Delay (s/veh)	11.25	9.11	9.71	11.78	8.91	8.91	15.07	14.51		22.85	13.31		15.37
	LOS	B	A	A	B	A	A	B	B		C	B		B
	95% Queue (m)	12.77	3.51	10.34	1.76	0.46	0.46	2.69	19.64		41.53	7.09		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.27	0.31	0.28	0.28	-	-	-	-	0.72	-	0.24	-
	Delay (s/veh)	-	6.26	6.52	6.57	6.39	-	-	-	-	20.86	-	15.96	9.91
	LOS	-	A	A	A	A	-	-	-	-	C	-	B	A
	95% Queue (m)	-	14.61	15.20	9.94	13.99	-	-	-	-	37.66	-	9.20	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.65	-	0.85	0.59	0.50	-	-	0.51	0.55	-
	Delay (s/veh)	-	-	-	29.75	-	38.24	15.06	9.45	-	-	17.71	18.11	17.88
	LOS	-	-	-	C	-	D	B	A	-	-	B	B	B
	95% Queue (m)	-	-	-	67.61	-	86.27	42.94	61.77	-	-	68.59	70.16	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	0.73	0.86	0.03	0.78	0.55	0.84	0.80	0.05	0.04	0.29	0.56	0.85	-
	Delay (s/veh)	62.29	31.16	20.37	56.55	23.19	29.28	45.28	19.39	19.36	38.09	36.31	45.92	32.13
	LOS	E	C	C	E	C	C	D	B	B	D	D	D	C
	95% Queue (m)	26.67	130.87	3.67	46.77	81.97	117.03	61.66	6.66	4.75	15.93	61.65	89.74	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.80	0.63	0.63	0.24	0.56	0.56	0.58	0.28	0.13	0.43	0.19	0.23	-
	Delay (s/veh)	63.07	32.35	33.83	35.93	34.15	35.56	29.33	23.72	22.00	55.58	41.79	42.24	33.70
	LOS	E	C	C	D	C	D	C	C	C	E	D	D	C
	95% Queue (m)	50.32	115.83	121.56	8.91	96.14	99.52	110.44	58.32	20.81	28.67	23.25	23.52	-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.71	0.84	0.23	0.14	0.43	0.39	0.86	0.45	0.09	0.16	0.83	0.31	-
	Delay (s/veh)	73.44	45.92	31.79	36.00	37.81	11.53	45.69	30.32	25.57	19.80	48.97	36.02	39.45
	LOS	E	D	C	D	D	B	D	C	C	B	D	D	D
	95% Queue (m)	66.87	145.15	32.92	12.43	61.00	64.58	107.03	79.50	13.33	15.67	135.22	44.07	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.55	0.67	0.67	0.08	0.28	0.29	0.24	0.43		0.01	0.27		-
	Delay (s/veh)	28.45	16.74	16.77	7.67	11.92	12.29	19.78	21.26		27.37	29.76		16.30
	LOS	C	B	B	A	B	B	B	C		C	C		B
	95% Queue (m)	16.93	72.36	71.93	2.58	22.00	23.72	18.79	24.63		0.19	4.48		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.34	0.56	0.31	0.02	0.40	0.40	0.59	0.64		0.29	0.29		-
	Delay (s/veh)	14.84	19.42	16.12	13.56	21.00	21.02	52.05	43.53		30.71	30.47		23.97
	LOS	B	B	B	B	C	C	D	D		C	C		C
	95% Queue (m)	31.31	111.62	54.92	0.42	80.78	79.57	57.82	85.34		30.22	47.99		-

2050 with Improvements Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.56	0.85	0.87	0.38	0.52	0.52	0.82	0.66	0.51	0.80	0.58	0.41	-
	Delay (s/veh)	23.93	43.55	45.27	27.71	28.22	28.24	48.49	39.26	38.10	52.61	40.28	38.75	39.13
	LOS	C	D	D	C	C	C	D	D	D	D	D	D	D
	95% Queue (m)	55.54	196.98	194.01	23.97	103.47	101.97	105.19	107.94	78.91	87.01	88.30	60.53	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.00	-	0.31	-	-	-	-	0.00	0.00	0.08	0.00	-	-
	Delay (s/veh)	12.14	-	10.06	-	-	-	-	0.00	0.00	7.49	0.00	-	8.09
	LOS	B	-	B	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	10.40	-	10.40	-	-	-	-	0.00	0.00	1.88	1.88	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.55	-	0.55	0.57		-	-	0.16		-
	Delay (s/veh)	-	-	-	13.92	-	13.92	15.15		-	-	9.26		13.89
	LOS	-	-	-	B	-	B	C		-	-	A		B
	95% Queue (m)	-	-	-	25.74	-	25.74	27.55		-	-	4.22		-
105 Avenue / 154 Street (Signalized)	v/c Ratio	0.26	0.42	0.42	0.02	0.31	0.32	0.08	0.81		0.33	0.09		-
	Delay (s/veh)	7.36	8.08	8.08	19.83	14.56	14.58	14.35	18.88		22.95	12.38		12.00
	LOS	A	A	A	B	B	B	B	B		C	B		B
	95% Queue (m)	12.69	23.66	23.28	0.51	13.90	13.75	3.86	46.26		8.52	3.84		-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.15	0.85	0.66	0.92	0.46		0.13	0.46	0.46	0.41	0.55	0.57	-
	Delay (s/veh)	24.23	52.55	46.27	49.83	34.82		17.01	28.82	28.83	20.17	27.00	15.59	31.66
	LOS	C	D	D	D	C		B	C	C	C	C	B	C
	95% Queue (m)	17.00	117.31	78.15	126.69	73.86		9.97	89.86	89.67	45.15	104.38	106.24	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.13	0.55		0.00	0.32	0.35	0.55	0.11		0.00	0.00		-
	Delay (s/veh)	13.03	11.76		0.00	10.25	10.53	11.42	6.70		0.00	0.00		10.98
	LOS	B	B		A	B	B	B	A		A	A		B
	95% Queue (m)	4.07	21.16		0.00	11.03	10.69	26.56	3.12		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.07	0.00	-	-	0.00	0.00	0.27	-	0.22	-	-	-	-
	Delay (s/veh)	8.11	0.00	-	-	0.00	0.00	25.09	-	16.89	-	-	-	4.82
	LOS	A	A	-	-	A	A	D	-	C	-	-	-	D
	95% Queue (m)	1.75	0.00	-	-	0.00	0.00	20.04	-	20.04	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.24	0.18		0.65	0.71		0.91	0.32	0.32	0.13	0.39	0.39	-
	Delay (s/veh)	35.62	23.30		33.28	29.88		46.84	7.53	7.53	11.16	8.00	8.01	18.38
	LOS	D	C		C	C		D	A	A	B	A	A	B
	95% Queue (m)	9.41	13.85		42.87	61.79		104.34	31.93	31.58	6.84	40.92	38.75	-
105A Avenue / 156 Street (Two-way stop)	v/c Ratio	0.07	0.01	-	-	0.01	0.00	0.03	-	0.00	-	-	-	-
	Delay (s/veh)	8.82	0.00	-	-	0.00	0.00	31.65	-	12.44	-	-	-	0.61
	LOS	A	A	-	-	A	A	D	-	B	-	-	-	D
	95% Queue (m)	1.84	1.84	-	-	0.00	0.00	0.72	-	0.72	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.67	0.53	0.36	0.04	0.54	0.46	0.72	0.58	0.58	0.69	0.76	0.76	-
	Delay (s/veh)	45.47	35.46	33.04	54.55	44.96	25.51	30.58	28.24	28.46	24.37	38.96	39.21	33.60
	LOS	D	D	C	D	D	C	C	C	C	C	D	D	C
	95% Queue (m)	88.60	90.28	55.08	1.66	69.62	80.42	76.52	120.15	114.68	71.89	161.31	159.38	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.30	0.65		0.37	0.53	0.67	0.62	0.49	0.13	0.08	0.52	0.53	-
	Delay (s/veh)	21.89	34.86		21.58	30.54	34.83	21.84	17.26	13.30	36.32	27.34	27.43	25.80
	LOS	C	C		C	C	C	C	B	B	D	C	C	C
	95% Queue (m)	29.56	80.13		35.60	69.03	79.27	65.97	80.23	15.84	4.82	73.65	70.29	-
104 Avenue / 157 Street (Signalized)	v/c Ratio	-	-	-	0.45	-	0.45	0.06	0.32	-	-	0.54	0.55	-
	Delay (s/veh)	-	-	-	42.04	-	42.04	4.01	3.09	-	-	8.10	8.12	7.08
	LOS	-	-	-	D	-	D	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	18.72	-	18.72	0.96	20.92	-	-	72.98	73.18	-

Full Buildout with Road Widening + Improvements Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.55	0.77	0.78	0.47	0.78	0.79	0.27	0.50	0.51	0.83	0.89	0.93	-
	Delay (s/veh)	32.82	40.60	41.32	26.55	41.10	41.48	19.95	24.44	26.15	39.33	38.69	41.83	35.43
	LOS	C	D	D	C	D	D	B	C	C	D	D	D	D
	95% Queue (m)	45.56	74.21	69.16	40.32	75.71	72.40	11.04	68.62	67.64	67.65	177.99	190.52	-
105A Avenue / 140 Street (Signalized)	v/c Ratio	0.00	0.31	0.31	0.33	0.60	0.60	0.20	0.25	0.63	0.11	0.69		-
	Delay (s/veh)	0.00	10.29	10.29	15.84	12.77	12.77	24.70	14.69	18.43	17.69	19.06		14.54
	LOS	A	B	B	B	B	B	C	B	B	B	B		B
	95% Queue (m)	0.00	22.10	22.10	18.26	56.36	56.22	7.93	18.80	49.14	6.63	59.55		-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.82	0.56	0.39	0.91	0.90	0.90	0.14	0.59	0.35	0.83	0.51	0.51	-
	Delay (s/veh)	45.59	40.98	23.35	50.91	50.91	51.43	16.51	34.44	32.03	51.33	25.08	25.89	38.10
	LOS	D	D	C	D	D	D	B	C	C	D	C	C	D
	95% Queue (m)	93.38	64.07	62.50	89.31	132.89	129.83	5.08	82.75	51.00	80.65	88.13	92.37	-
103 Avenue / 140 Street (Signalized)	v/c Ratio	-	0.43	0.45	0.42	0.55	-	-	-	-	0.83	-	0.34	-
	Delay (s/veh)	-	14.38	15.66	32.07	10.86	-	-	-	-	26.92	-	19.36	15.68
	LOS	-	B	B	C	B	-	-	-	-	C	-	B	B
	95% Queue (m)	-	44.17	47.64	9.96	58.97	-	-	-	-	77.82	-	24.37	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.84	0.30	-	-	0.76	0.45	0.21	-	0.87	-	-	-	-
	Delay (s/veh)	30.49	8.13	-	-	21.48	17.08	20.41	-	35.95	-	-	-	20.12
	LOS	C	A	-	-	C	B	C	-	D	-	-	-	C
	95% Queue (m)	64.93	27.59	-	-	94.04	48.34	16.77	-	84.49	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.35	0.64	0.64	0.83	0.90	0.91	0.55	0.39	0.40	0.89	0.76	0.77	-
	Delay (s/veh)	27.95	36.39	39.01	44.21	53.50	54.52	30.96	32.19	32.24	52.33	42.43	43.47	43.36
	LOS	C	D	D	D	D	D	C	C	C	D	D	D	D
	95% Queue (m)	23.03	103.87	104.27	93.28	192.92	191.74	46.70	68.62	67.15	127.04	141.50	134.35	-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.96	-	0.27	-	-	-	-	0.77	0.81	0.79	0.36	-	-
	Delay (s/veh)	51.52	-	21.80	-	-	-	-	33.95	41.03	62.03	18.24	-	32.38
	LOS	D	-	C	-	-	-	-	C	D	E	B	-	C
	95% Queue (m)	60.24	-	41.97	-	-	-	-	135.82	148.39	37.91	61.21	-	-
103 Avenue / 142 Street (Signalized	v/c Ratio	-	-	-	0.71	-	0.46	0.58		-	-	0.50		-
	Delay (s/veh)	-	-	-	12.59	-	10.57	10.47		-	-	7.70		10.32
	LOS	-	-	-	B	-	B	B		-	-	A		B
	95% Queue (m)	-	-	-	26.98	-	13.68	14.87		-	-	16.59		-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.66	0.46		0.15	0.53		0.48	0.47	0.47	0.15	0.63	0.64	-
	Delay (s/veh)	43.27	27.87		33.41	28.83		35.16	11.76	11.83	17.54	14.72	14.75	18.12
	LOS	D	C		C	C		D	B	B	B	B	B	B
	95% Queue (m)	50.97	55.21		10.39	62.28		30.66	69.87	66.62	9.52	103.84	103.49	-
104A Avenue / 144 Street (Roundabout)	v/c Ratio	0.10	0.22		0.04	0.33		0.01	0.26		0.16	0.33		-
	Delay (s/veh)	4.45	4.45		7.87	7.87		6.51	6.51		6.15	6.15		6.11
	LOS	A	A		A	A		A	A		A	A		A
	95% Queue (m)	2.44	6.41		0.83	11.17		0.12	7.91		4.39	11.30		-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.22	0.44	0.08	0.75	0.67		0.80	0.61	0.61	0.86	0.39	0.39	-
	Delay (s/veh)	31.05	44.43	24.16	43.68	44.77		58.91	26.29	27.98	53.90	18.42	19.14	30.76
	LOS	C	D	C	D	D		E	C	C	D	B	B	C
	95% Queue (m)	21.17	43.06	10.98	102.08	76.25		49.09	107.43	115.01	80.78	69.24	69.41	-
103 Avenue / 144 Street (Signalized)	v/c Ratio	0.42	0.40		0.43			0.23	0.69		0.76			-
	Delay (s/veh)	17.77	10.22		10.52			12.47	16.98		23.96			15.67
	LOS	B	B		B			B	B		C			B
	95% Queue (m)	22.03	27.22		34.24			14.35	45.38		62.74			-
100 Avenue / 144 Street (Signalized)	v/c Ratio	-	-	-	0.85	-	0.92	0.16	0.43	-	-	0.52	0.57	-
	Delay (s/veh)	-	-	-	36.56	-	45.89	10.09	10.95	-	-	17.46	18.69	22.58
	LOS	-	-	-	D	-	D	B	B	-	-	B	B	C
	95% Queue (m)	-	-	-	109.88	-	118.61	8.64	54.50	-	-	66.76	68.79	-

Full Buildout with Road Widening + Improvements Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / Green Timbers Park Access (Signalized)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.52	0.52	0.00	0.46	-	-
	Delay (s/veh)	0.00	-	0.00	-	-	-	-	5.22	5.22	0.00	2.94	-	4.11
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	22.41	22.41	0.00	6.29	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.06	-	0.55	-	-	-	-	0.56	0.53	0.43	0.33	-	-
	Delay (s/veh)	37.30	-	30.57	-	-	-	-	17.37	17.88	46.05	6.09	-	15.46
	LOS	D	-	C	-	-	-	-	B	B	D	A	-	B
	95% Queue (m)	5.64	-	84.31	-	-	-	-	99.97	100.80	33.55	40.66	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.03	0.00	-	-	0.00	0.00	0.01	-	0.02	-	-	-	-
	Delay (s/veh)	7.29	0.00	-	-	0.00	0.00	9.60	-	8.44	-	-	-	4.43
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.76	0.76	-	-	0.00	0.00	0.69	-	0.69	-	-	-	-
108 Avenue / 146 Street (Signalized)	v/c Ratio	0.60	0.32		0.18	0.27		0.13	0.38	0.38	0.08	0.49	0.49	-
	Delay (s/veh)	39.48	30.56		34.13	30.09		16.02	7.96	8.00	12.36	9.21	9.21	13.07
	LOS	D	C		C	C		B	A	A	B	A	A	B
	95% Queue (m)	53.54	28.07		13.52	23.69		6.70	49.42	47.86	4.77	68.76	68.55	-
110 Avenue / 148 Street (Signalized)	v/c Ratio	0.49	0.58	-	-	0.45	0.49	0.65	-	0.65	-	-	-	-
	Delay (s/veh)	6.57	6.96	-	-	6.21	6.46	11.37	-	11.37	-	-	-	7.24
	LOS	A	A	-	-	A	A	B	-	B	-	-	-	A
	95% Queue (m)	13.02	12.95	-	-	9.81	10.23	14.12	-	14.12	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.47	0.73	0.73	0.43	0.66	0.66	0.09	0.52	0.53	0.23	0.83	0.87	-
	Delay (s/veh)	30.57	43.16	43.37	27.62	41.39	41.40	15.77	18.96	19.49	11.01	28.22	31.72	28.73
	LOS	C	D	D	C	D	D	B	B	B	B	C	C	C
	95% Queue (m)	52.02	57.54	56.09	41.24	49.83	49.76	2.60	82.77	74.53	13.65	159.24	163.46	-
106A Avenue / 148 Street (Signalized)	v/c Ratio	0.22	0.25	-	-	0.36	0.36	0.47	-	0.48	-	-	-	
	Delay (s/veh)	3.86	3.96	-	-	4.31	4.35	13.79	-	14.08	-	-	-	5.73
	LOS	A	A	-	-	A	A	B	-	B	-	-	-	A
	95% Queue (m)	4.07	4.34	-	-	7.41	7.48	9.24	-	8.73	-	-	-	
105 Avenue / 148 Street (Roundabout)	v/c Ratio	0.20	0.23		0.41	0.47		0.05	0.78		0.37	0.34		-
	Delay (s/veh)	6.09	6.09		9.98	9.98		30.12	30.12		6.94	6.94		11.94
	LOS	A	A		A	B		A	D		A	A		B
	95% Queue (m)	5.84	6.81		15.68	19.23		1.16	53.53		13.34	11.48		-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.13	0.48	0.50	0.58	0.82	0.82	0.85	0.65	0.65	0.44	0.50	0.50	-
	Delay (s/veh)	26.94	44.53	44.70	30.60	43.45	43.93	55.30	24.22	26.18	55.40	27.27	28.09	32.19
	LOS	C	D	D	C	D	D	E	C	C	E	C	C	C
	95% Queue (m)	8.93	49.65	48.41	80.47	123.13	112.93	73.18	117.18	116.35	13.55	84.88	89.93	-
102A Avenue / 148 Street (Signalized)	v/c Ratio	-	0.22	0.24	0.28	0.56	-	-	-	-	0.76	-	0.76	-
	Delay (s/veh)	-	7.18	7.27	10.98	8.52	-	-	-	-	13.56	-	13.56	9.62
	LOS	-	A	A	B	A	-	-	-	-	B	-	B	A
	95% Queue (m)	-	6.63	6.73	8.78	18.66	-	-	-	-	26.39	-	26.39	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.69	0.41	0.48	0.55	0.76	0.76	0.12	0.89	0.46	0.68	0.68	0.68	-
	Delay (s/veh)	27.29	27.90	29.62	22.14	45.30	46.04	18.73	45.73	17.13	31.82	38.60	38.62	35.08
	LOS	C	C	C	C	D	D	B	D	B	C	D	D	D
	95% Queue (m)	79.60	61.25	62.62	60.84	100.36	94.08	9.89	118.90	67.72	63.36	91.80	91.46	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.50	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.58	0.08		0.39	0.84		0.53	0.21	0.21	0.03	0.60	0.60	-
	Delay (s/veh)	52.37	31.84		37.58	46.42		29.65	5.15	5.16	6.68	9.00	9.14	14.57
	LOS	D	C		D	D		C	A	A	A	A	A	B
	95% Queue (m)	19.43	5.42		30.49	70.73		34.67	20.87	20.59	1.58	81.63	81.32	-

Full Buildout with Road Widening + Improvements Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.29	-	0.02	-	-	-	-	0.20	0.02	0.02	0.55	-	-
	Delay (s/veh)	43.07	-	40.35	-	-	-	-	2.02	1.62	2.95	3.56	-	3.69
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	9.23	-	0.62	-	-	-	-	7.55	0.63	0.84	32.35	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.29	0.04	0.24	0.04	0.11		0.03	0.63	0.17	0.61	0.53		-
	Delay (s/veh)	14.44	9.83	11.00	14.69	10.18		23.73	17.65	13.71	32.80	16.48		16.51
	LOS	B	A	B	B	B		C	B	B	C	B		B
	95% Queue (m)	21.69	3.06	17.15	2.09	7.89		1.07	61.75	11.74	24.54	50.18		-
104A Avenue / 150 Street (Signalized)	v/c Ratio	0.25	0.41	0.43	0.14	0.47		0.13	0.25		0.32	0.15		-
	Delay (s/veh)	18.79	13.47	13.66	17.56	13.89		9.36	9.86		7.19	6.45		11.64
	LOS	B	B	B	B	B		A	A		A	A		B
	95% Queue (m)	9.11	19.73	18.11	4.62	22.87		4.73	10.48		14.19	5.82		-
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.04	0.00	0.00	0.68	0.82		0.88	0.44	0.44	0.79	0.48	0.48	-
	Delay (s/veh)	33.46	41.04	41.04	42.95	50.48		53.46	16.95	17.40	58.36	22.32	23.29	28.39
	LOS	C	D	D	D	D		D	B	B	E	C	C	C
	95% Queue (m)	2.30	0.33	0.33	99.45	90.41		89.74	75.53	80.30	47.67	84.32	83.40	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.23	0.01	0.12	0.04	0.10	0.11	0.01	0.82		0.53	0.03		-
	Delay (s/veh)	10.80	7.33	7.85	9.67	7.75	7.77	15.17	22.89		29.56	13.85		16.54
	LOS	B	A	A	A	A	A	B	C		C	B		B
	95% Queue (m)	13.58	0.47	6.72	2.46	6.66	6.53	0.35	59.57		16.92	1.87		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.19	0.23	0.37	0.39	-	-	-	-	0.69	-	0.16	-
	Delay (s/veh)	-	5.19	5.37	6.90	6.15	-	-	-	-	21.20	-	16.12	8.89
	LOS	-	A	A	A	A	-	-	-	-	C	-	B	A
	95% Queue (m)	-	8.81	9.26	13.51	18.84	-	-	-	-	30.29	-	5.21	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.66	-	0.86	0.44	0.46	-	-	0.43	0.46	-
	Delay (s/veh)	-	-	-	28.57	-	38.65	11.67	9.67	-	-	16.14	16.52	17.92
	LOS	-	-	-	C	-	D	B	A	-	-	B	B	B
	95% Queue (m)	-	-	-	69.89	-	92.01	30.21	56.35	-	-	57.55	58.49	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	0.80	0.86	0.04	0.19	0.47	0.67	1.29	0.07	0.03	0.24	0.68	0.83	-
	Delay (s/veh)	60.68	25.80	16.18	35.44	16.68	12.74	176.73	21.55	21.34	34.84	34.94	39.48	33.74
	LOS	E	C	B	D	B	B	F	C	C	C	C	D	C
	95% Queue (m)	27.14	115.50	3.41	10.67	60.56	79.77	105.84	7.09	2.14	11.35	57.72	119.74	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.79	0.57	0.57	0.18	0.49	0.49	0.84		0.69	0.65	0.37	0.75	-
	Delay (s/veh)	63.92	23.67	24.61	25.25	24.41	25.32	49.89		46.00	32.87	43.62	51.88	31.61
	LOS	E	C	C	C	C	C	D		D	C	D	D	C
	95% Queue (m)	34.39	99.17	104.71	5.89	84.75	87.11	76.19		76.07	77.34	36.34	66.22	-
104 Avenue / 152 Street (Signalized)	v/c Ratio	1.10	0.62	0.62	0.17	0.53	0.55	1.11	0.59	0.59	0.18	0.48	0.49	-
	Delay (s/veh)	152.10	36.61	38.21	35.48	35.56	14.97	129.91	32.02	33.85	52.21	34.26	35.43	45.22
	LOS	F	D	D	D	D	B	F	C	C	D	C	D	D
	95% Queue (m)	111.56	92.07	99.09	6.94	72.53	91.37	109.26	94.73	94.94	8.60	72.99	76.61	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.65	0.38	0.07	0.77	0.29	0.29	0.17	0.53		0.74	0.79		-
	Delay (s/veh)	58.09	15.09	12.29	59.48	13.33	13.60	33.63	49.99		44.78	52.28		24.68
	LOS	E	B	B	E	B	B	C	D		D	D		C
	95% Queue (m)	26.03	63.70	10.29	40.73	48.35	50.42	13.74	37.48		95.10	75.35		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.84	0.42	0.42	0.14	0.33	0.33	0.45	0.15	0.26	0.51	0.42	0.49	-
	Delay (s/veh)	78.43	16.28	16.94	10.91	15.20	15.54	35.63	32.16	33.38	50.39	42.75	38.08	23.02
	LOS	E	B	B	B	B	B	D	C	C	D	D	D	C
	95% Queue (m)	47.29	74.25	73.52	3.40	58.52	60.78	50.41	21.40	31.14	39.62	44.65	16.53	-

Full Buildout with Road Widening + Improvements Scenario – AM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.40	0.53	0.53	0.25	0.45	0.45	0.61	0.65	0.71	0.26	0.64	0.25	-
	Delay (s/veh)	53.76	26.01	27.27	16.86	24.63	25.45	29.55	36.19	43.22	22.51	36.81	31.26	30.52
	LOS	D	C	C	B	C	C	C	D	D	C	D	C	C
	95% Queue (m)	20.75	80.28	82.07	18.78	68.22	70.80	66.36	84.68	91.78	24.18	81.92	27.90	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.08	-	0.24	-	-	-	-	0.00	0.00	0.02	0.00	-	-
	Delay (s/veh)	11.82	-	10.73	-	-	-	-	0.00	0.00	7.49	0.00	-	6.36
	LOS	B	-	B	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	10.75	-	10.75	-	-	-	-	0.00	0.00	0.38	0.38	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.34	-	0.34	0.43		-	-	0.24		-
	Delay (s/veh)	-	-	-	10.45	-	10.45	11.69		-	-	9.22		10.65
	LOS	-	-	-	B	-	B	B		-	-	A		B
	95% Queue (m)	-	-	-	11.56	-	11.56	16.35		-	-	7.26		-
105 Avenue / 154 Street (Signalized)	v/c Ratio	0.36	0.41	0.41	0.01	0.18	0.19	0.16	0.57		0.08	0.34		-
	Delay (s/veh)	5.73	5.81	5.81	18.70	13.12	13.18	16.57	15.18		17.89	13.52		8.49
	LOS	A	A	A	B	B	B	B	B		B	B		A
	95% Queue (m)	15.19	16.64	16.63	0.34	6.00	5.91	5.40	21.22		2.21	12.38		-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.33	0.85	0.86	0.84	0.04	0.04	0.39	0.50	0.50	0.66	0.42	0.59	-
	Delay (s/veh)	18.67	39.51	40.22	39.36	26.26	26.28	56.43	32.00	32.95	58.23	28.34	33.98	34.22
	LOS	B	D	D	D	C	C	E	C	C	E	C	C	C
	95% Queue (m)	55.99	158.45	151.81	72.70	6.19	5.76	9.46	79.22	84.64	27.13	68.94	92.82	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.16	0.96		0.00	0.05	0.08	0.84	0.25		0.00	0.00		-
	Delay (s/veh)	12.78	37.23		0.00	10.17	10.31	32.33	14.43		0.00	0.00		30.63
	LOS	B	D		A	B	B	C	B		A	A		C
	95% Queue (m)	12.84	163.49		0.00	4.41	5.73	106.13	20.12		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.12	0.01	-	-	0.00	0.00	0.22	-	0.14	-	-	-	-
	Delay (s/veh)	8.13	0.00	-	-	0.00	0.00	33.93	-	14.67	-	-	-	3.04
	LOS	A	A	-	-	A	A	D	-	B	-	-	-	D
	95% Queue (m)	3.09	0.00	-	-	0.00	0.00	12.38	-	12.38	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.02	0.11		0.66	0.21		0.30	0.29	0.29	0.09	0.35	0.85	-
	Delay (s/veh)	21.58	18.56		27.67	19.08		13.43	7.66	7.66	10.55	7.90	16.49	12.96
	LOS	C	B		C	B		B	A	A	B	A	B	B
	95% Queue (m)	0.99	7.06		41.53	13.26		15.71	24.12	23.97	4.43	28.39	93.93	-
105A Avenue / 156 Street (Signalized)	v/c Ratio	0.44	0.54	-	-	0.44	0.44	0.57	-	0.57	-	-	-	-
	Delay (s/veh)	4.89	5.25	-	-	4.77	4.78	12.11	-	12.11	-	-	-	5.42
	LOS	A	A	-	-	A	A	B	-	B	-	-	-	A
	95% Queue (m)	5.50	6.02	-	-	4.81	4.82	7.33	-	7.33	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.29	0.82	0.82	0.34	0.78	0.44	0.86	0.57	0.57	0.92	0.32	0.32	-
	Delay (s/veh)	34.22	50.67	51.43	35.21	47.77	22.48	45.88	32.81	34.19	50.23	25.69	26.09	38.45
	LOS	C	D	D	D	D	C	D	C	C	D	C	C	D
	95% Queue (m)	26.59	104.02	98.79	17.66	76.11	74.67	114.97	91.69	96.06	144.45	55.33	58.82	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.77	0.29	0.29	0.26	0.56	0.62	0.40	0.26	0.26	0.08	0.73	0.73	-
	Delay (s/veh)	41.75	25.81	25.81	48.64	41.90	26.08	16.18	15.05	15.08	31.83	42.99	43.07	31.57
	LOS	D	C	C	D	D	C	B	B	B	C	D	D	C
	95% Queue (m)	110.31	54.50	53.75	16.73	68.48	115.13	49.25	50.10	45.26	5.26	112.83	111.06	-
104 Avenue / 157 Street (Signalized)	v/c Ratio	-	-	-	0.33	-	0.33	0.10	0.28	-	-	0.28	0.27	-
	Delay (s/veh)	-	-	-	38.74	-	38.74	4.61	2.49	-	-	2.56	2.73	3.10
	LOS	-	-	-	D	-	D	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	9.33	-	9.33	3.34	12.28	-	-	13.45	14.48	-

Full Buildout with Road Widening + Improvements Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
108 Avenue / 140 Street (Signalized)	v/c Ratio	0.27	0.80	0.81	0.81	0.65	0.65	0.08	0.81	0.81	0.82	0.56	0.56	-
	Delay (s/veh)	23.49	43.83	45.18	37.30	35.08	35.10	13.95	35.42	39.56	47.99	24.02	24.18	35.05
	LOS	C	D	D	D	D	D	B	D	D	D	C	C	D
	95% Queue (m)	22.10	90.07	81.86	93.53	87.53	86.71	4.58	134.52	140.84	52.39	97.72	92.91	-
105A Avenue / 140 Street (Signalized)	v/c Ratio	0.00	0.35	0.36	0.42	0.57	0.57	0.24	0.61	0.75	0.01	0.54		-
	Delay (s/veh)	16.76	10.01	10.03	17.29	11.81	11.81	22.59	18.18	20.85	21.80	17.41		14.54
	LOS	B	B	B	B	B	B	C	B	C	C	B		B
	95% Queue (m)	0.13	27.54	26.20	22.80	50.93	50.85	11.43	51.44	58.41	0.49	41.29		-
104 Avenue / 140 Street (Signalized)	v/c Ratio	0.79	0.53	0.83	0.89	0.87	0.88	0.80	0.76	0.17	0.11	0.38	0.38	-
	Delay (s/veh)	39.37	38.52	39.33	54.03	50.90	51.24	68.27	43.15	17.86	45.16	30.33	30.92	42.25
	LOS	D	D	D	D	D	D	E	D	B	D	C	C	D
	95% Queue (m)	94.84	78.10	174.90	84.37	150.36	147.92	37.44	112.41	27.55	9.65	66.36	69.87	-
103 Avenue / 140 Street (Signalized)	v/c Ratio	-	0.64	0.68	0.76	0.38	-	-	-	-	0.80	-	0.55	-
	Delay (s/veh)	-	15.54	18.63	36.96	6.76	-	-	-	-	30.59	-	25.24	16.64
	LOS	-	B	B	D	A	-	-	-	-	C	-	C	B
	95% Queue (m)	-	71.50	78.58	31.94	31.83	-	-	-	-	62.55	-	33.66	-
102 Avenue / 140 Street (Signalized)	v/c Ratio	0.52	0.44	-	-	0.76	0.29	0.80	-	0.87	-	-	-	-
	Delay (s/veh)	14.54	9.38	-	-	22.45	16.29	27.74	-	34.06	-	-	-	18.68
	LOS	B	A	-	-	C	B	C	-	C	-	-	-	B
	95% Queue (m)	30.90	37.66	-	-	74.61	22.76	71.55	-	77.04	-	-	-	-
100 Avenue / 140 Street (Signalized)	v/c Ratio	0.22	0.80	0.80	0.75	0.81	0.81	0.67	0.67	0.67	0.81	0.64	0.64	-
	Delay (s/veh)	25.11	43.06	48.78	79.30	46.11	46.52	36.71	41.45	41.60	47.07	38.04	38.47	43.77
	LOS	C	D	D	E	D	D	D	D	D	D	D	D	D
	95% Queue (m)	16.40	147.24	144.85	64.42	172.28	165.80	67.93	126.13	121.77	92.21	122.55	112.99	-
104 Avenue / 142 Street (Signalized)	v/c Ratio	0.01	-	0.09	-	-	-	-	0.45	0.48	0.53	0.14	-	-
	Delay (s/veh)	54.15	-	43.69	-	-	-	-	5.36	6.29	60.36	1.61	-	5.99
	LOS	D	-	D	-	-	-	-	A	A	E	A	-	A
	95% Queue (m)	0.41	-	7.87	-	-	-	-	58.71	62.96	19.02	5.94	-	-
103 Avenue / 142 Street (Signalized	v/c Ratio	-	-	-	0.66	-	0.39	0.35		-	-	0.43		-
	Delay (s/veh)	-	-	-	9.04	-	7.41	8.30		-	-	8.59		8.47
	LOS	-	-	-	A	-	A	A		-	-	A		A
	95% Queue (m)	-	-	-	19.43	-	8.60	9.70		-	-	10.72		-
108 Avenue / 144 Street (Signalized)	v/c Ratio	0.49	0.06		0.12	0.86		0.29	0.60	0.63	0.47	0.43	0.43	-
	Delay (s/veh)	53.04	30.66		33.11	44.99		18.46	11.78	12.60	33.84	9.07	9.07	16.63
	LOS	D	C		C	D		B	B	B	C	A	A	B
	95% Queue (m)	21.11	6.12		12.02	101.62		21.03	100.95	97.53	32.25	65.51	65.50	-
104A Avenue / 144 Street (Roundabout)	v/c Ratio	0.05	0.16		0.29	0.38		0.01	0.70		0.17	0.22		-
	Delay (s/veh)	5.54	5.54		7.75	7.75		20.25	20.25		4.44	4.44		10.00
	LOS	A	A		A	A		A	C		A	A		B
	95% Queue (m)	1.18	4.25		9.33	13.39		0.24	44.10		4.62	6.36		-
104 Avenue / 144 Street (Signalized)	v/c Ratio	0.46	0.16	0.30	0.77	0.57		0.49	0.60	0.60	0.57	0.22	0.22	-
	Delay (s/veh)	31.69	34.71	23.89	40.20	38.86		60.20	29.82	31.47	53.05	19.31	19.67	31.54
	LOS	C	C	C	D	D		E	C	C	D	B	B	C
	95% Queue (m)	56.27	23.88	51.56	130.22	85.56		16.01	111.21	119.12	42.72	40.21	41.61	-
103 Avenue / 144 Street (Signalized)	v/c Ratio	0.21	0.86		0.48			0.32	0.85		0.54			-
	Delay (s/veh)	11.14	18.40		16.26			13.82	22.81		18.53			18.13
	LOS	B	B		B			B	C		B			B
	95% Queue (m)	9.46	69.65		31.16			20.47	59.61		29.42			-
100 Avenue / 144 Street (Signalized)	v/c Ratio	-	-	-	0.94	-	0.41	0.44	0.35	-	-	0.51	0.64	-
	Delay (s/veh)	-	-	-	49.48	-	24.46	13.75	10.30	-	-	18.58	21.58	22.45
	LOS	-	-	-	D	-	C	B	B	-	-	B	C	C
	95% Queue (m)	-	-	-	138.95	-	42.23	32.30	42.72	-	-	67.66	81.62	-

Full Buildout with Road Widening + Improvements Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / Green Timbers Park Access (Signalized)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.46	0.46	0.00	0.46	-	-
	Delay (s/veh)	0.00	-	0.00	-	-	-	-	4.83	4.83	0.00	2.95	-	3.85
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	18.42	18.42	0.00	6.34	-	-
104 Avenue / 146 Street (Signalized)	v/c Ratio	0.42	-	0.49	-	-	-	-	0.67	0.67	0.67	0.14	-	-
	Delay (s/veh)	45.57	-	30.10	-	-	-	-	21.49	23.20	49.63	4.54	-	22.51
	LOS	D	-	C	-	-	-	-	C	C	D	A	-	C
	95% Queue (m)	46.21	-	82.72	-	-	-	-	139.67	143.83	69.89	14.44	-	-
103 Avenue / 146 Street (Two-way stop)	v/c Ratio	0.01	0.00	-	-	0.00	0.00	0.04	-	0.03	-	-	-	-
	Delay (s/veh)	7.31	0.00	-	-	0.00	0.00	9.28	-	8.78	-	-	-	4.39
	LOS	A	A	-	-	A	A	A	-	A	-	-	-	A
	95% Queue (m)	0.16	0.16	-	-	0.00	0.00	1.66	-	1.66	-	-	-	-
108 Avenue / 146 Street (Signalized)	v/c Ratio	0.44	0.33		0.24	0.22		0.14	0.34	0.34	0.22	0.40	0.40	-
	Delay (s/veh)	42.57	36.34		41.33	35.29		8.47	4.94	4.96	8.49	5.40	5.41	8.86
	LOS	D	D		D	D		A	A	A	A	A	A	A
	95% Queue (m)	26.45	20.56		12.77	13.50		6.69	33.49	32.03	12.34	42.41	41.77	-
110 Avenue / 148 Street (Signalized)	v/c Ratio	0.25	0.43	-	-	0.63	0.68	0.54	-	0.54	-	-	-	-
	Delay (s/veh)	4.65	3.54	-	-	4.39	4.77	17.75	-	17.75	-	-	-	4.67
	LOS	A	A	-	-	A	A	B	-	B	-	-	-	A
	95% Queue (m)	4.65	3.08	-	-	6.07	6.83	4.43	-	4.43	-	-	-	-
108 Avenue / 148 Street (Signalized)	v/c Ratio	0.56	0.31	0.32	0.76	0.87	0.87	0.07	0.53	0.54	0.19	0.80	0.82	-
	Delay (s/veh)	33.00	34.30	34.33	41.63	51.54	51.70	16.81	23.19	23.61	13.74	30.34	31.77	33.86
	LOS	C	C	C	D	D	D	B	C	C	B	C	C	C
	95% Queue (m)	54.86	35.67	34.94	106.57	109.76	107.87	2.63	93.06	83.32	13.42	161.70	156.16	-
106A Avenue / 148 Street (Signalized)	v/c Ratio	0.24	0.43	-	-	0.56	0.58	0.25	-	0.33	-	-	-	
	Delay (s/veh)	4.65	4.73	-	-	5.24	5.41	9.80	-	10.29	-	-	-	5.49
	LOS	A	A	-	-	A	A	A	-	B	-	-	-	A
	95% Queue (m)	3.15	4.32	-	-	6.72	7.01	2.43	-	3.03	-	-	-	
105 Avenue / 148 Street (Roundabout)	v/c Ratio	0.55	0.62		0.58	0.65		0.03	0.66		0.24	0.55		-
	Delay (s/veh)	13.69	13.69		16.72	16.72		19.50	19.50		11.85	11.85		15.06
	LOS	B	B		C	C		A	C		A	B		C
	95% Queue (m)	26.44	34.02		28.15	36.47		0.71	36.79		7.31	26.04		-
104 Avenue / 148 Street (Signalized)	v/c Ratio	0.49	0.54	0.54	0.64	0.51	0.52	0.89	0.71	0.72	0.52	0.44	0.45	-
	Delay (s/veh)	34.17	40.02	40.06	36.00	39.66	39.76	56.78	27.22	29.79	60.36	30.05	31.57	33.81
	LOS	C	D	D	D	D	D	E	C	C	E	C	C	C
	95% Queue (m)	58.78	81.38	79.39	68.31	78.09	74.00	99.98	146.53	150.11	18.17	77.56	75.40	-
102A Avenue / 148 Street (Signalized)	v/c Ratio	-	0.67	0.71	0.30	0.30	-	-	-	-	0.78	-	0.78	-
	Delay (s/veh)	-	14.51	14.82	6.80	6.10	-	-	-	-	18.14	-	18.14	11.52
	LOS	-	B	B	A	A	-	-	-	-	B	-	B	B
	95% Queue (m)	-	30.34	31.18	9.19	11.00	-	-	-	-	29.35	-	29.35	-
100 Avenue / 148 Street (Signalized)	v/c Ratio	0.62	0.73	0.73	0.58	0.37	0.38	0.27	0.68	0.25	0.39	0.92	0.93	-
	Delay (s/veh)	29.48	40.42	41.30	28.83	30.31	30.56	21.62	28.69	22.49	19.87	49.90	51.72	36.69
	LOS	C	D	D	C	C	C	C	C	C	B	D	D	D
	95% Queue (m)	72.93	102.45	94.01	53.77	50.72	47.07	15.44	100.05	31.82	29.32	174.80	170.26	-
108A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
	Delay (s/veh)	8.50	-	8.50	-	-	-	-	0.00	0.00	7.20	0.00	-	4.00
	LOS	A	-	A	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	0.00	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	-	-
108 Avenue / Oriole Drive (Signalized)	v/c Ratio	0.29	0.19		0.00	0.00		0.00	0.29	0.29	0.07	0.49	0.49	-
	Delay (s/veh)	46.57	44.01		0.00	0.00		0.00	3.12	3.13	4.72	4.42	4.42	5.20
	LOS	D	D		A	A		A	A	A	A	A	A	A
	95% Queue (m)	16.60	8.41		0.00	0.00		0.00	21.21	20.91	2.95	45.06	45.06	-

Full Buildout with Road Widening + Improvements Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
107A Avenue / Oriole Drive (Two-way stop)	v/c Ratio	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
	Delay (s/veh)	-	-	-	8.50	-	8.30	7.20	0.00	-	-	0.00	0.00	4.00
	LOS	-	-	-	A	-	A	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00	-
108 Avenue / 150 Street (Signalized)	v/c Ratio	0.55	-	0.09	-	-	-	-	0.17	0.23	0.06	0.47	-	-
	Delay (s/veh)	48.19	-	42.59	-	-	-	-	2.52	2.93	3.76	3.83	-	5.33
	LOS	D	-	D	-	-	-	-	A	A	A	A	-	A
	95% Queue (m)	30.04	-	4.26	-	-	-	-	9.97	13.72	3.33	38.24	-	-
105 Avenue / 150 Street (Signalized)	v/c Ratio	0.43	0.17	0.93	0.49	0.19		0.13	0.91	0.21	0.51	0.94		0.05
	Delay (s/veh)	23.05	20.15	46.41	13.65	12.08		17.42	43.46	18.48	30.24	51.47		22.86
	LOS	C	C	D	B	B		B	D	B	C	D		C
	95% Queue (m)	34.04	18.31	124.44	30.92	21.02		6.97	155.23	21.97	11.73	127.54		4.07
104A Avenue / 150 Street (Signalized)	v/c Ratio	0.70	0.76		0.38	0.20		0.13	0.27		0.51	0.23		
	Delay (s/veh)	13.95	14.24		23.97	7.17		18.49	15.65		22.70	15.39		15.05
	LOS	B	B		C	A		B	B		C	B		B
	95% Queue (m)	68.84	65.70		14.73	12.32		7.07	13.28		30.70	11.20		
104 Avenue / 150 Street (Signalized)	v/c Ratio	0.34	0.70	0.71	0.65	0.63		0.92	0.54	0.54	0.88	0.65	0.74	-
	Delay (s/veh)	35.53	51.13	51.47	39.99	48.04		53.36	25.09	25.94	59.50	36.16	43.41	38.62
	LOS	D	D	D	D	D		D	C	C	E	D	D	D
	95% Queue (m)	36.29	78.31	75.54	68.44	73.19		144.7	103.36	108.70	83.84	113.07	124.97	-
102A Avenue / 150 Street (Signalized)	v/c Ratio	0.50	0.33	0.33	0.20	0.22	0.23	0.21	0.39		0.61	0.29		-
	Delay (s/veh)	20.86	13.08	13.13	19.33	12.32	12.44	19.05	14.27		26.11	13.50		16.15
	LOS	C	B	B	B	B	B	B	B		C	B		B
	95% Queue (m)	35.87	30.30	28.14	10.93	19.21	17.49	13.83	32.01		42.69	23.42		-
101 Avenue / 150 Street (Signalized)	v/c Ratio	-	0.34	0.37	0.38	0.40	-	-	-	-	0.48	-	0.67	-
	Delay (s/veh)	-	6.48	6.65	7.08	6.84	-	-	-	-	17.82	-	20.54	9.66
	LOS	-	A	A	A	A	-	-	-	-	B	-	C	A
	95% Queue (m)	-	19.27	19.73	13.33	21.53	-	-	-	-	22.00	-	30.23	-
100 Avenue / 150 Street (Signalized)	v/c Ratio	-	-	-	0.74	-	0.87	0.79	0.45	-	-	0.89	0.97	-
	Delay (s/veh)	-	-	-	32.99	-	42.44	35.74	9.42	-	-	33.85	47.62	30.65
	LOS	-	-	-	C	-	D	D	A	-	-	C	D	C
	95% Queue (m)	-	-	-	82.68	-	97.19	58.67	57.69	-	-	153.60	180.74	-
108 Avenue (Guildford Drive) / 152 Street (Signalized)	v/c Ratio	0.68	0.86	0.08	1.03	0.41	0.68	0.79	0.06	0.01	0.01	0.72	0.87	-
	Delay (s/veh)	65.35	36.52	25.46	101.94	21.25	25.62	50.82	22.40	22.00	36.81	41.42	53.57	38.12
	LOS	E	D	C	F	C	C	D	C	C	D	D	D	D
	95% Queue (m)	24.37	133.72	9.39	133.83	68.47	102.44	59.58	8.49	1.13	0.30	86.56	105.06	-
105 Avenue / 152 Street (Signalized)	v/c Ratio	0.77	0.54	0.54	0.24	0.55	0.56	0.89	0.64	0.35	0.85	0.10		-
	Delay (s/veh)	66.08	34.73	35.88	36.99	36.33	38.44	46.98	32.90	32.90	22.17	54.44	40.08	39.49
	LOS	E	C	D	D	D	D	D	C	C	C	D	D	D
	95% Queue (m)	36.26	91.66	97.18	9.57	90.94	91.10	126.7	117.08	34.35	110.40	10.44		-
104 Avenue / 152 Street (Signalized)	v/c Ratio	0.73	0.51	0.52	0.26	0.50	0.39	0.69	0.67	0.67	0.63	0.57	0.57	-
	Delay (s/veh)	79.38	37.45	38.70	58.94	38.89	12.50	54.80	36.33	39.76	67.19	38.84	40.27	39.15
	LOS	E	D	D	E	D	B	D	D	D	E	D	D	D
	95% Queue (m)	64.16	81.23	85.39	12.74	70.03	66.45	69.30	117.12	112.18	54.00	91.56	97.63	-
102A Avenue / 152 Street (Signalized)	v/c Ratio	0.57	0.82	0.70	1.16	0.60	0.61	0.16	0.85		0.16	0.11		-
	Delay (s/veh)	28.39	29.04	19.37	121.83	22.35	25.41	12.49	31.70		12.33	19.22		33.35
	LOS	C	C	B	F	C	C	B	C		B	B		C
	95% Queue (m)	18.79	58.10	70.72	119.55	45.21	49.78	12.76	55.70		11.95	5.65		-
101 Avenue / 152 Street (Signalized)	v/c Ratio	0.84	0.68	0.69	0.67	0.39	0.40	0.60	0.11	0.38	0.49	0.11	0.57	-
	Delay (s/veh)	55.99	29.01	31.15	58.81	22.32	22.84	54.24	42.29	27.68	39.11	33.74	31.87	31.17
	LOS	E	C	C	E	C	C	D	D	C	D	C	C	C
	95% Queue (m)	85.50	136.76	138.64	17.71	75.44	77.92	57.16	11.54	62.94	72.73	16.65	30.33	-

Full Buildout with Road Widening + Improvements Scenario – PM Peak Hour														
Intersection	Attribute	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Overall
100 Avenue / 152 Street (Signalized)	v/c Ratio	0.92	0.81	0.81	0.88	0.79	0.79	0.86	0.77	0.38	0.57	0.90	0.33	-
	Delay (s/veh)	70.68	42.27	46.47	73.68	47.02	52.37	53.57	42.54	18.77	30.90	47.46	22.48	45.18
	LOS	E	D	D	E	D	D	D	D	B	C	D	C	D
	95% Queue (m)	133.82	149.74	157.52	90.00	125.29	127.64	97.10	113.06	68.48	59.50	135.91	57.98	-
102A Avenue / 153 Street (Two-way stop)	v/c Ratio	0.01	-	0.10	-	-	-	-	0.00	0.00	0.03	0.00	-	-
	Delay (s/veh)	13.43	-	11.64	-	-	-	-	0.00	0.00	8.38	0.00	-	1.60
	LOS	B	-	B	-	-	-	-	A	A	A	A	-	B
	95% Queue (m)	2.85	-	2.85	-	-	-	-	0.00	0.00	0.62	0.62	-	-
101 Avenue / 153 Street (All-way stop)	v/c Ratio	-	-	-	0.34	-	0.34	0.28		-	-	0.22		-
	Delay (s/veh)	-	-	-	9.82	-	9.82	9.90		-	-	8.60		9.50
	LOS	-	-	-	A	-	A	A		-	-	A		A
	95% Queue (m)	-	-	-	11.42	-	11.42	8.88		-	-	6.52		-
105 Avenue / 154 Street (Signalized)	v/c Ratio	0.38	0.42	0.42	0.04	0.62	0.63	0.13	0.58		0.15	0.16		-
	Delay (s/veh)	7.23	7.07	7.08	18.43	15.76	15.91	16.31	16.51		20.10	13.77		11.23
	LOS	A	A	A	B	B	B	B	B		C	B		B
	95% Queue (m)	15.47	22.59	22.27	0.95	31.91	29.84	5.45	25.61		4.55	6.13		-
104 Avenue / 154 Street (Signalized)	v/c Ratio	0.25	0.57	0.57	0.74	0.31	0.31	0.52	0.50	0.50	0.87	0.56	0.91	-
	Delay (s/veh)	24.43	37.76	37.91	34.30	31.78	31.86	60.35	34.02	35.54	58.93	27.97	51.06	37.22
	LOS	C	D	D	C	C	C	E	C	D	E	C	D	D
	95% Queue (m)	33.45	93.29	88.70	82.88	54.10	50.03	17.90	83.74	87.79	84.82	105.51	196.92	-
102A Avenue / 154 Street (Signalized)	v/c Ratio	0.31	0.50		0.00	0.45	0.44	0.64	0.38		0.00	0.00		-
	Delay (s/veh)	18.03	13.00		0.00	12.64	12.71	14.19	9.41		0.00	0.00		12.98
	LOS	B	B		A	B	B	B	A		A	A		B
	95% Queue (m)	13.10	29.72		0.00	26.44	22.27	47.63	19.57		0.00	0.00		-
101 Avenue / 154 Street (Two-way stop)	v/c Ratio	0.13	0.01	-	-	0.00	0.00	0.09	-	0.14	-	-	-	-
	Delay (s/veh)	8.61	0.00	-	-	0.00	0.00	27.90	-	12.91	-	-	-	2.37
	LOS	A	A	-	-	A	A	D	-	B	-	-	-	D
	95% Queue (m)	3.26	0.00	-	-	0.00	0.00	6.82	-	6.82	-	-	-	-
100 Avenue / 154 Street (Signalized)	v/c Ratio	0.37	0.39		0.41	0.32		0.34	0.47	0.47	0.35	0.74	0.79	-
	Delay (s/veh)	41.66	32.91		23.19	21.24		16.64	14.31	14.59	32.00	23.93	28.44	22.35
	LOS	D	C		C	C		B	B	B	C	C	C	C
	95% Queue (m)	18.78	31.66		55.73	37.84		19.64	69.60	69.92	19.64	103.75	108.77	-
105A Avenue / 156 Street (Signalized)	v/c Ratio	0.40	0.54	-	-	0.56	0.57	0.42	-	0.42	-	-	-	-
	Delay (s/veh)	3.48	3.93	-	-	3.96	3.99	20.49	-	20.49	-	-	-	3.98
	LOS	A	A	-	-	A	A	C	-	C	-	-	-	A
	95% Queue (m)	5.65	1.77	-	-	1.89	1.93	1.57	-	1.57	-	-	-	-
104 Avenue / 156 Street (Signalized)	v/c Ratio	0.43	0.56	0.56	0.09	0.37	0.81	0.65	0.46	0.46	0.90	0.68	0.68	-
	Delay (s/veh)	35.02	35.45	35.64	54.40	40.07	29.35	38.46	30.62	31.50	54.64	43.70	46.47	37.39
	LOS	D	D	D	D	D	C	D	C	C	D	D	D	D
	95% Queue (m)	57.95	96.20	86.95	3.74	49.65	185.26	104.18	82.37	84.60	116.89	105.30	110.33	-
100 Avenue / 156 Street (Signalized)	v/c Ratio	0.79	0.34	0.35	0.18	0.40	0.46	0.85	0.54	0.17	0.14	0.87	0.87	-
	Delay (s/veh)	42.45	33.33	33.34	23.85	39.20	23.84	43.23	19.09	14.39	47.10	44.84	44.92	35.41
	LOS	D	C	C	C	D	C	D	B	B	D	D	D	D
	95% Queue (m)	123.59	54.52	53.71	18.25	49.72	78.43	102.49	105.85	25.80	8.03	152.08	149.72	-
104 Avenue / 157 Street (Signalized)	v/c Ratio	-	-	-	0.49	-	0.49	0.09	0.25	-	-	0.37	0.36	-
	Delay (s/veh)	-	-	-	42.20	-	42.20	2.99	2.87	-	-	6.50	6.77	6.02
	LOS	-	-	-	D	-	D	A	A	-	-	A	A	A
	95% Queue (m)	-	-	-	21.20	-	21.20	1.65	14.96	-	-	42.90	44.13	-

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