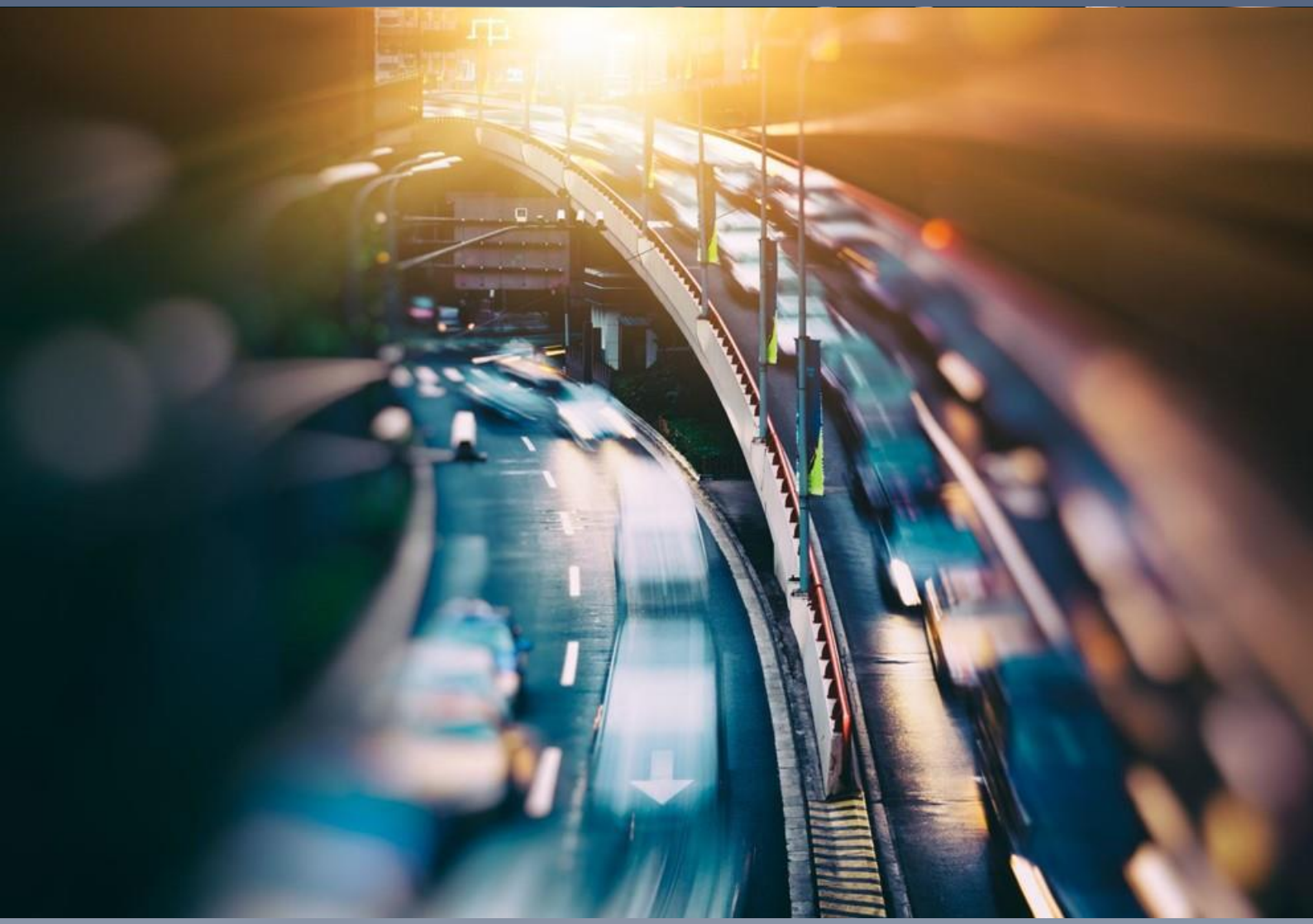
Campsie Stage 1 Analysis

Strategic Transport Modelling Assessment
Final Report



Prepared by: Stantec Australia Pty Ltd for Canterbury-Bankstown City Council
on 15/02/2022
Reference: N205150
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1. INTRODUCTION

1.1. Background

Canterbury-Bankstown City Council (Council) has developed a draft Local Strategic Planning Statement, Connective City 2036 (September 2019) that recognises Southwest Metro Project as a catalyst for growth within the Campsie Town Centre. Campsie is located on the banks of the Cooks River and is located approximately 13 kilometres south-west of Sydney.

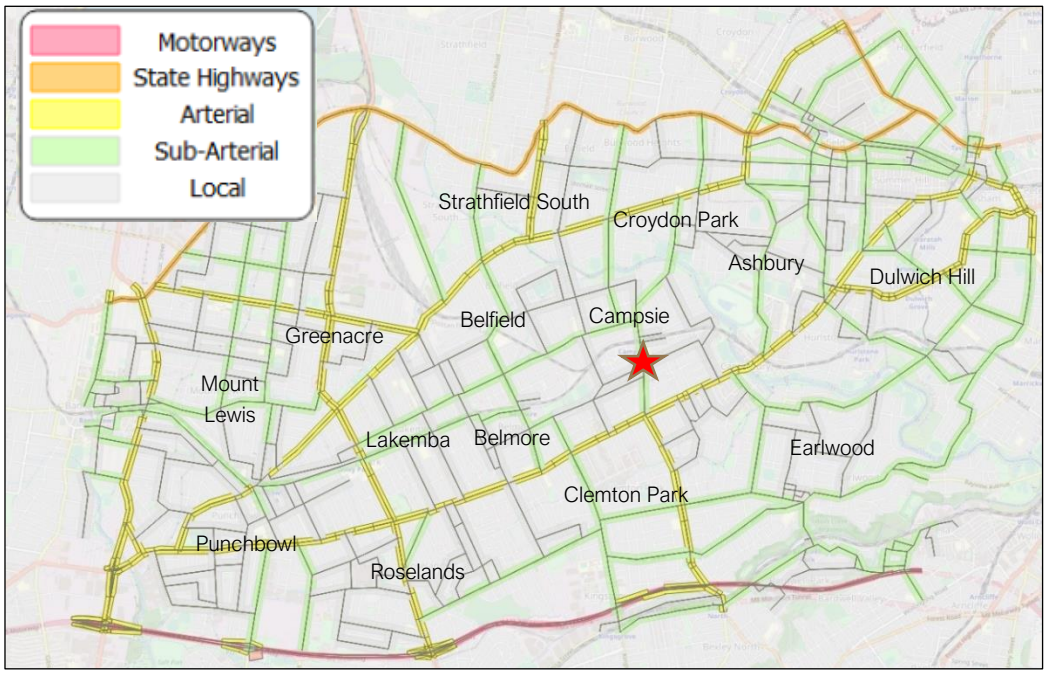
Beamish Street functions as a spine road that runs north south through the Campsie Town Centre providing a key connection between the town centre, Campsie train station and key arterial roads such as King Georges Road in the north and Canterbury Road in the south. Majority of the development such as small retailers, food outlets and other various small businesses are concentrated on either side of Beamish Street.

Council is in the process of developing a masterplan that focuses on capitalising this opportunity and recognises the presence of the hospital and embrace its unique position next to the river to create a health and lifestyle hub.

A Transport and Parking Study is currently being undertaken for the Campsie masterplan. A robust traffic model is required to assess the impacts of the land use uplift on the existing network and to develop mitigation strategies to accommodate the expected growth. The model development is being undertaken in two stages as follows:

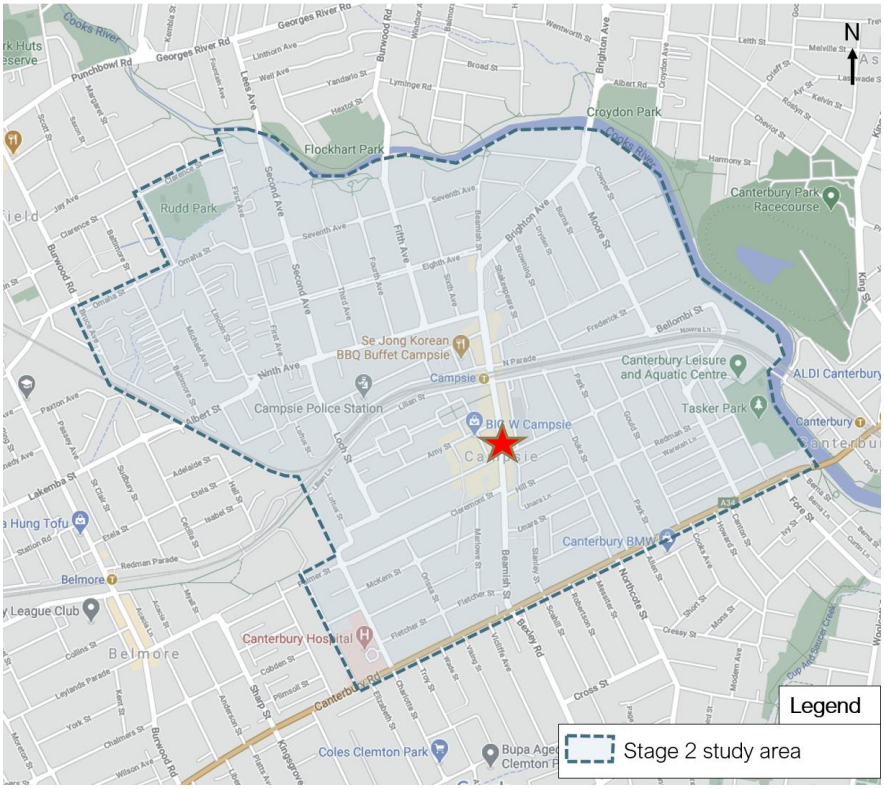
- Stage 1 – *strategic transport modelling* utilising a sub-area of the metropolitan wide Strategic Traffic Forecasting Model (STFM) to enable a high-level assessment of the forecast growth on the strategic transport network within and surrounding Campsie (as shown in Figure 1.1).
- Stage 2 – *detailed traffic modelling* using the Aimsun model program – a mesoscopic model for the Campsie precinct for a more detailed level of assessment of the forecast growth on the transport network in the Campsie precinct (as shown in Figure 1.2). Following on the completion of Stage 1 model, the Stage 2 model will assess detailed impacts of the proposed uplift within the Campsie town centre.

Figure 1.1: Stage 1 STFM Strategic Modelling Study Area



Base map source: OpenStreetMap

Figure 1.2: Stage 2 Aimsun Mesoscopic Modelling Study Area



Base map source: Google Maps

1.2. Purpose of this Report

In order to better understand what some of the transport challenges might be as a result of the expected growth and understanding the need to develop a coordinated response to them, scenario testing through the use of a strategic transport modelling platform has been undertaken. The STFM outputs have been analysed to understand the key network issues and constraints and an alternative north- south route (alternative to Beamish Street) has been assessed.

The purpose of this report is to present and interrogate the key findings of the existing and future Stage 1 STFM results. It is noted that the modelling activities and outputs presented in this report have been prepared in an effort to aid Council with their understanding of the broad network performance as a result of the expected population growth and transport network arrangements in the agreed future years (2026 and 2036).

2. MODEL DEVELOPMENT

2.1. Strategic Modelling

As part of this project, strategic transport modelling has been used to understand how Campsie functions now and in the future with consideration of the broader context it sits within.

The traditional approach to strategic transport modelling is undertaken through the following four-step process, noting they are iterative and there are feedback loops within the process:

- *Trip Generation* – how many users are travelling
- *Trip Distribution* – where users are travelling to and from
- *Mode Choice* – what form of transport users choose to make a trip
- *Route Assignment* – what routes users take.

The four-step model provides the fundamental basis for insights into future transport patterns.

2.1.1. Strategic Traffic Forecasting Model (STFM)

The strategic transport modelling investigations have been completed using the State-wide Strategic Traffic Forecasting Model (STFM) that is developed and maintained by Transport for NSW (TfNSW) and is used to project travel patterns in the Greater Metropolitan Area of Sydney under different land use, transport, and pricing scenarios. Outputs are available at five-year intervals from the latest Census year up to a 30-year horizon.

The Travel Zone Projections 2019 (TZP19) are developed by TfNSW and are an input into the STFM, allowing it to take into consideration population and employment growth expected in the future.

2.1.2. Model Limitations

It is important to note that the model is based on mathematical modelling, which provides a simplification of travel behaviour. The main limitations in using this strategic model are as follows:

- Level of detail – strategic models cannot model detailed characteristics of traffic behaviour, such as lane changing, queuing, signal timings or other operational aspects. Detail in land use and demographics are also lost in the aggregation of zones.
- Accuracy of input assumptions – strategic models require inputs relating to land use and the road network and cannot produce outputs that are more accurate than the data used. For example, population, employment, and enrolment numbers are all inputs into the model for the trip generation component of the model.
- Estimation of real-world behaviours – the model relies on mathematical modelling which aims to estimate real world behaviours. However, it does not consider other factors that influence travel behaviour such as user perception and driver awareness.

2.1.3. Model Version

STFM Model has been developed in EMME version 4.

2.1.4. Calibration and Validation

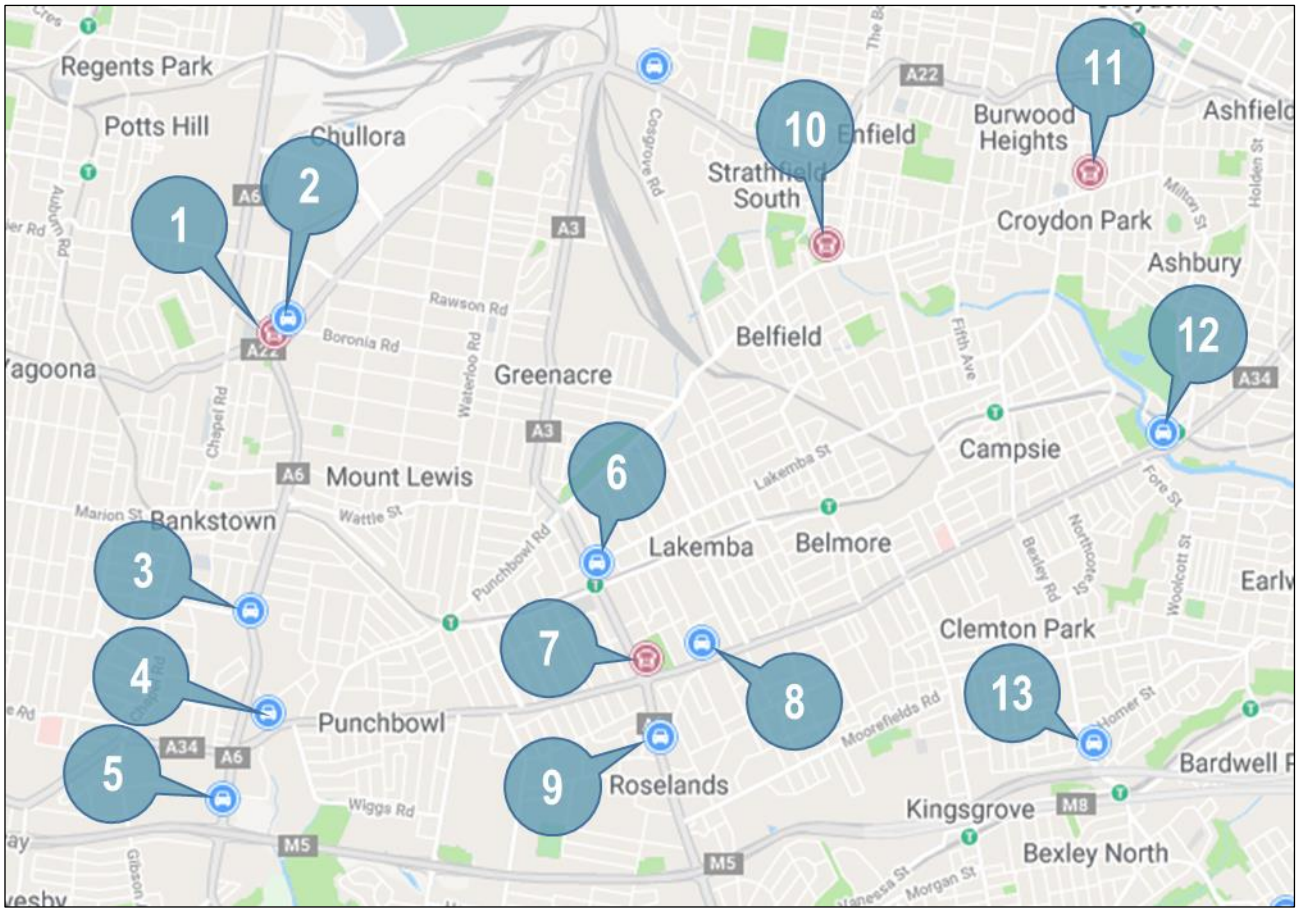
The purpose of this strategic assessment is to understand the key issues and congestion areas for existing and future traffic conditions, and to estimate any relative differences in network operations. Detailed assessment will be carried out in Stage 2- mesoscopic model.

A high-level check was conducted, comparing historical volume data for year 2018 from the TfNSW (RMS) Traffic Volume Viewer (permanent count stations), and modelled volumes in STFM at 13 locations as presented in Figure 2.1 and Table 2.1.

It is noted that year 2018 was selected as this year had data available for higher number of locations. It is also acknowledged that one key major infrastructure project (M4 east, part of WestConnex works) opened in July 2019 that may have some impacts on the traffic volumes.

To inform this stage of the strategic assessment, upper-level checks of traffic volumes were carried out to establish if the model was fit for purpose. Calibration and validation will be carried out for Stage 2 modelling.

Figure 2.1: RMS Traffic Volume Viewer Locations



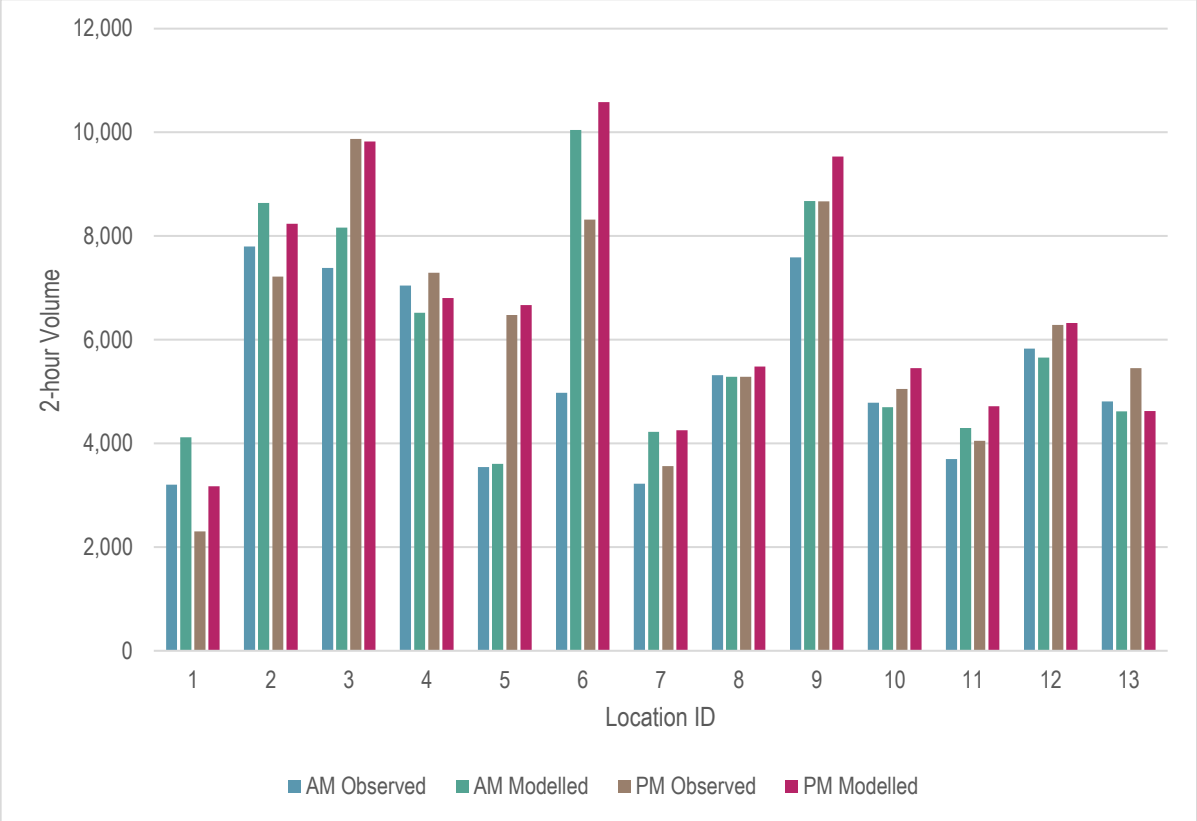
Base map source: RMS Traffic Volume Viewer

Table 2.1: RMS Traffic Volume Viewer Locations

ID	Location
1	Stacey Street, 20 m south of Hume Highway
2	Hume Highway, 70m east of Stacey Street
3	Fairford Road, 70m south of Aster Avenue
4	Canterbury Road, 70 m west of Fairford Road
5	Fairford Road, 110 m north of South Western Motorway
6	King Georges Road, 40m north of The Boulevard
7	King Georges Road, 40m north of The Boulevard
8	Canterbury Road, 30 m west of Sproule Street
9	King Georges Road, 30m north of Roseland Avenue
10	Punchbowl Road, 90m east of Margaret Street
11	Georges River Road, 10m west of Croydon Avenue
12	Canterbury Road, 90 m west of Charles Street
13	Bexley Road, 60 m north of South Western Motorway

The comparison between historical volume data and modelled volumes and is presented in Figure 2.2.

Figure 2.2: Observed vs Modelled Two-hour Traffic Volumes.



In general, the modelled counts are a good match to the permanent count station counts except for Site 6 (King Georges Road, 40m north of The Boulevard), Site 7 (King Georges Road, 40m north of Canterbury Road) and Site 9 (King Georges Road, 30m north of Roseland Avenue). It is noted that model is estimating higher traffic at King Georges Road than what has been estimated at the permanent count locations.

As acknowledged above, the opening of M4 East may have had some impacts to traffic demand. As the model is generally estimating higher traffic volumes when compared to the permanent count station volumes, it is considered that the model is fit to assess any relative impacts. Therefore, the model was considered fit for purpose and no adjustments were made to the existing demands.

2.2. Baseline Conditions

2.2.1. Overview

The following inputs are required by the STFM in order to forecast traffic demand:

- Demographics and Land Use
- Road Network Assumptions.

This section of the report outlines the above key inputs used in the base case model runs (i.e., Business as Usual) for the years 2019, 2026 and 2036. It also provides a number of key measures of how the transport network currently performs and how it will perform in the future under a Business as Usual or Do Nothing scenarios. An alternative route towards west Campsie (Option 1) has also been assessed for future traffic conditions. As summary of all scenarios assessed are presented in Table 2.2.

Table 2.2: STFM Scenarios

#	Scenario Name	Description
1	Existing 2019	2019 traffic demands and network
2	2026 and 2036 Do Nothing	2026 and 2036 traffic demand based on population and employment forecasts. Network upgrades include all approved and funded projects.
3	2026 and 2036 Option 1	Same as Do Nothing scenario but with the inclusion of an alternative route towards west of the Campsie town centre

2.2.2. Demographics and Land Use

Table 2.3 shows the anticipated population and employment growth in the Stage 1 STFM study area based on Travel Zone Projections 2019 (TZP19).

Table 2.3: Population and Employment Projections in Stage 1 STFM Study Area

Projection	2019[1]	2026	2036
Population	296,638	339,783	370,846
% Difference in Population (vs 2019)		+15% (2.1 % pa)	+25% total (1.5% pa)
Employment	71,013	80,266	90,712
% Difference in Employment (vs 2019)		+13% (1.9% pa)	+28% total (1.6% pa)

Data source: Transport for New South Wales (TfNSW), Travel Zone Explorer Visualisation

2019 has been interpolated from 2016 and 2021 data

Population and employment within the broader Stage 1 STFM study area are expected to increase at a rate of approximately 1.5% to 2.1% per annum. The population is expected to increase by 25% by year 2036, while the employment is expected to increase by 28% by year 2036.

More specifically, Table 2.3 shows the anticipated population and employment growth in the Stage 2 study area based on Travel Zone Projections 2019 (TZP19).

Table 2.4: Population and Employment Projections in Stage 2 STFM Study Area

Projection	2016[1]	2036	Difference vs 2016
Population	28,636	38,598	9,962 +35% total (1.7 % pa)
Employment	6,616	9,378	2,762 +42% total (2.1% pa)

Population and employment within the Stage 2 study area are expected to increase at a rate of approximately 1.7% to 2.1% per annum. The population is expected to increase by 35% by year 2036, while the employment is expected to increase by 42% by year 2036.

The Campsie City Centre Masterplan (masterplan) estimates for additional population and employment by 2036 are show in Table 2.5

Table 2.5: Campsie Masterplan Population and Employment Projections

Projection	2016[1]	2036	Difference vs 2016
Population	24,500	39,300	14,800 +60% total (3.0 % pa)
Employment	4,800	7,500	2,700 +56% total (2.8% pa)

Based on the masterplan (2016) estimates for residents and jobs, the masterplan estimates an increase of 3% per annum in residents and 2.8% per annum increase in employment.

As mentioned in the masterplan, the draft local Housing Strategy (2019) identifies that approximately 11% of the total housing targets within the Canterbury-Bankstown LGA are expected to be delivered within the Campsie Town Centre. Therefore, a higher growth in dwellings and employment as compared to area wide average is expected within the Campsie Town Centre.

It is noted that there is a difference in the 2036 forecasts for population with the masterplan estimating an additional 702 residents and 1,878 fewer jobs in comparison to the Stage 2 STFM study area.

However, when comparing the overall difference in growth between the STFM Stage 2 area and the masterplan a larger discrepancy of 4,838 more residents is expected in the masterplan. Employment is more comparable with a difference of only 62 jobs.

The discrepancy in the 2036 figures can be contributed to the following factors:

- The Common Planning Assumptions used in the STFM have not been updated to factor in known land-use developments underway or planned and strategic plans of Council,

- The Master Plan figures are housing and job targets that came from Councils Local Strategic Planning Statement. The uplift proposed in the Master Plan allows for the housing and job targets to be met.
- There are slight differences in the zones used within the STFM model vs the Master Plan study area which can contribute to different areas for intensification.

To determine whether the difference would generate a significant amount of traffic, reference was made to the Household Travel Survey Data for the whole of Campsie. This data, seen in Figure 2.3, and Table 2.6, identifies that 62% of residents travelled via modes of transport other than private vehicle as driver.

Figure 2.3: Household Travel Survey data area

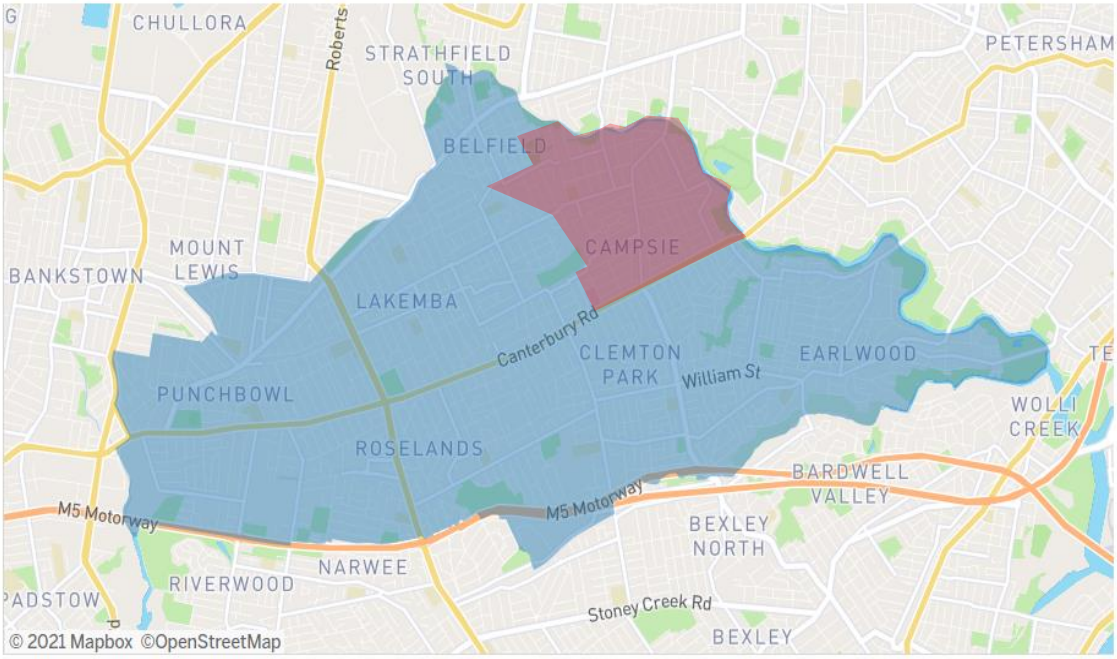


Table 2.6: Household Travel Survey Results

Mode	No. of Trips	% of Total Trips	Mode Share %
Vehicle Driver	237K	38.3%	46.5%
Vehicle Passenger	134K	21.7%	26.3%
Train	37K	5.9%	7.2%
Bus	27K	4.3%	5.2%
Walk Only	72K	11.7%	14.1%
Walk Linked	108K	17.5%	N/A
Other	4K	0.6%	0.7%

When considering that each resident typically generates 2-3 trips per day (a general rule of thumb guideline adopted for this comparison), the additional residential population estimated in the masterplan would generate to approximately 5,515 additional trips per day (4,838 more residents X 3 trips/day X 38% of private vehicle trips). When considering a peak to daily ratio of 10%, this means that there is a chance that the 2036 model demands may be approximately 551veh/h higher than anticipated.

However, because the end residential population projections for the TZP is aligned with the Masterplan i.e., within 700 people or 80veh/h (700 more residents x 3 trips/day X 38% of private trips X 10% peak to daily ration) the demands included in the 2036 model from residential population are considered to represent the anticipated 2036 demands. Furthermore, it is noted that the overall volume increases on roads or at intersections are not of a significant nature to change the outcomes and recommendations of the study discussed in the body of this report.

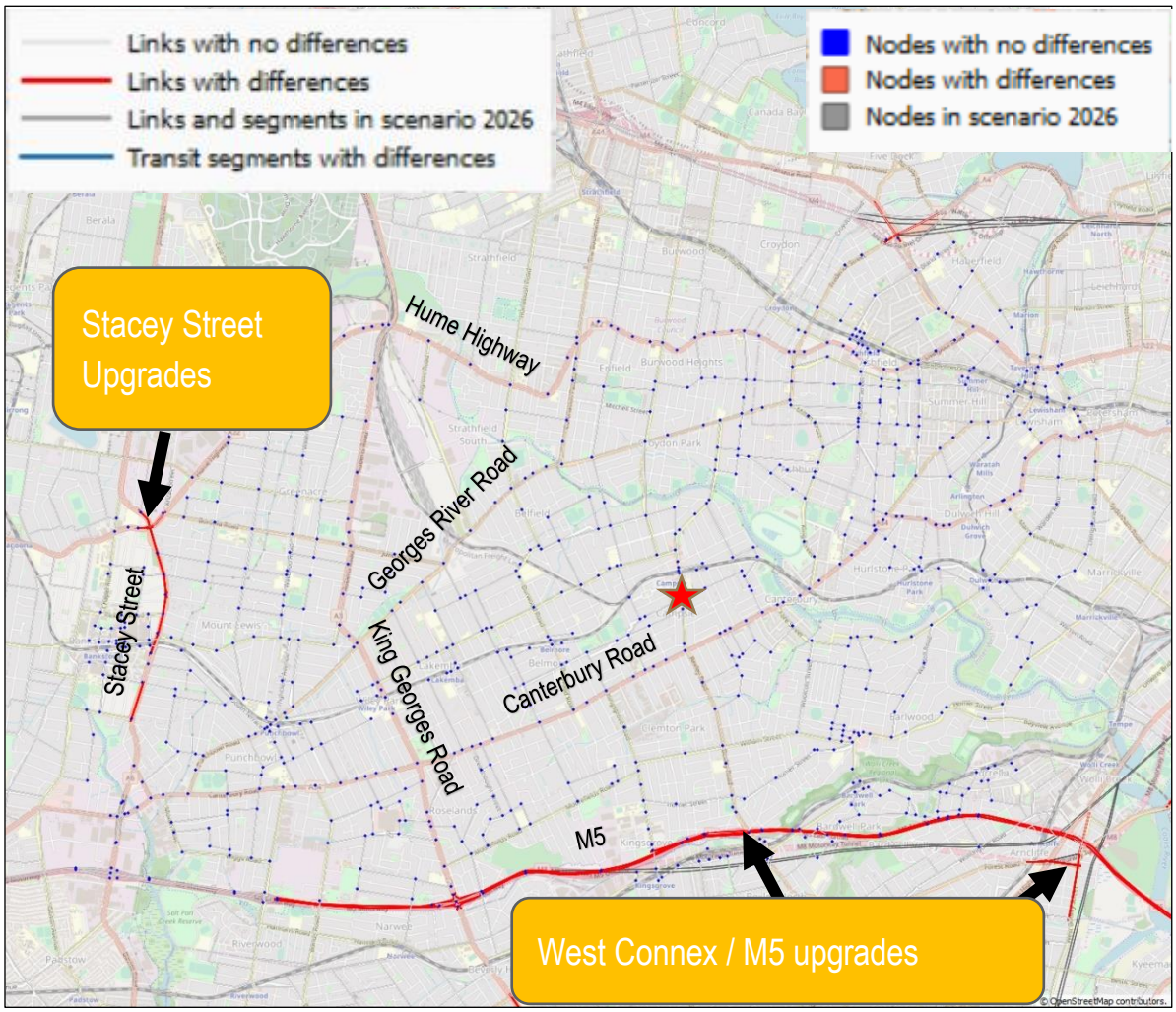
2.2.3. Road Network Assumptions

Existing Road Hierarchy is presented in Figure 1.1. The future Road network is assumed to be the same as existing (2019) except for the road network upgrades outlined in Table 2.7. These upgrades are also presented in Figure 2.4 and Figure 2.5 for year 2026 and 2036 respectively.

Table 2.7: Future Road Network Assumptions

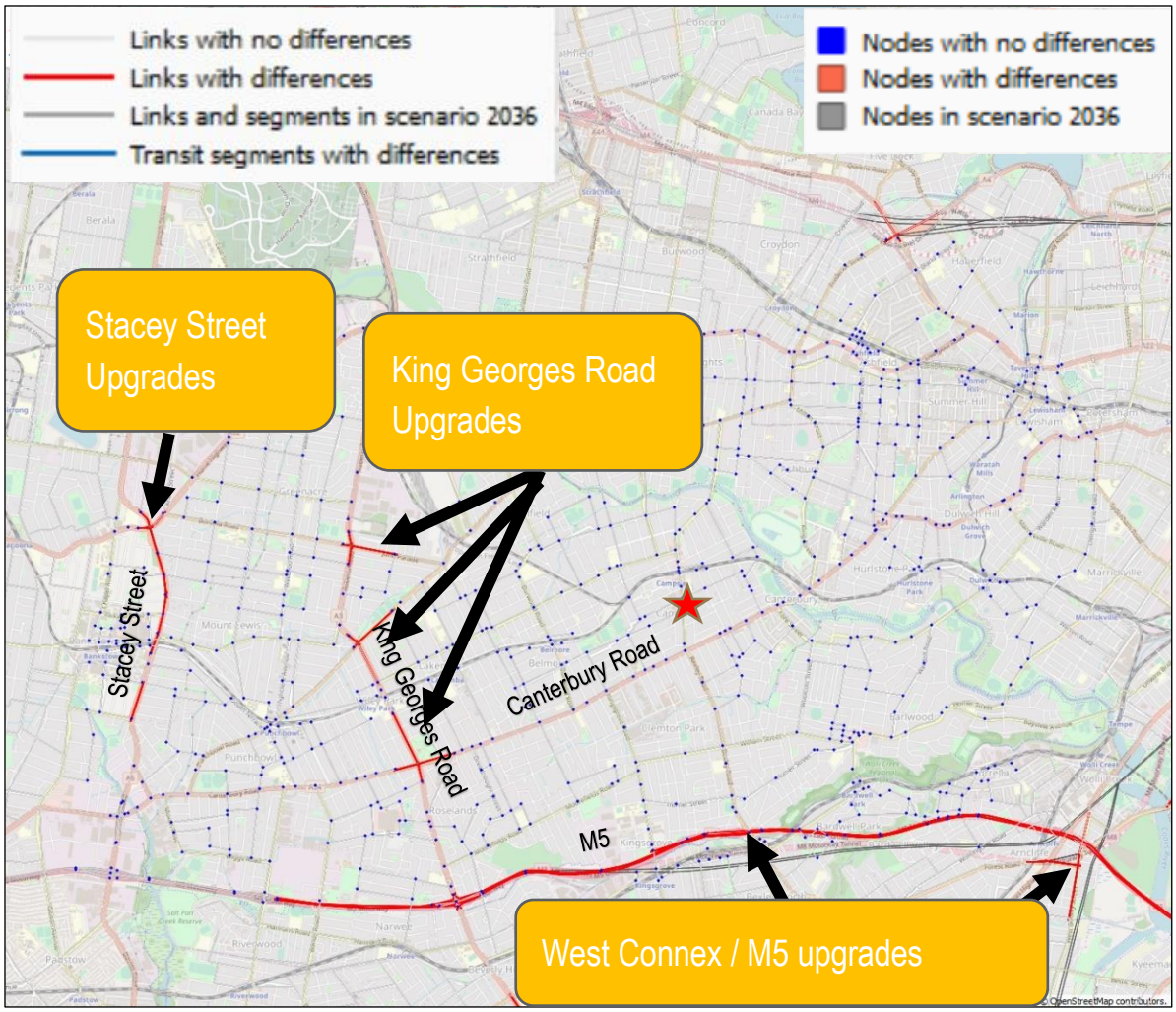
#	Description of Upgrades	2019	2026	2036
1	Stacey Street Upgrades	-	✓	✓
2	West Connex and M5 upgrades	-	✓	✓
3	King Georges Road Upgrades	-	-	✓

Figure 2.4: 2026 Road Network Upgrades (vs 2019)



Base map source: OpenStreetMap

Figure 2.5: 2036 Road Network Upgrades (vs 2019)



Base map source: OpenStreetMap

Stacey Street Upgrades

It is understood that Stacey Street has recently been upgraded between Macauley Avenue and Stanley Street. Construction works have started for stage two upgrades. The following upgrades are proposed under stage two[1]:

- building an additional northbound lane on Stacey Street, between Macauley Avenue and Stanley Street
- providing dual right turn lanes from Macauley Avenue onto Fairford Street as well as a dedicated bus right turn lane
- installing a new lane on Fairford Road which when complete will have three northbound lanes and a dedicated left turn lane at the intersection of Macauley Avenue
- moving the pedestrian crossing across Stacey Street to the other side of Macauley Avenue to improve pedestrian safety and traffic flow
- installing new pedestrian crossing lights at Salvia Avenue, near Stacey Street.

[1] https://www.rms.nsw.gov.au/projects/stacey-fairford-bankstown/index.html

- extending the right turn bay on Stacey Street so more motorists can queue to safely turn right into Stanley Street.

King Georges Road Upgrade

Proposed upgrades include the following:

- widening Canterbury Road on both the eastern and western approaches to provide additional right turn lanes to King Georges Road
- changing the existing dual left turn signalised slip lanes on Canterbury Road for vehicles turning into King Georges Road to a single give way slip lane
- realigning of the left turn slip lanes on Canterbury Road in both directions to provide better vision for motorists preparing to turn left.

WestConnex

The M8 tunnels will connect to upgraded local roads at St Peters, including two new bridges over Alexandra Canal, as well as the M5 corridor. In the future connections with M4-M5 Link (WestConnex Stage 3A), Sydney Gateway to the airport and the M6 to southern Sydney are proposed. It is noted that the M8 tunnels opened in 2020 and were not included in the 2019 STFM network assumptions.

2.3. Road Network Performance

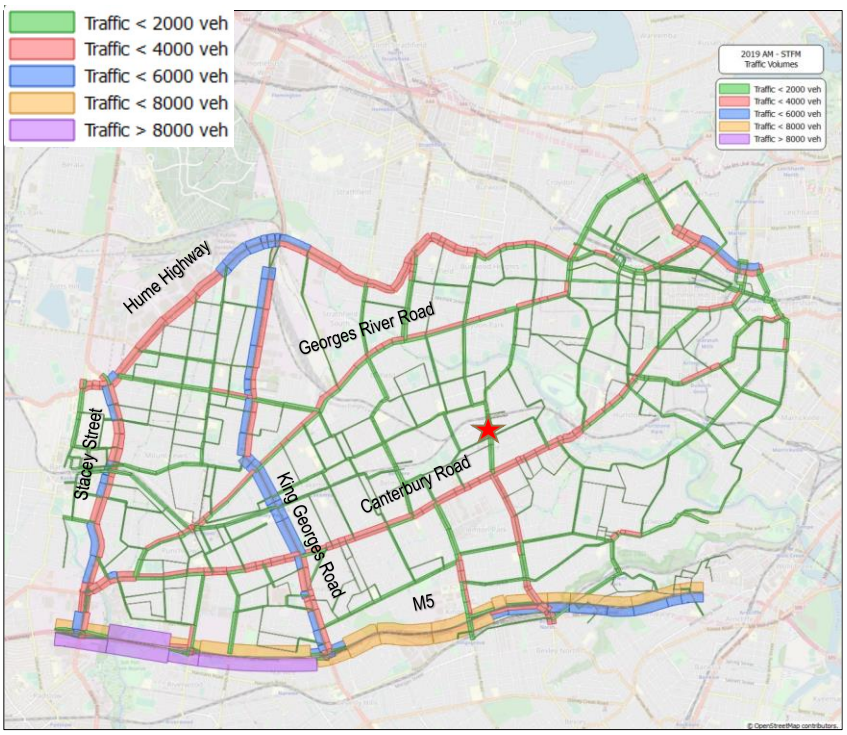
The performance of the existing network and the future Do Nothing networks have been assessed based on the following:

- Road Network Volume Plots
- Volume/ Capacity (V/ C plots) i.e., the ratio between the traffic demand and the capacity of the road. A ratio closer to one indicates that the road is operating near capacity
- Vehicle Kilometres Travelled (VKT) i.e., the total distance travelled by all vehicles within the network
- Vehicle Hours Travelled (VHT) i.e., the time taken by all vehicles to travel from their origin to their destination.

2.3.1. Road Network Volume Plots

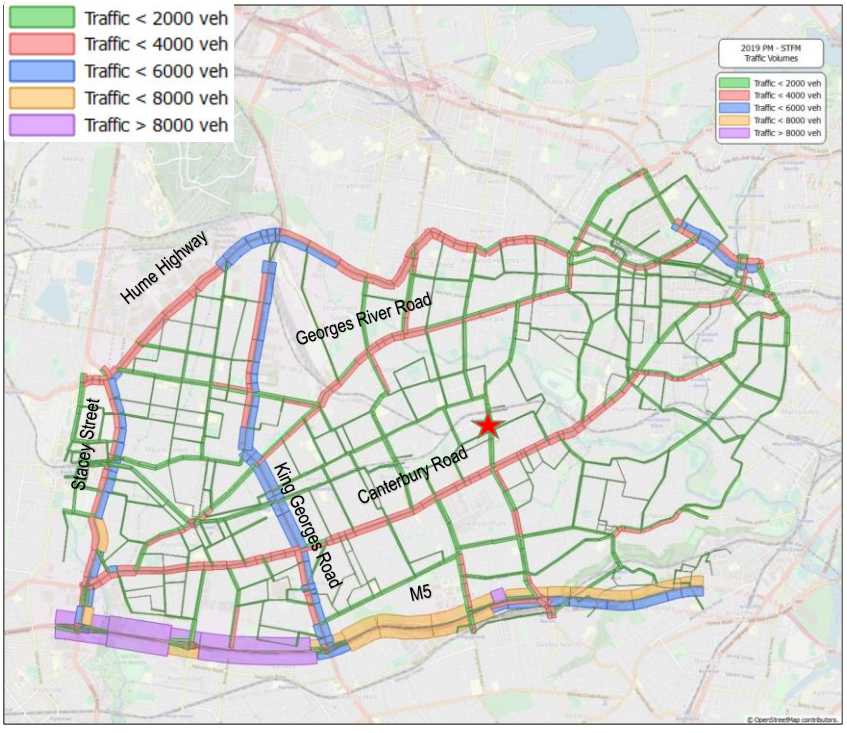
Traffic volume plots for existing year (2019) are presented in Figure 2.6 and Figure 2.7 for AM (7:00am to 9:00am) and PM (4:00pm to 6:00pm) peak periods, respectively.

Figure 2.6: 2019 Traffic Volumes – AM Peak



Base map source: OpenStreetMap

Figure 2.7: 2019 Traffic Volumes – PM Peak



Base map source: OpenStreetMap

The volume plots indicate the following:

- Key arterial Roads and motorways carry between 6,000 to 8,000 vehicles in the peak periods. These include the M5 motorway and King Georges Road.
- Stacey Street, Georges River Road, Hume Highway and Canterbury Road carry between 4,000 to 6,000 vehicles during the peak periods.

As a way of comparison, the traffic volume plots for 2019, 2026 and 2036 are presented in Figure 2.8 and Figure 2.9 for AM and PM peak periods, respectively.

Figure 2.8: Traffic Volume Plots - AM Peak Period (7:00am – 9:00am)

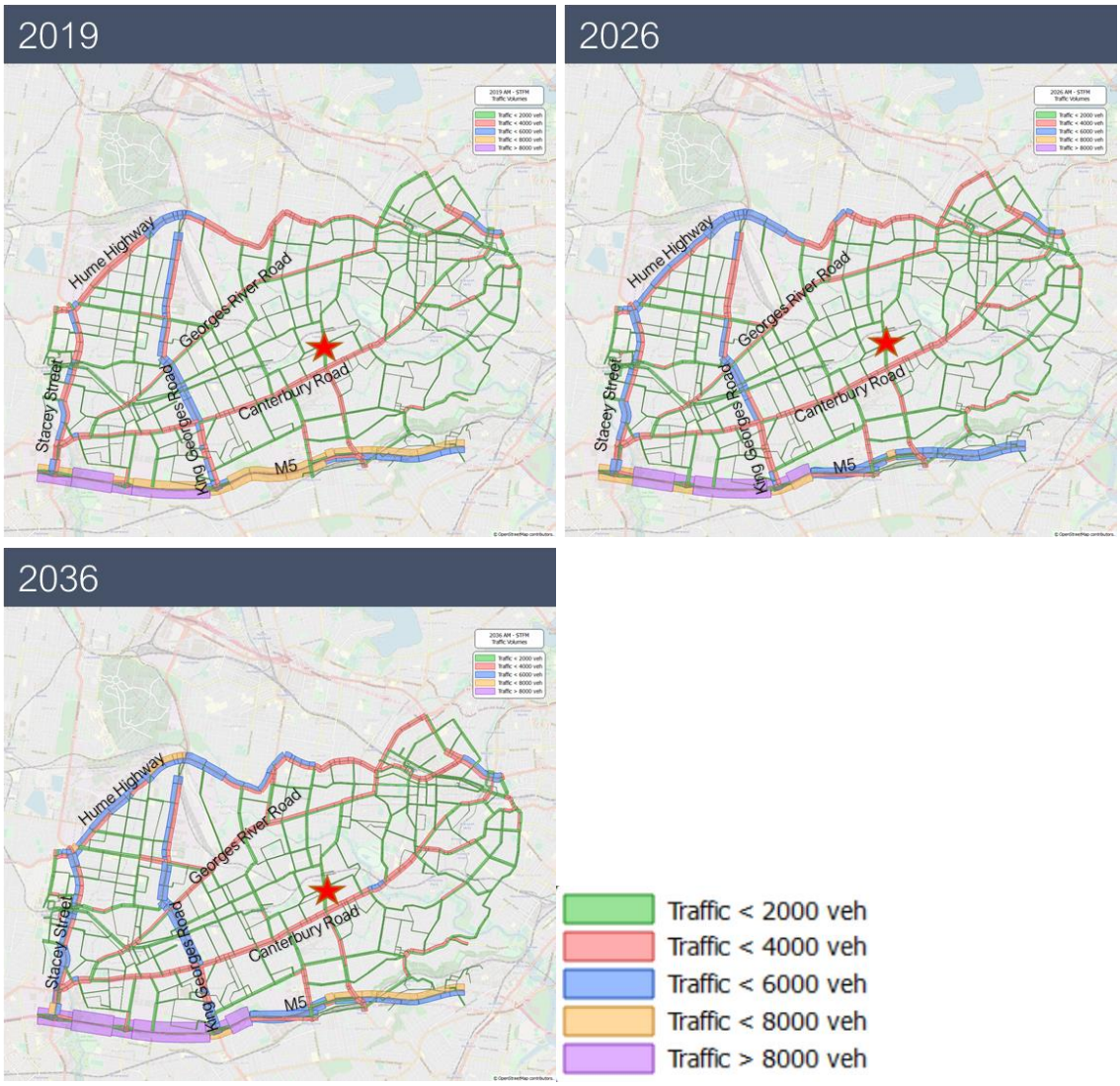
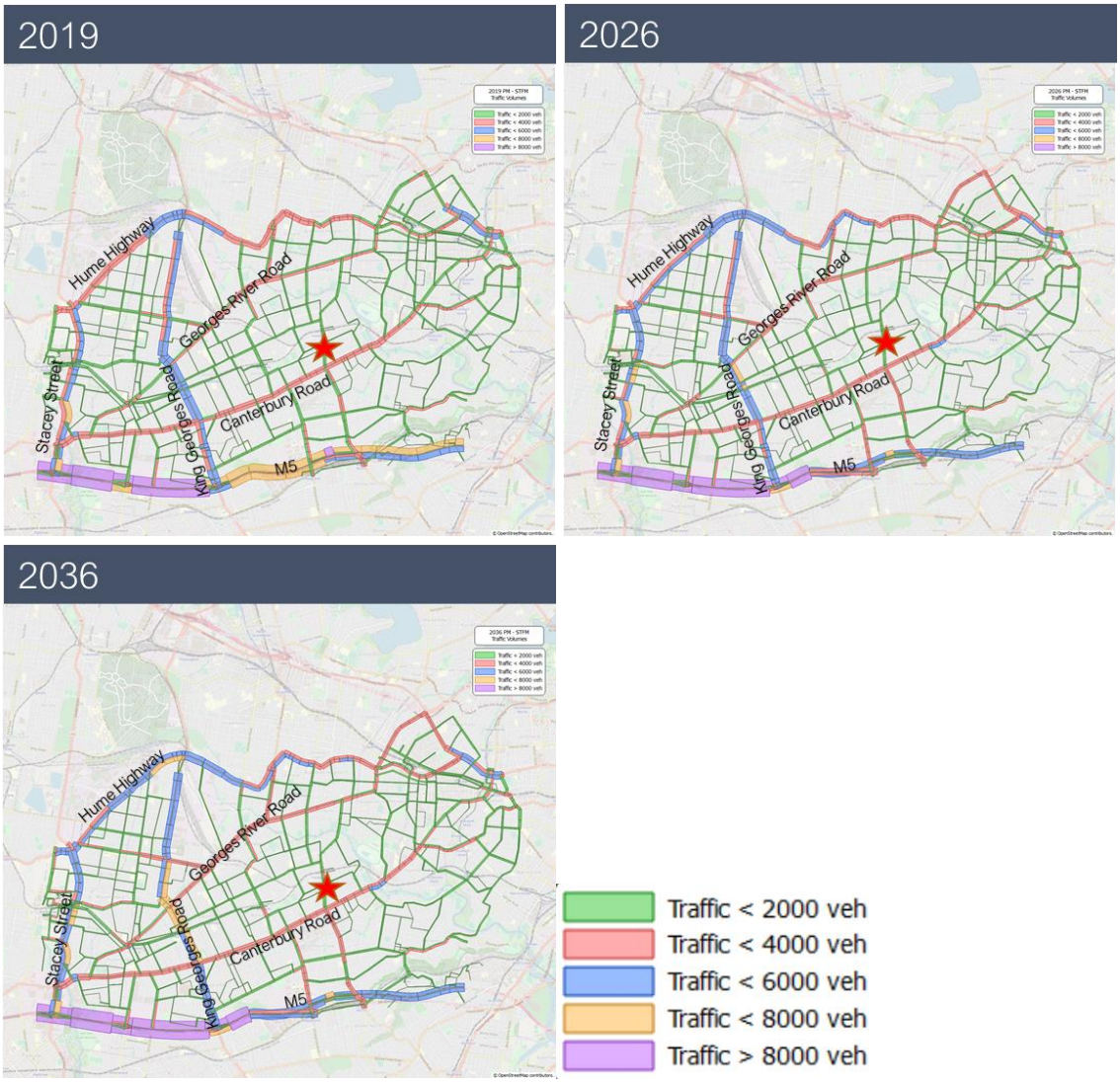


Figure 2.9: Traffic Volume Plots - PM Peak Period (4:00pm – 6:00pm)



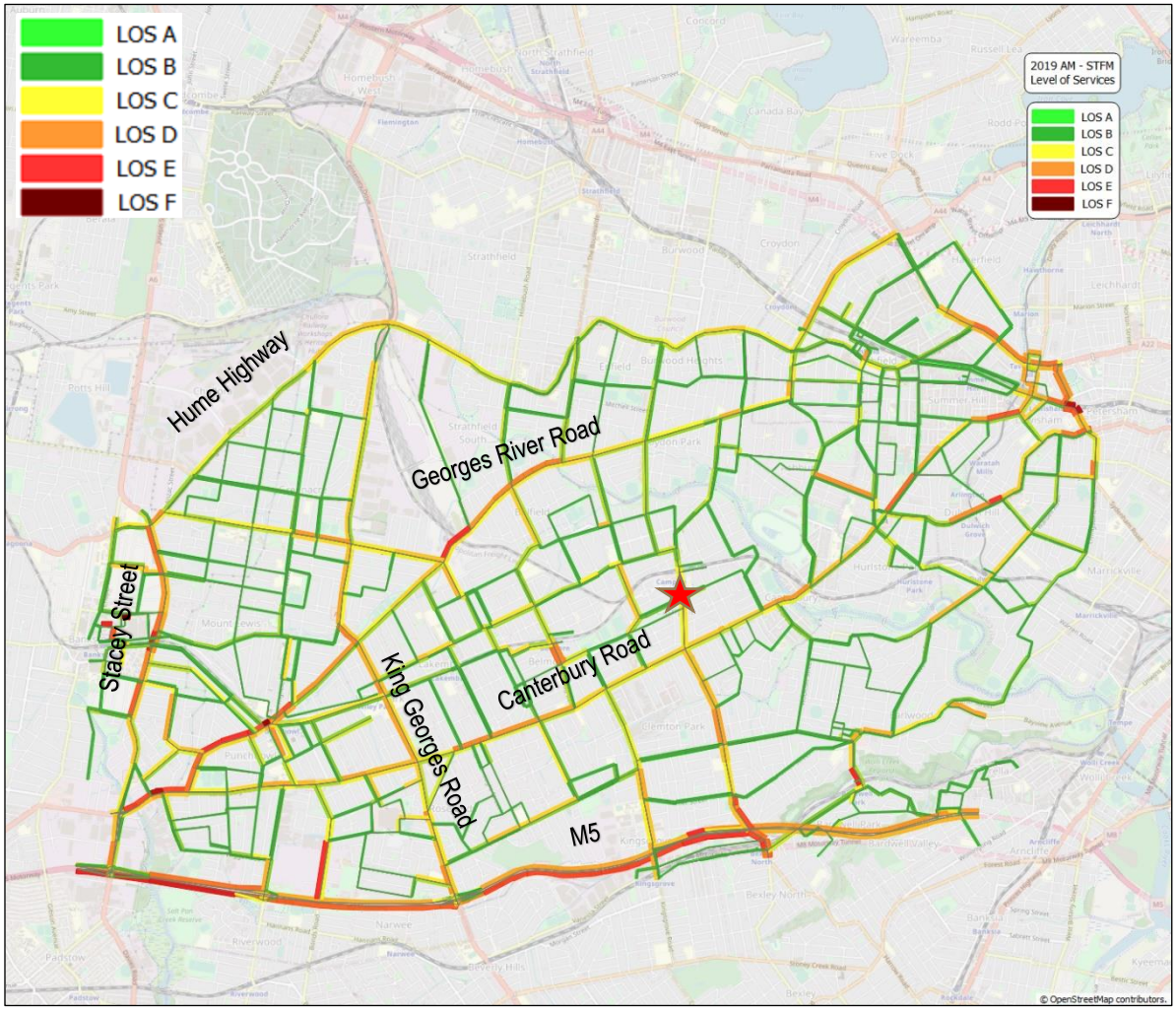
Detailed volume plots are included in Appendix A. The volume plots present the following:

- Traffic along M5 is expected to decrease in 2026 but then increase again in 2036. This may be attributed to opening of the M4-M5 link tunnels and that travel patterns are expected to change by 2026. Traffic is then gradually expected to increase from 2026 to 2036.
- Traffic is gradually expected to increase on Stacey Street and King Georges Road due to the expected growth in population and employment.
- M5 Motorway is expected to carry more than 8,000 vehicles during the peak periods by year 2036.
- Traffic along Stacey Street is also expected to increase from 4,000 vehicles for existing conditions to approximately 6,000 vehicles for 2036 traffic conditions during peak periods.
- The section of King Georges Road between Georges River Road and Canterbury Road is expected to carry about 6,000 vehicles in the peak periods for existing year (2019). This traffic is estimated to increase to 8,000 vehicles in the peak periods for year 2036.

2.3.2. Volume/ Capacity Plots – Level of Service

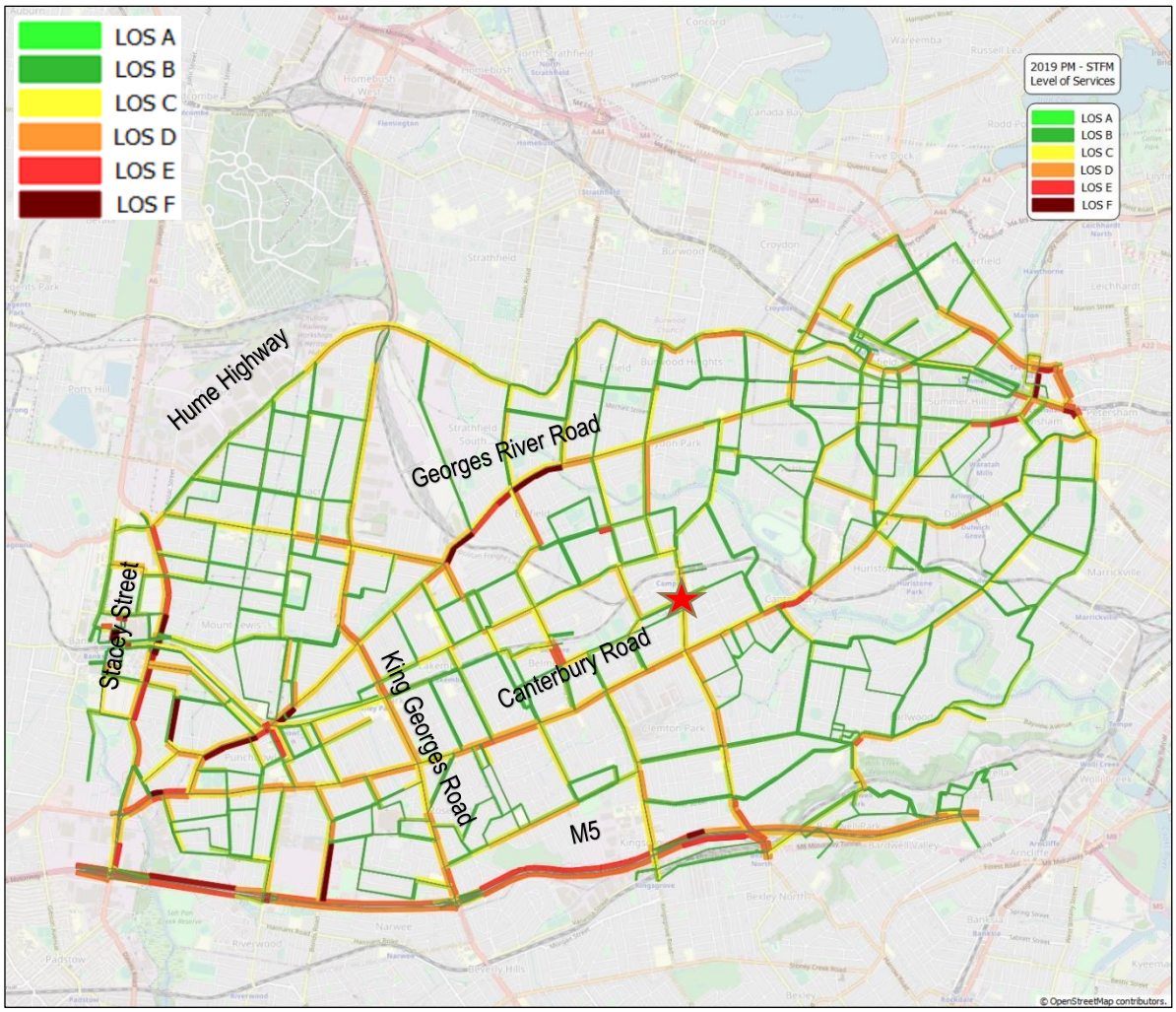
Level of service (LOS) describes the quality of traffic service experienced by users of motor vehicles. Free flow conditions would equate to a good level of service (between A and B) whereas congested conditions would lead to a poor level of service (E and F). The level of service is presented with the Volume/ Capacity (V/ C) plots. The closer the V/ C ratio is to one, the closer the road is to its theoretical operating capacity and the poorer the level of service. Level of service for the existing year (2019) is presented in Figure 2.10 and Figure 2.11 for AM and PM peak periods, respectively.

Figure 2.10:2019 Level of Service – 2019 AM Peak, Do Nothing Scenario



Base map source: OpenStreetMap

Figure 2.11:2019 Level of Service – 2019 PM Peak, Do Nothing Scenario



Base map source: OpenStreetMap

The level of service plots above indicates the following:

- The existing network has some spare capacity to accommodate additional traffic, however it is very limited.
- Sections along key arterial roads and motorways including the M5 motorway, Georges River Road and Stacey Street operate at level of service D or worse in the AM peak and level of service E or worse in the PM peak.
- The PM peak appears to be the critical peak period with less spare capacity as compared to the AM peak.

As a way of comparison, the level of service for 2019, 2026 Do Nothing and 2036 Do Nothing Scenario is presented in Figure 2.12 and Figure 2.13 for AM and PM peak periods, respectively.

Figure 2.12:Level of Service – AM Peak Period, Do Nothing Scenario

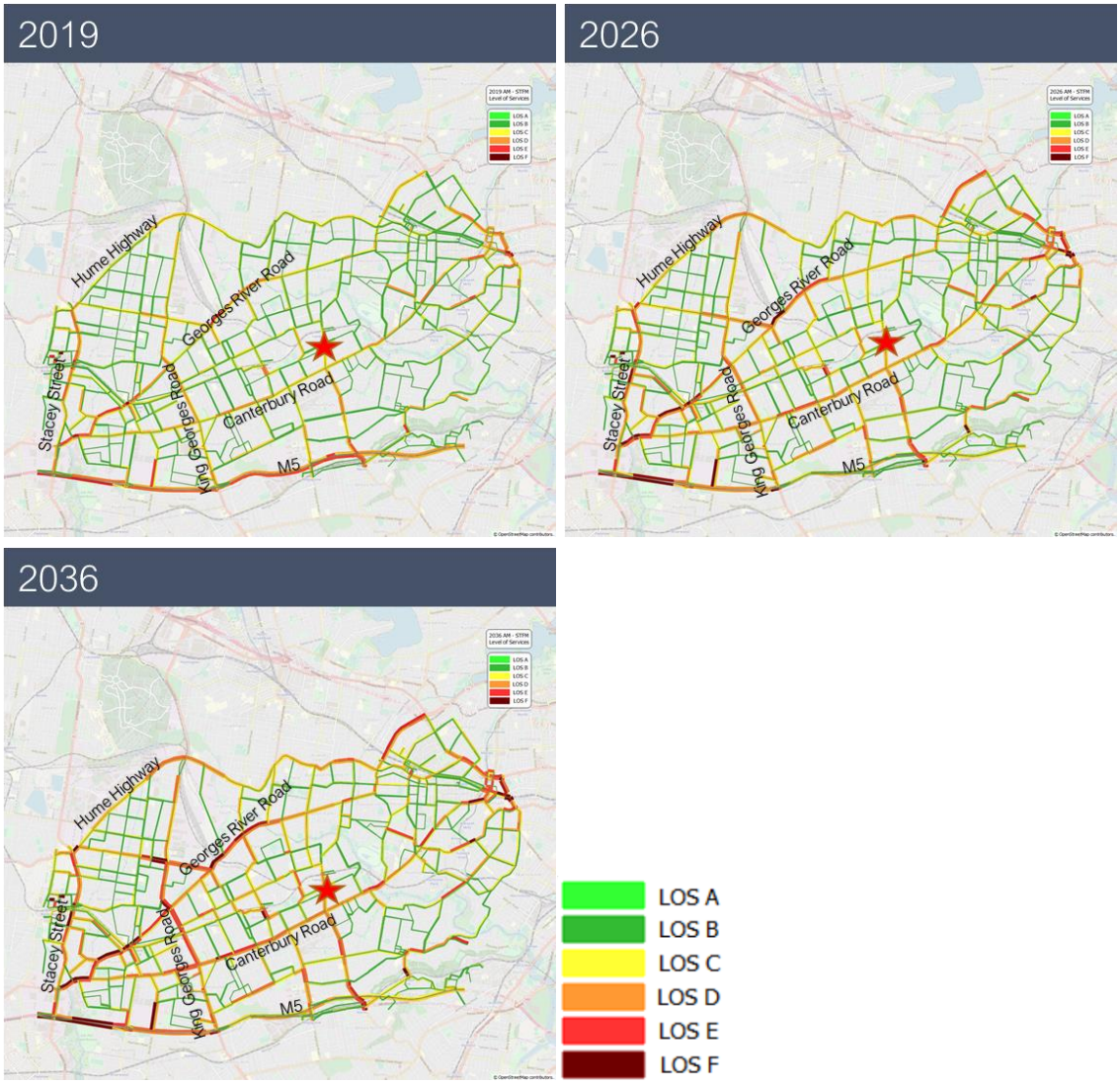
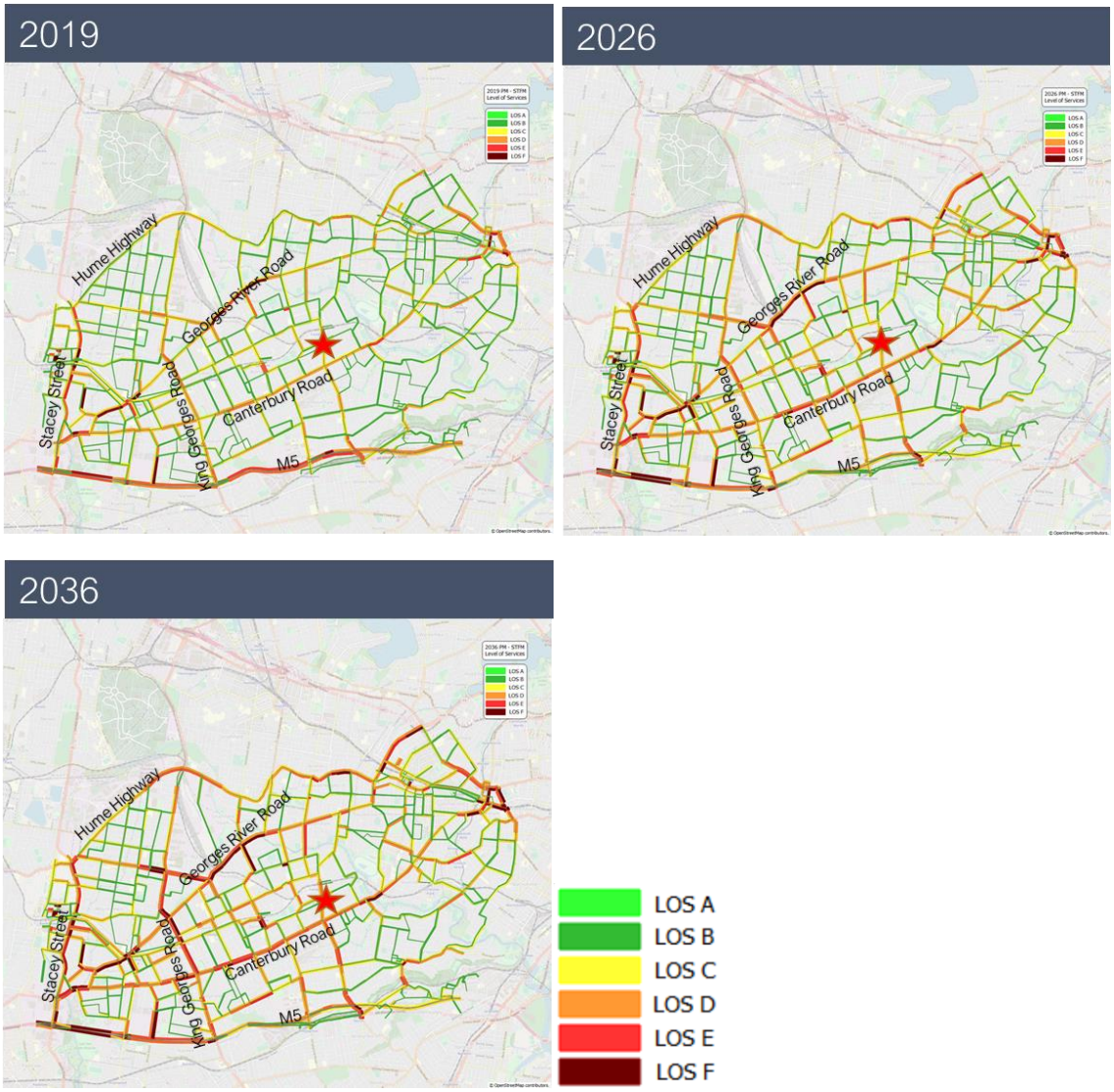


Figure 2.13:Level of Service – PM Peak, Do Nothing Scenario



Detailed level of service plots is included in Appendix A and the comparative level of service plots above indicate:

- Congestion on key arterial roads such as Canterbury Road, Hume Highway and Georges River Road is expected to increase in 2026 and 2036. This is in line with the expected increase in traffic volumes. As traffic increases along these roads, the congestion is also expected to worsen.
- Key arterials are expected to operate at or over capacity by 2026. These include Canterbury Road, King Georges Road, and some sections of Hume Highway.
- Beamish Street is expected to operate generally at LOS C by 2026, with some sections between Canterbury Road and the M5 motorway operating at LOS D.
- Parts of Canterbury Road are expected to operate close to capacity by 2036. These include at
  - the intersection with Fore Street (eastbound in AM peak, westbound in PM peak),
  - the intersection with Haldon Street (eastbound in AM peak, westbound in PM peak)

- east of the intersection with Stacey Street (in both directions in both peak periods).

2.3.3. Congestion Hot Spots

By the year 2036, it is anticipated that there will be numerous pinch point locations due to the increase in traffic on the road network. Figure 2.14 shows the level of service and congestion in 2036 PM peak period. As discussed above, PM peak period is generally more congested than AM peak therefore only PM peak plot has been presented. Same locations are expected to operate at capacity in the AM Peak as well.

Figure 2.14:2036 Do Nothing Congestion – PM peak

From the level of service plots above, the following locations are expected to be key pinch points within the Stage 1 study area:

- Canterbury Road and King Georges Road intersection
- Beamish Street and Canterbury Road intersection
- Canterbury Road and Fore Street intersection
- Georges River Road and King Georges Road intersection
- Punchbowl Road and Water Street intersection
- Punchbowl Road and Juno Parade intersection
- Roberts Road and Juno Parade intersection
- Hume Highway and Stacey Street intersection.

2.3.4. Network Performance- VKT and VHT

Figure 2.15 shows the Vehicle Kilometres Travelled (VKT) while Figure 2.16 shows the Vehicle Hours Travelled (VHT) along the different road types within STFM for the AM peak period for 2019, 2026 Do Nothing and 2036 Do Nothing Scenarios.

Figure 2.15:Vehicle Kilometres Travelled (VKT) – AM Peak, Do Nothing Scenario

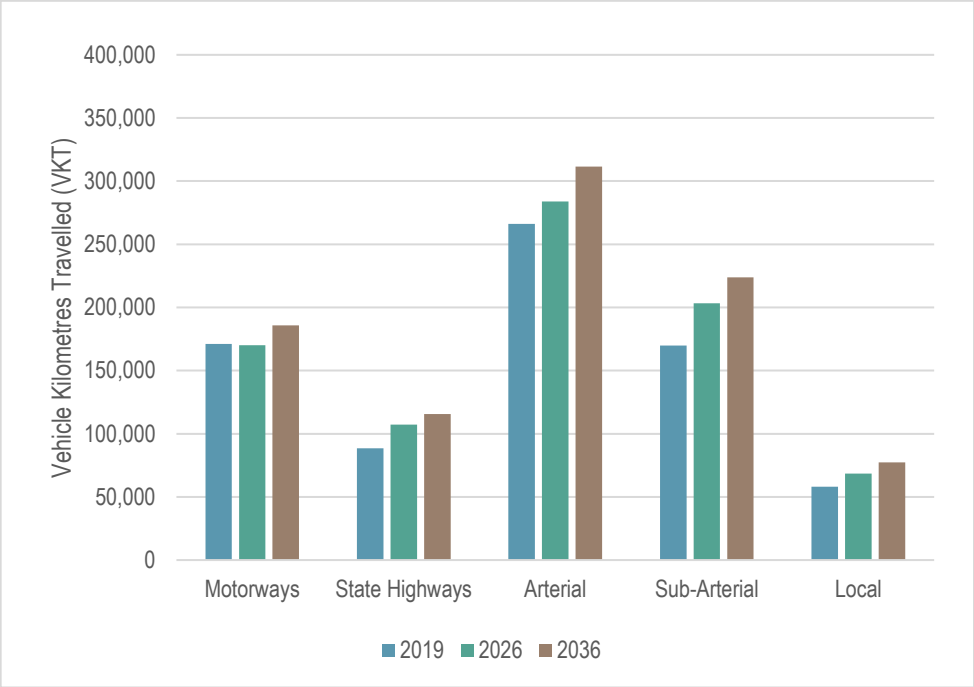
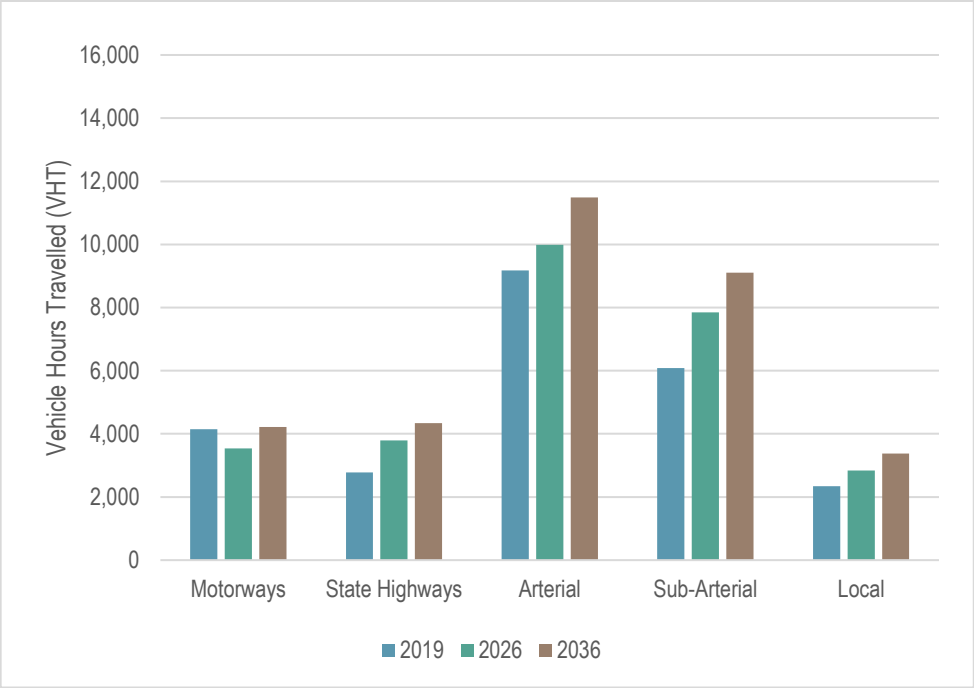


Figure 2.16:Vehicle Hours Travelled (VHT) – AM Peak, Do Nothing Scenario



The VKT and VHT results for the AM peak period suggest that:

- With an increase in the number of vehicles in the future, the VKT increases for all road types for future year 2026 and 2036.
- VHT also increases for the future years, implying increase in congestion.

Figure 2.17 shows the Vehicle Kilometres Travelled (VKT) and Figure 2.18 shows the Vehicle Hours Travelled (VHT) along the different road types within STFM for the PM peak.

Figure 2.17:Vehicle Kilometres Travelled (VKT) – PM Peak, Do Nothing Scenario

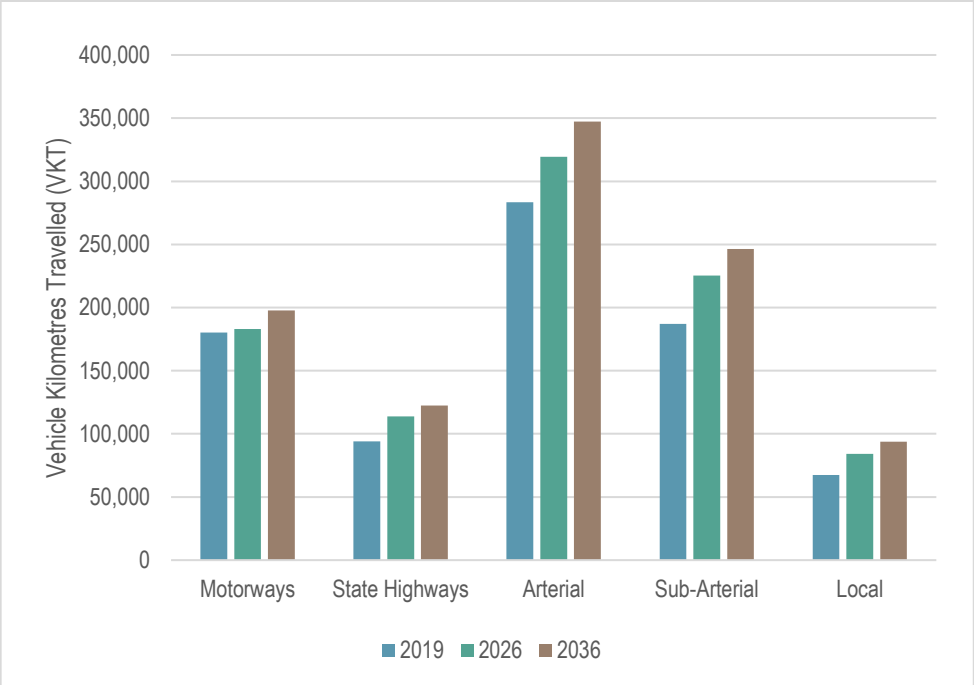
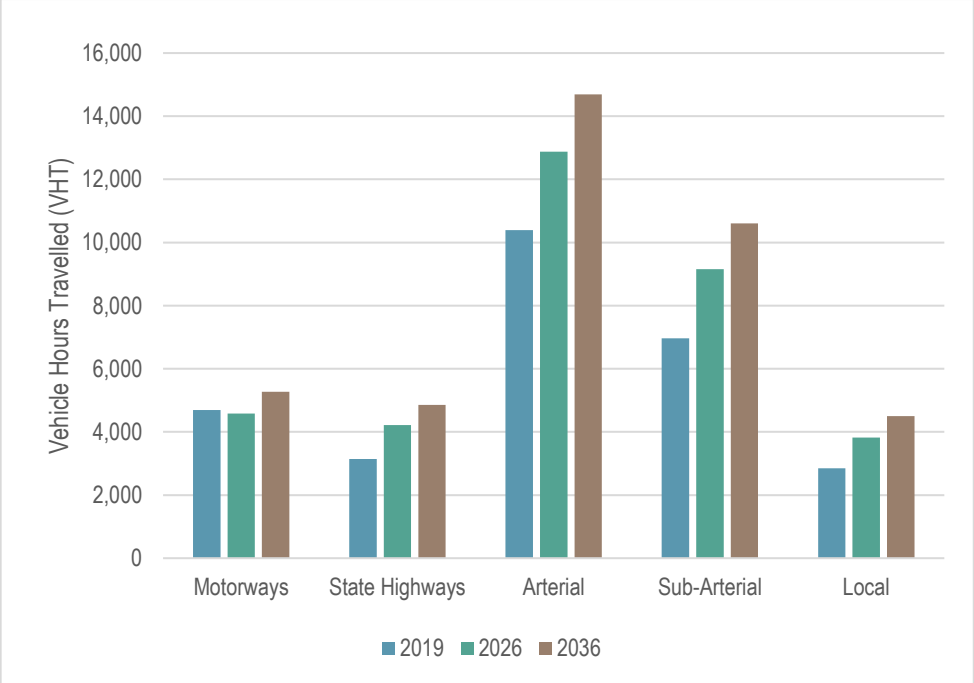


Figure 2.18:Vehicle Hours Travelled (VHT) – PM Peak, Do Nothing Scenario



PM peak network performance is like the AM peak, and the results present that:

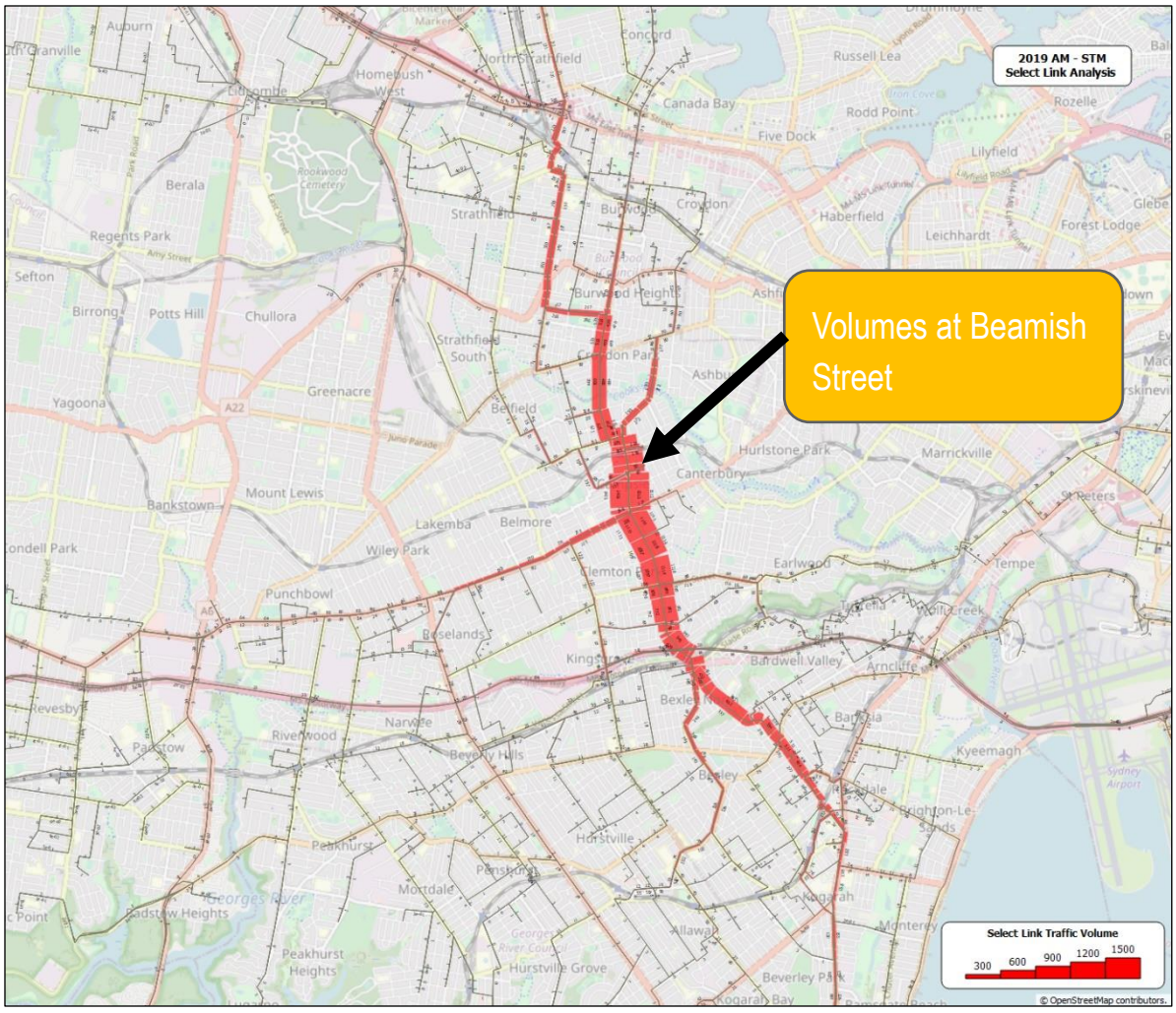
- With an increase in number of vehicles, the VKT increases for all road types for future year 2026 and 2036 in the PM peak as well.

- VHT also increases implying more vehicles are travelling and taking longer to reach their destinations in the future (2026 and 2036).

2.3.5. Campsie Town Centre – Beamish Street

Beamish Street functions a 'Spine Road' that runs through the middle of the Campsie Town Centre. It provides key north-south connection between Burwood and Rockdale. A select link analysis of Beamish Street is presented in Figure 2.19.

Figure 2.19:Beamish Street Volumes – Select Link Analysis, Do Nothing Scenario



Base map source: OpenStreetMap

The STFM estimates between 2,800 to 3,000 vehicles (two-hour total, two way) at Beamish Street under existing conditions. By year 2026, the model is estimating additional 4% traffic on Beamish Street in the AM peak and additional 13% traffic in PM peak. By year 2036, the model is estimating additional 9% traffic on Beamish Street in the AM peak and 22% additional traffic during the PM peak as presented in Table 2.8. Majority of the trips at Beamish Street are travelling north-south providing connection between Corydon in the north and Rockdale in the south.

Table 2.8: Beamish Street Demand (Two-hour, Two-way)

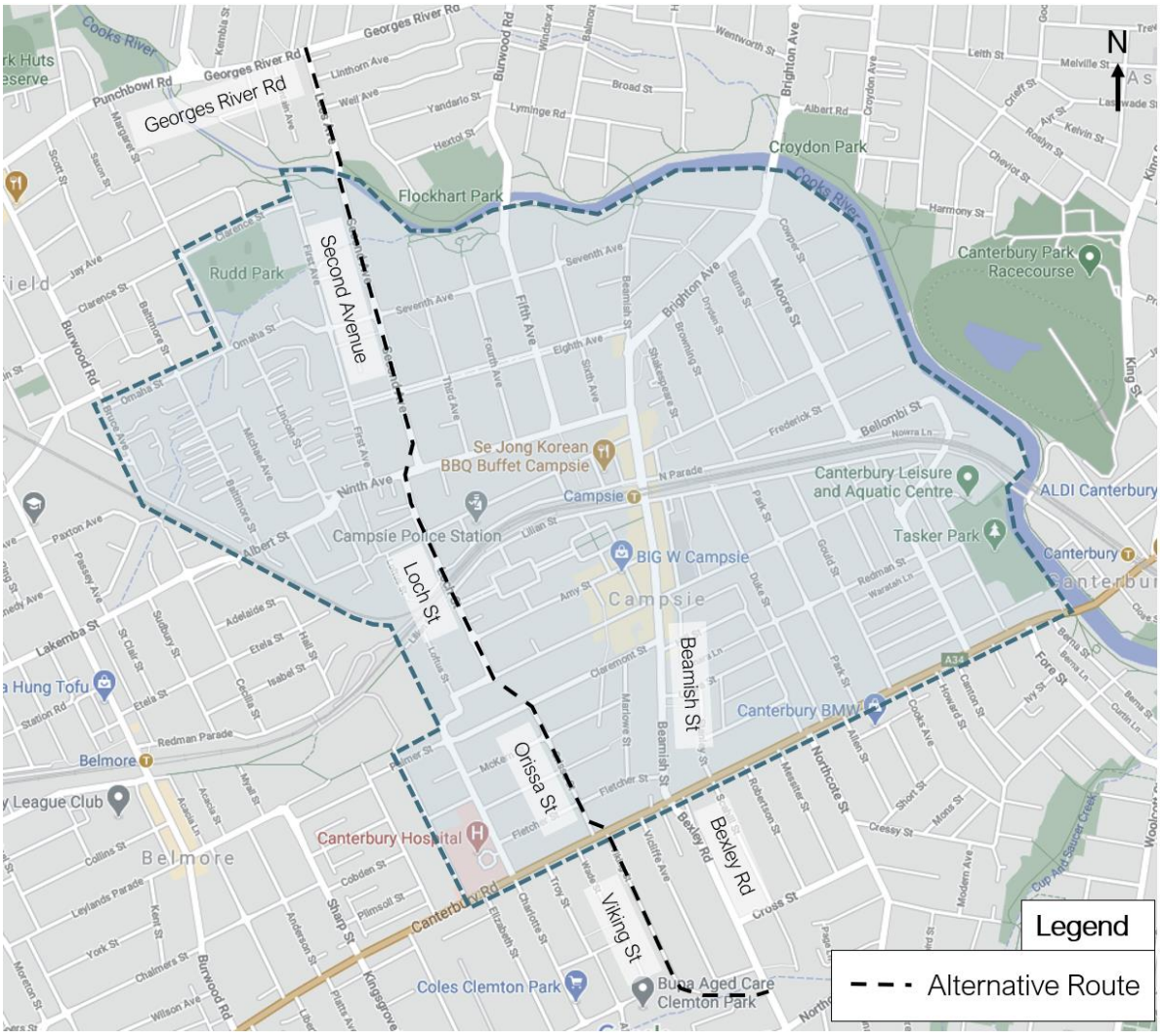
Peak Period	2019	2026	2036
AM	2,890	3,000	3,150
% Difference – AM (vs 2019)		+4%	+9%
PM	3,000	3,380	3,670
% Difference – PM (vs 2019)		+13%	+22%

3. OPTION ASSESSMENT

3.1. Option 1

An alternative route, west of Campsie Town Centre (Option 1), is being considered to provide an alternative north-south connection between Canterbury Road and Georges River Road. Option 1 is also expected to alleviate some congestion from Beamish Street, providing opportunities for land use uplift within the Campsie Town Centre. The proposed layout for Option 1 is presented in Figure 3.1.

Figure 3.1: Proposed West Campsie Alternative Route



Base map source: Google Maps

To assess the impacts of Option 1 on the local and the regional network, alternative route (Option 1) was assessed in STFM. Key features for Option 1 include:

- Lees Avenue (Second Avenue) bridge upgrade
- providing direct connection between Second Avenue, Loch Street, Orissa Street and Viking Street
- new connection between:
    - Loch Street and Orissa Street
    - Orissa Street, Canterbury Road and Viking Street
    - Viking Street and Bexley Road at southern end of the alternative route.
- due to the proposed new connections and alignment, land acquisition around:
    - Second Avenue/ Ninth Avenue/ Loch Street
    - Loch Street/ Evaline Street (partial)
    - Canterbury Road/ Orissa Street/ Viking Street.

Appendix B illustrates the potential new connections and upgrades for Option 1.

3.1.1. Assumptions

The alternative route will have the same properties and function similarly to Beamish Street. Therefore, the alternative route is expected to have:

- Two lanes in each direction
- Posted speed of 40 km/ h.

The operation of the future network with the proposed Option 1 upgrades have been assessed for both 2026 and 2036 future years.

3.2. Results

3.2.1. Volume Difference Plots

AM Peak

The difference in traffic volumes on the road network under Option 1 as compared to the Do Nothing scenario for the AM peak are presented in Figure 3.2 and Figure 3.3 for the years 2026 and 2036, respectively with detailed plots included in Appendix A. It is noted that the difference plots are presented on the existing network, i.e., the future upgrades a part of Options 1 are not presented. These plots represent the increase (in green) and decrease (in red) in traffic at existing roads.

Figure 3.2: 2026 Volume Difference Plot – AM Peak – Option 1 vs Do Nothing Scenario

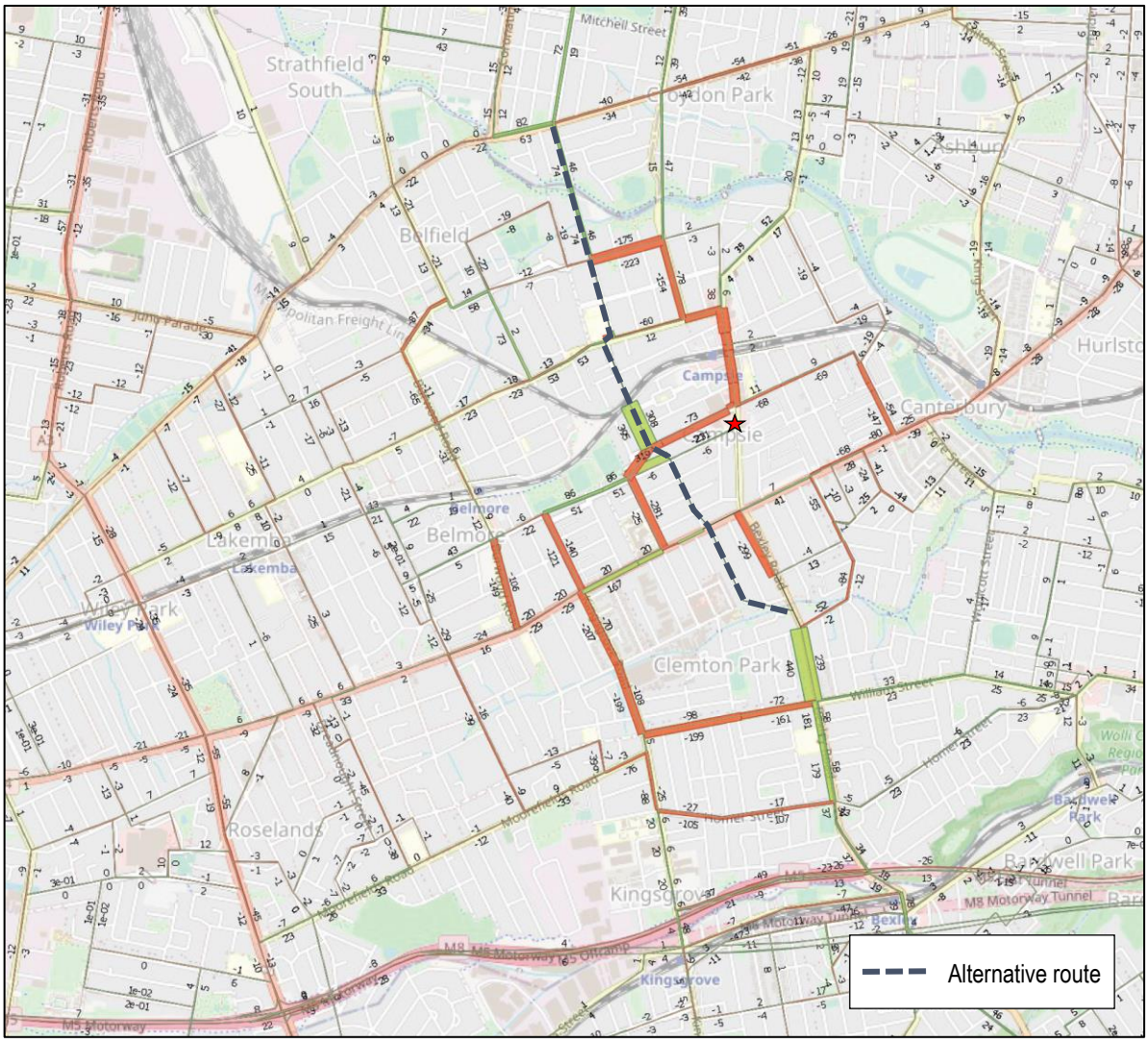
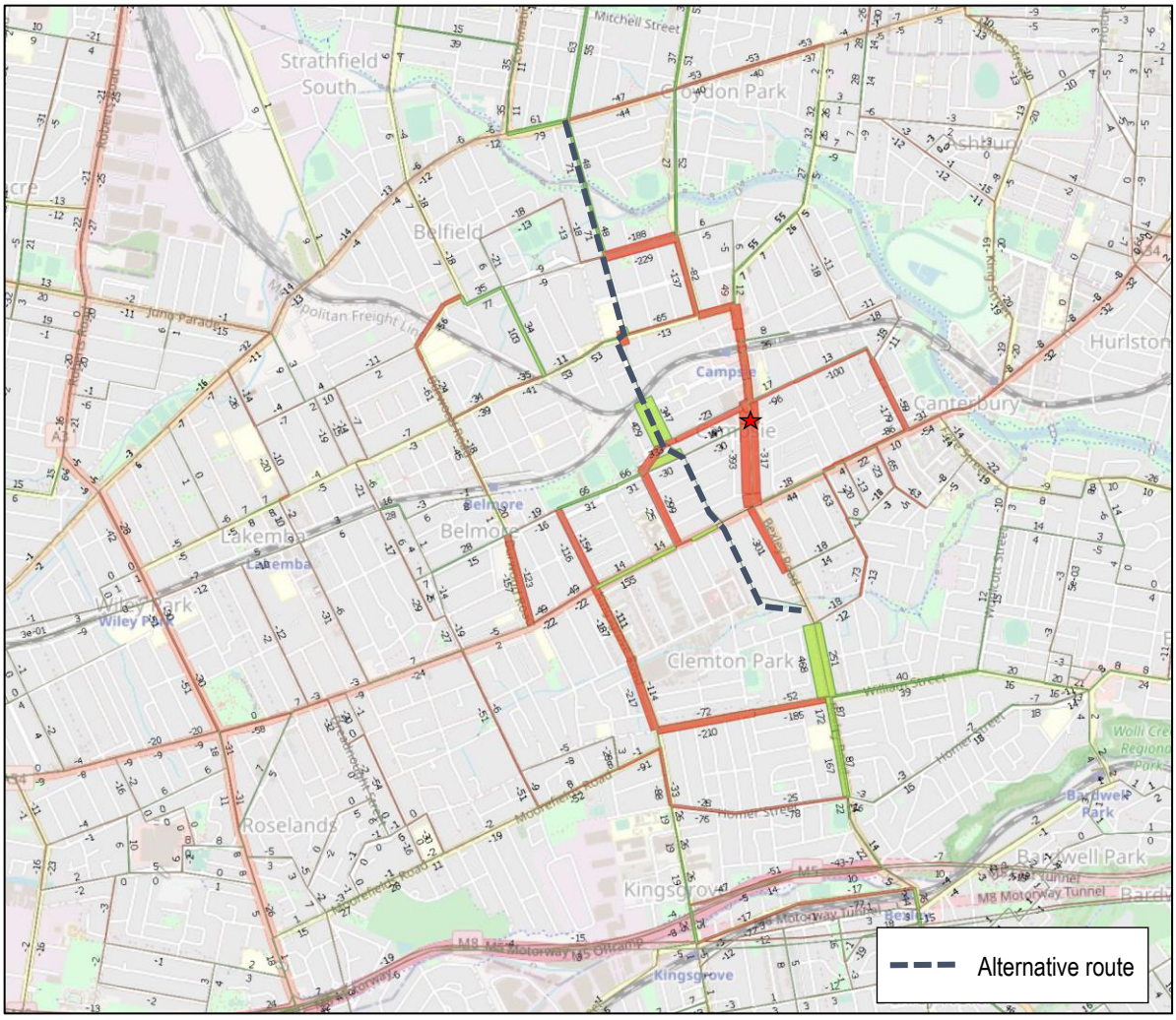


Figure 3.3: 2036 Volume Difference Plot – AM Peak – Option 1 vs Do Nothing Scenario



The AM peak plots generally indicate that:

- Option 1 only has localised impacts and is generally not attracting any regional traffic. It appears to be functioning as an alternative local north-south route to Beamish Street.
- Very minor traffic volume reduction is expected on King Georges Road due proposed Option 1 upgrades.
- An overall reduction in traffic volumes along Beamish Street is expected in both directions for Option 1.
- Traffic volumes at Loch Street (part of Option 1) are expected to increase in both directions.
- Traffic on Bexley Road (south of Northcote Street) is expected to increase while traffic along Kingsgrove Road is expected to decrease with Option 1 upgrades. Therefore, some shift of traffic from Kingsgrove Road to the proposed alternative route in Option 1 is expected.

PM Peak

The difference in traffic volumes on the road network under Option 1 compared to the Do Nothing scenario for the PM peak are resented in Figure 3.4 and Figure 3.5 for the 2026 and 2036 years, respectively with detailed plots included in Appendix A. It is noted that the difference plots are presented on existing network, i.e., the future alternative route option is not shown. These plots represent the increase (in green) and decrease (in red) in traffic at existing roads.

Figure 3.4: 2026 Volume Difference Plot – PM Peak – Option 1 vs Do Nothing Scenario

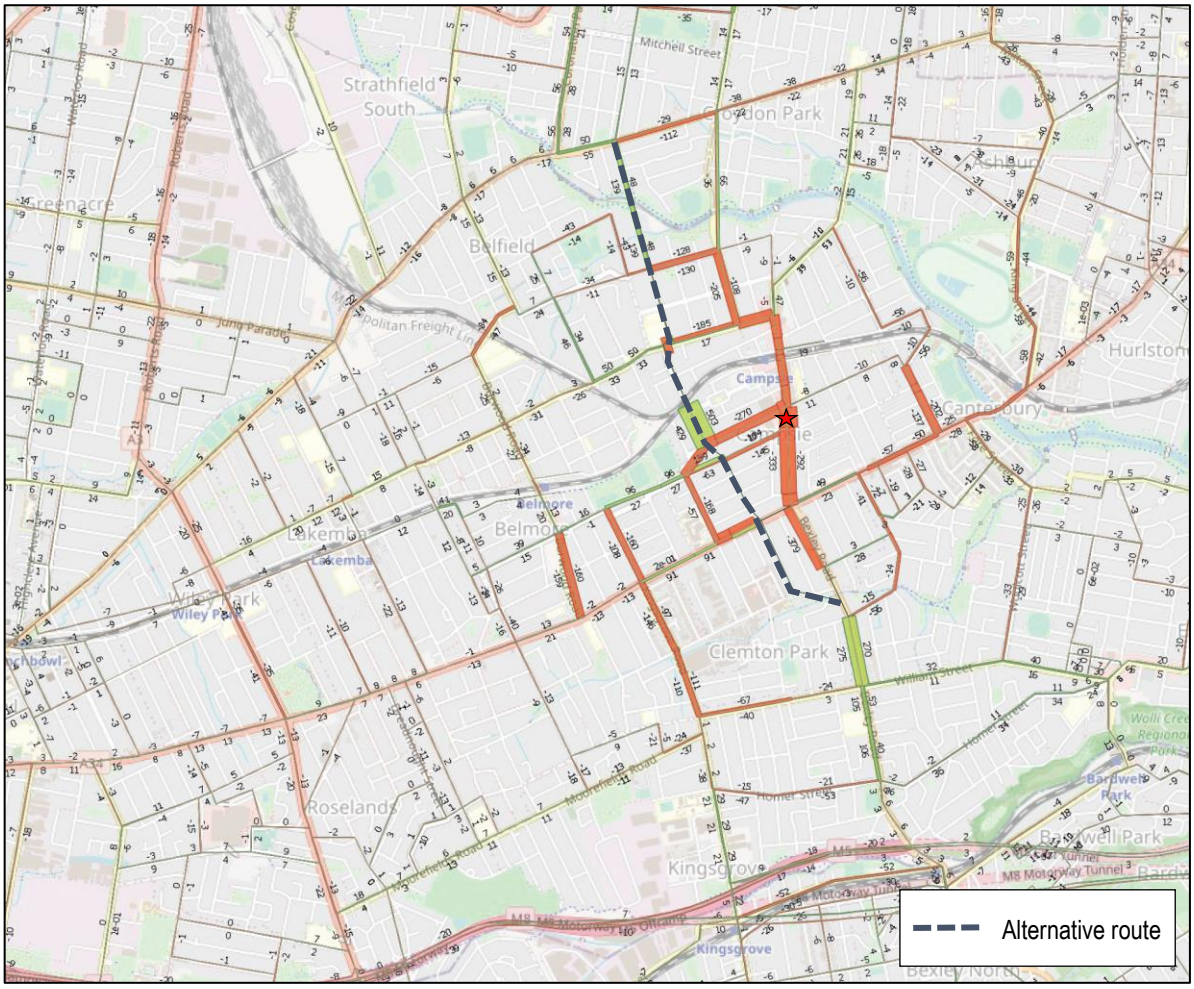
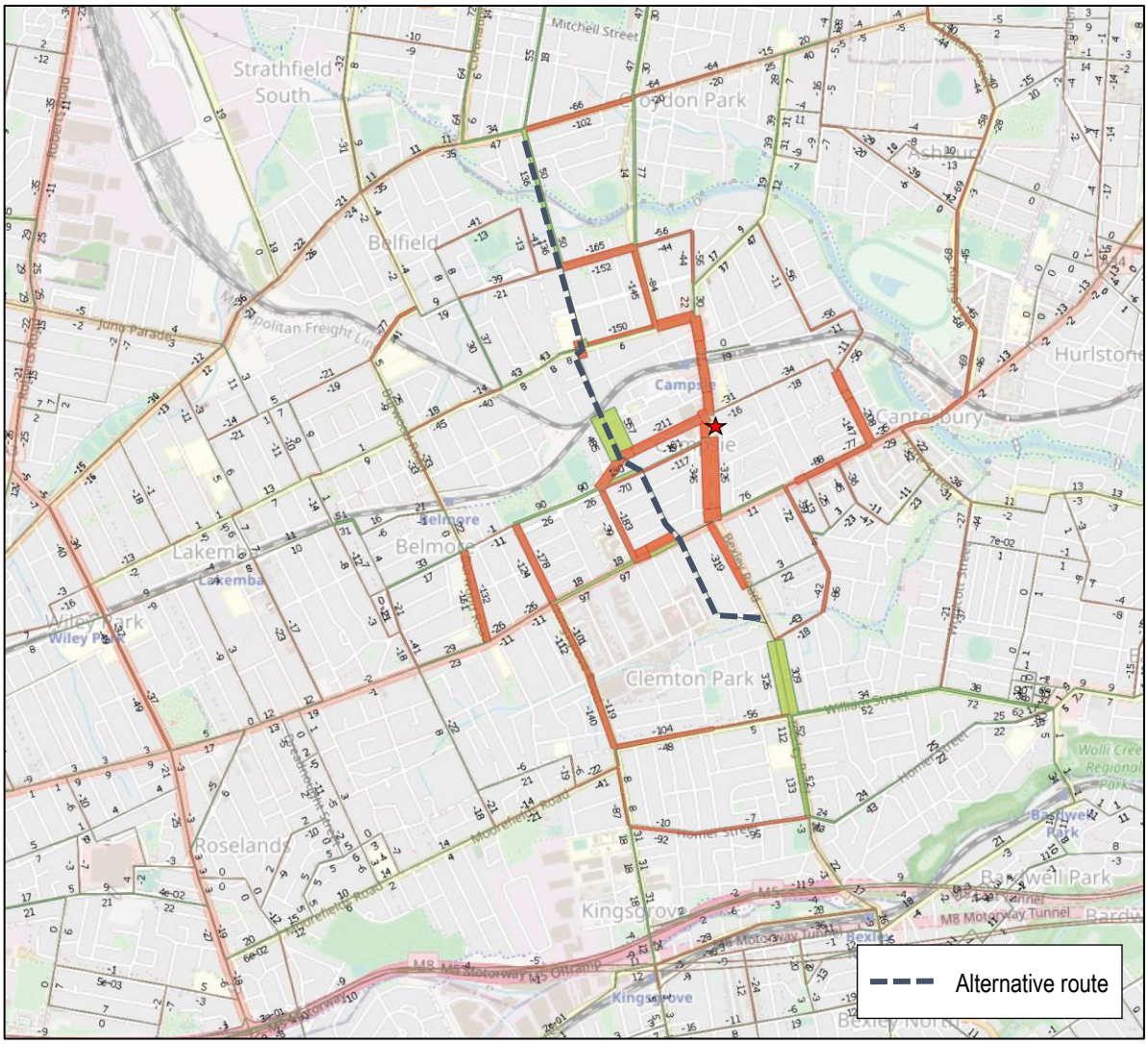


Figure 3.5: 2036 Volume Difference Plot – PM Peak – Option 1 vs Do Nothing Scenario



Detailed numerical comparison for this shift in traffic from Beamish Street to the proposed alternative route in Option 1 is presented in Table 3.1. The comparison shows increase in traffic at a section along the alternative route at Loch Street (between railway bridge and Evaline Street) and the decrease in traffic at a section along Beamish Street (between Evaline Street and Canterbury Road).

Table 3.1: Traffic Volumes Changes on Loch Street and Beamish Street for Option 1

Peak Period	Year	Scenario	Loch St [1]		Beamish St [2]	
			Northbound	Southbound	Northbound	Southbound
AM	2026	Do Nothing (without alternative route)	1,198	765	1,586	1,418
		Option 1 (with alternative route)	1,597	1,076	1,175	1,065
		Difference	+399	+311	-411	-353
		Difference (%)	+33%	+41%	-26%	-25%
	2036	Do Nothing (without alternative route)	1,285	810	1,687	1,519
		Option 1 (with alternative route)	1,713	1,151	1,290	1,204
		Difference	+428	+341	-397	-315
		Difference (%)	+33%	+42%	-24%	-21%
PM	2026	Do Nothing (without alternative route)	911	1,262	1,682	1,743
		Option 1 (with alternative route)	1,341	1,757	1,344	1,444
		Difference	+430	+495	-338	-299
		Difference (%)	+47%	+39%	-20%	-17%
	2036	Do Nothing (without alternative route)	982	1,334	1,822	1,850
		Option 1 (with alternative route)	1,469	1,893	1,477	1,517
		Difference	+487	+559	-345	-333
		Difference (%)	+50%	+42%	-19%	-18%

[1] Loch Street between railway bridge and Evaline Street
[2] Beamish Street between Evaline Street and Canterbury Road

The 2026 results indicate that alternative route under Option 1 attracts an additional 400 to 500 vehicles over the two hours in each direction (or approximately between 200 to 250 vehicles per hour). Majority of this traffic is expected to shift from Beamish Street, while some traffic re-distribution was also expected from Kingsgrove Road. In 2026, Beamish Street traffic volumes under Option 1 are expected to decrease by about 25% overall in the AM peak and 20% in the PM peak compared to the Do-Nothing Scenario.

The 2036 results indicate that the alternative route attracts an additional 340 to 560 vehicles over the two-hour period in each direction (or approximately between 170 - 280 vehicles per hour). Similar to the 2026 results, most of this traffic is expected to shift from Beamish Street, while some traffic re-distribution was also expected from Kingsgrove Road. In 2036, Beamish Street traffic volumes under Option 1 are expected to decrease by about 22% overall in the AM peak and 19% in the PM peak compared to the Do-Nothing Scenario.

3.2.2. Network Statistics

Figure 3.6 presents the VKT while Figure 3.7 presents the VHT for local roads within STFM for the AM peak period for Do Nothing and Option scenarios for all years assessed.

Figure 3.6: Vehicle Kilometres Travelled (VKT) – AM Peak

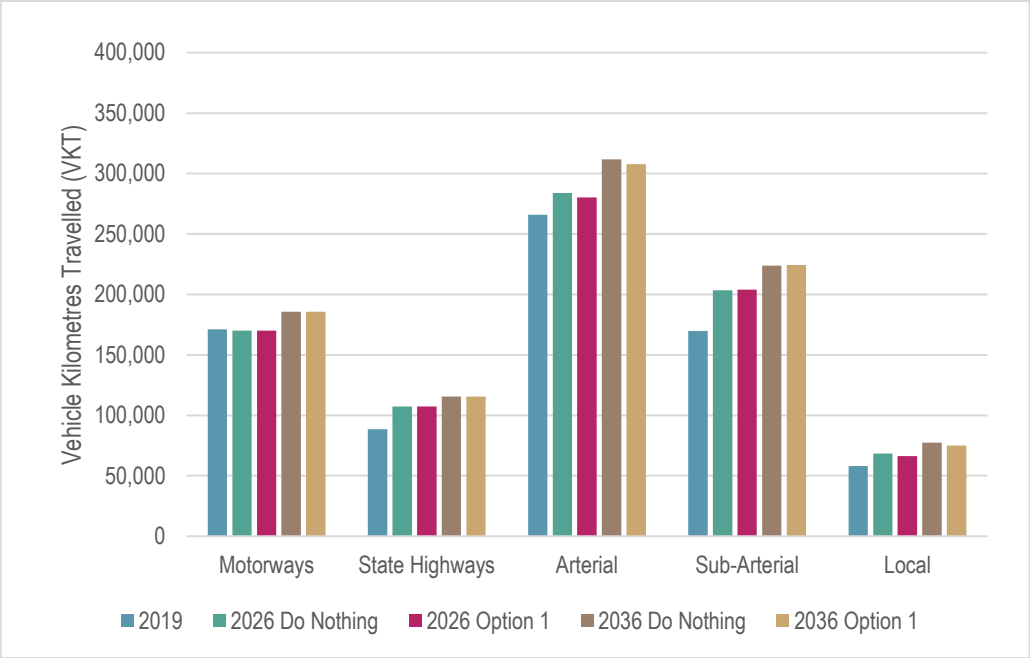


Figure 3.7: Vehicle Hours Travelled (VHT) – AM Peak

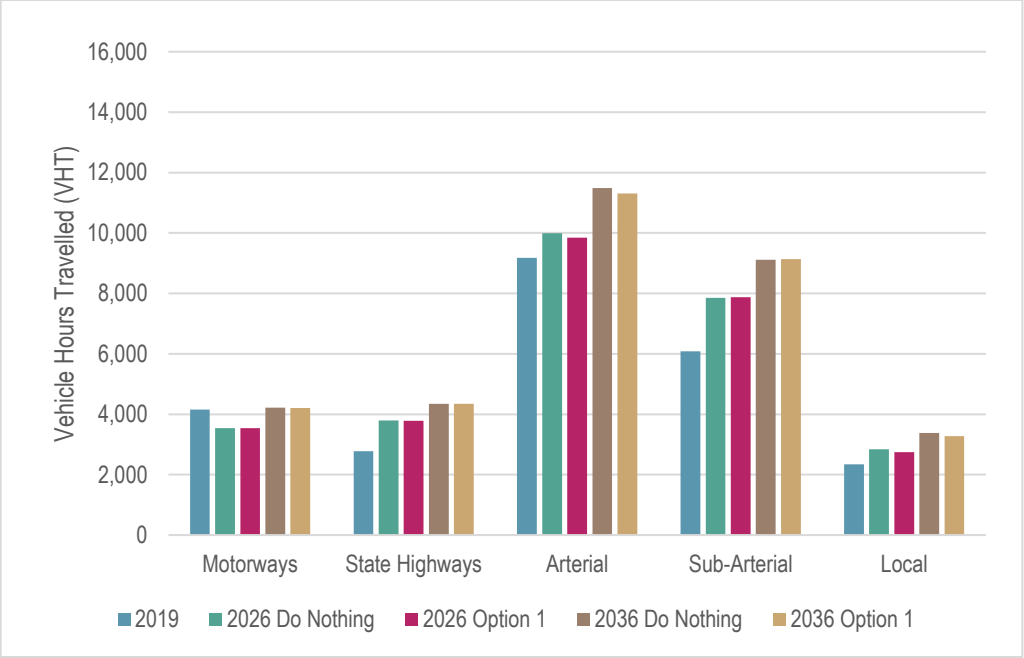


Figure 3.8 presents the VKT while Figure 3.9 presents the VHT for local roads within STFM for the PM peak period for Do Nothing and Option scenarios for all years assessed.

Figure 3.8: Vehicle Kilometres Travelled (VKT)– PM Peak

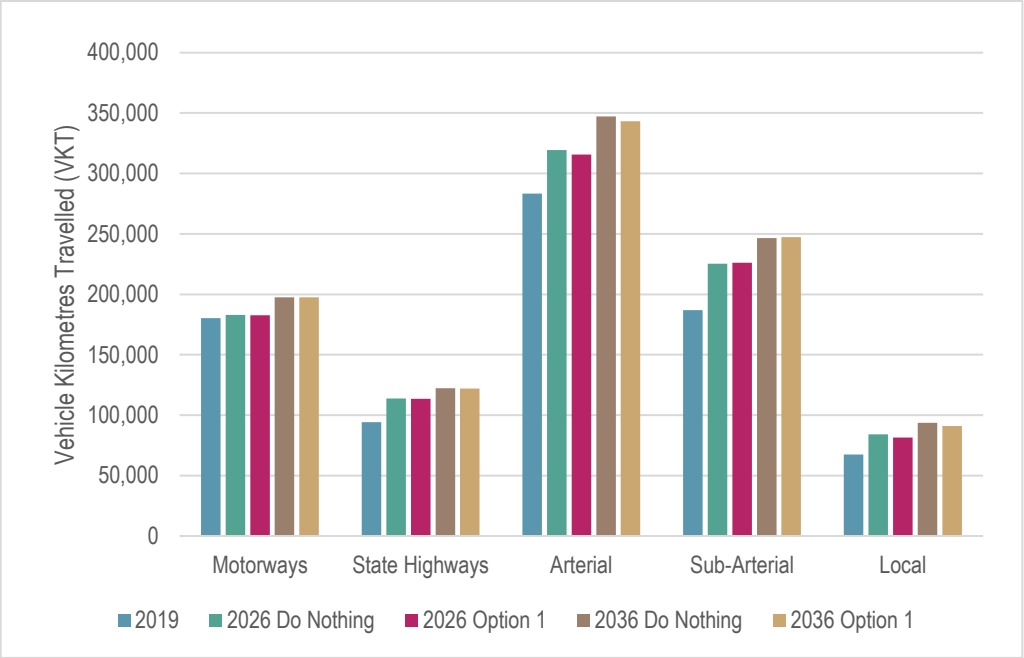
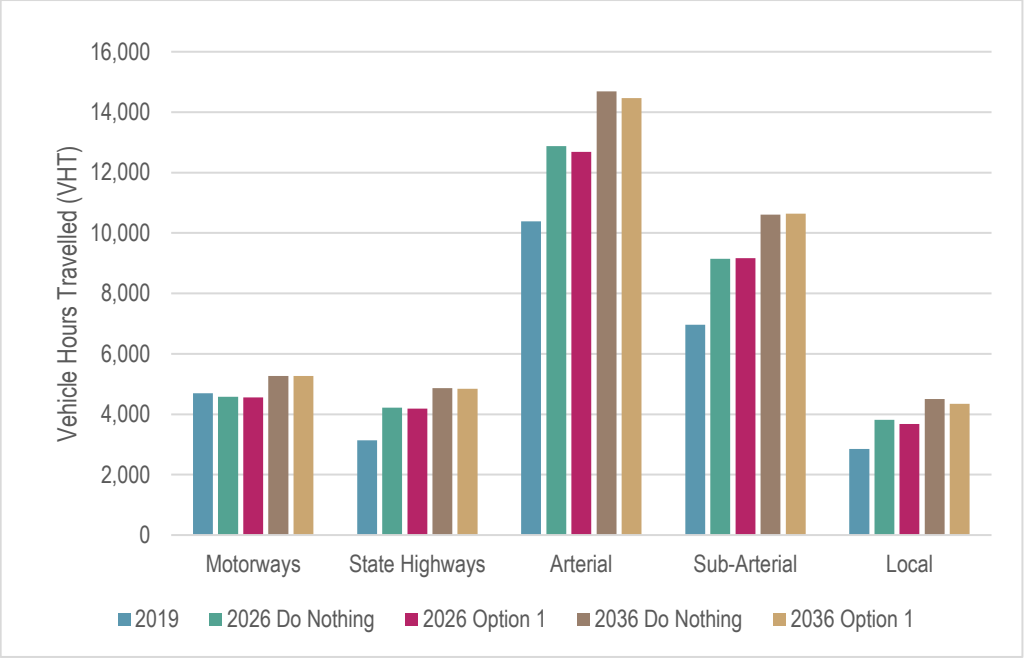


Figure 3.9: Vehicle Hours Travelled (VHT)– PM Peak



The VKT and VHT results generally present the following:

- Marginal decrease in VKT and VHT is expected for local roads and arterial rads with the Option 1 for both 2026 and 2036 AM and PM peak periods.
    - VKT decreases by 1% whereas VHT decreases by 2% with Option 1 for arterials for both 2026 and 2036 AM peak period.
    - VKT and VHT decrease by 3% with Option 1 for local roads for both 2026 and 2036 AM peak period.
    - VKT and VHT decrease by 1% with Option 1 for arterial roads for both 2026 and 2036 PM peak period.
    - VKT decreases by 3% whereas VHT decreases by 4% with Option 1 for local roads for both 2026 and 2036 PM peak period.
- This decrease in VKT and VHT indicate that the alternative route would reduce travel distance and travel times within the local street network. This in turn implies that the congestion on the local street network would decrease marginally.

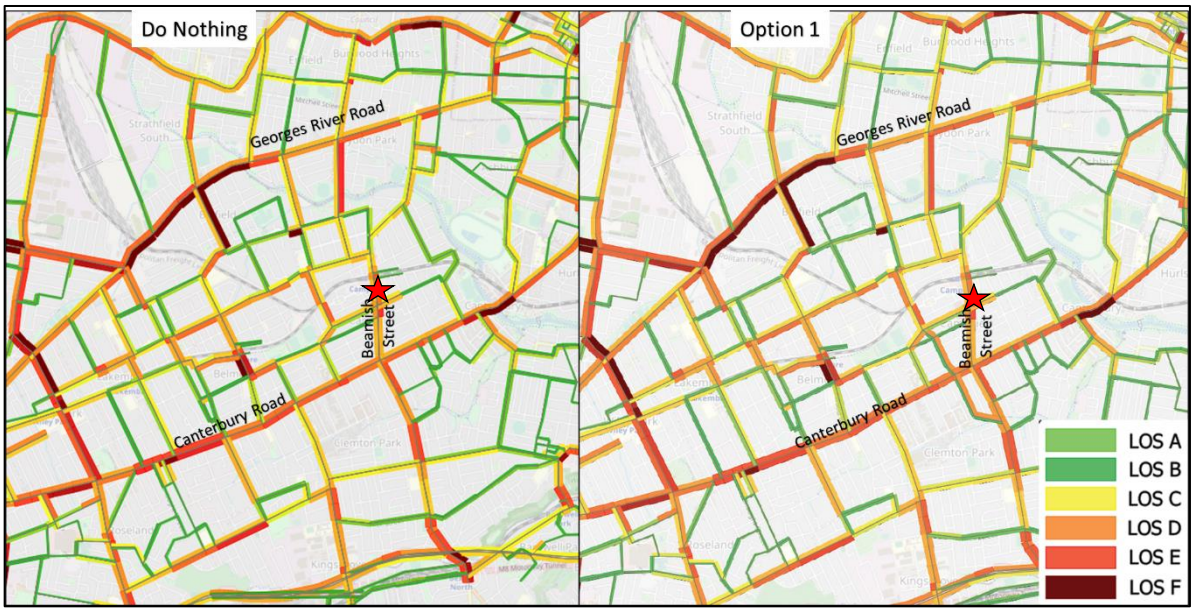
Therefore, based on the results presented above, it can be concluded that the proposed alternative route in Option 1 is expected to provide some relief to the expected congestion at the local street level for both 2026 and 2036 future years and for both peak periods. It is noted here that these are very upper level results and detailed performance and assessment of results for Option 1 will be tested in Stage 2 models.

3.2.3. Level of Service

Level of service plots are presented in Appendix A. Comparison between Do Nothing (without the alternative route) and Option 1 (with the alternative route) scenario for the critical PM peak period is provided in Figure 3.10 and Figure 3.11 for the 2026 and 2036 years respectively.

Figure 3.10:2026 LOS Comparison – PM peak

Figure 3.11:2036 LOS Comparison – PM peak



The LOS plots are generally indicating that the performance of the network as a whole is with the proposed alternative route is generally similar to the Do Nothing Scenario. This is in line with the network statistics results and only localised benefits within the Campsie town centre are expected with the proposed alternative route. It is noted that detailed impacts of the alternative route will be assessed in Stage 2 mesoscopic models where active and public transport strategies for Beamish Street and their potential impacts can be assessed in much more detail.

4. SUMMARY

This report presents a summary of the strategic assessment of future travel conditions within the Campsie and potential impacts of an alternative connection (west of Campsie Town Centre) which aims at alleviating traffic conditions along Beamish Street.

The assessment showed that population and employment in the area levels will continue to grow at a rate of 1.6% - 2.1% per annum to up to 2036. As result of this growth, the transport network in the study area is expected to experience the following:

- Gradually increasing traffic volumes on a number of road corridors including Stacey Street, Hume Highway, King Georges Road and Canterbury Road.
- For both the AM and PM peak periods, traffic volumes on the M5 are expected to decrease when WestConnex M4-M5 tunnel links are operational (by 2026) but then increase again by 2036.
- Network performance statistics (VKT and VHT) indicate that vehicles are expected to gradually spend more time on the roads travelling from their origin to their destination in 2026 and 2036 when compared to 2019. The PM peak is expected to continue to be the critical peak period in 2026 and 2036 with more time spent (VHT) and greater distances travelled (VKT) on the road network compared to the AM peak.
- Key congestion hot spots in the AM and PM peaks were expected to be:
    - Canterbury Road and King Georges Road intersection
    - Beamish Street and Canterbury Road intersection
    - Canterbury Road and Fore Street intersection
    - Georges River Road and King Georges Road intersection
    - Punchbowl Road and Water Street intersection
    - Punchbowl Road and Juno Parade intersection
    - Roberts Road and Juno Parade intersection
    - Hume Highway and Stacey Street intersection.
- Modelling results showed that congestion at the identified hot spots is expected to increase in 2036, mainly due to the anticipated traffic growth around and within the Campsie area.
- 2036 traffic volumes along Beamish Street, running north-south through the centre of Campsie, are expected to increase by up to 9% and 22% in the AM and PM peak periods respectively.
- The introduction of an alternative route (west of Campsie Town Centre) is expected to relieve some pressure the local and arterial street level by providing an alternative north-south connection. However, it is noted that the impacts are only minor (1% to 4% reduction in congestion) as indicated by the network statistics results.
- Traffic on Bexley Road is anticipated to increase south of the proposed intersection of Bexley Road and the new alternative route which can be attributed to traffic utilising the new alternative route.
- Although the results of this assessment indicate that the alternative route can successfully relieve pressure from Beamish Street (with modelling suggestion a 17% to 26% reduction in traffic volumes in the 2026, and a 18% to 24% reduction in traffic volumes in 2036), it would be prudent to undertake a cost-benefit analysis before any further considerations on the merits of the proposal.

A.MODEL PLOTS

A

Do Nothing Results

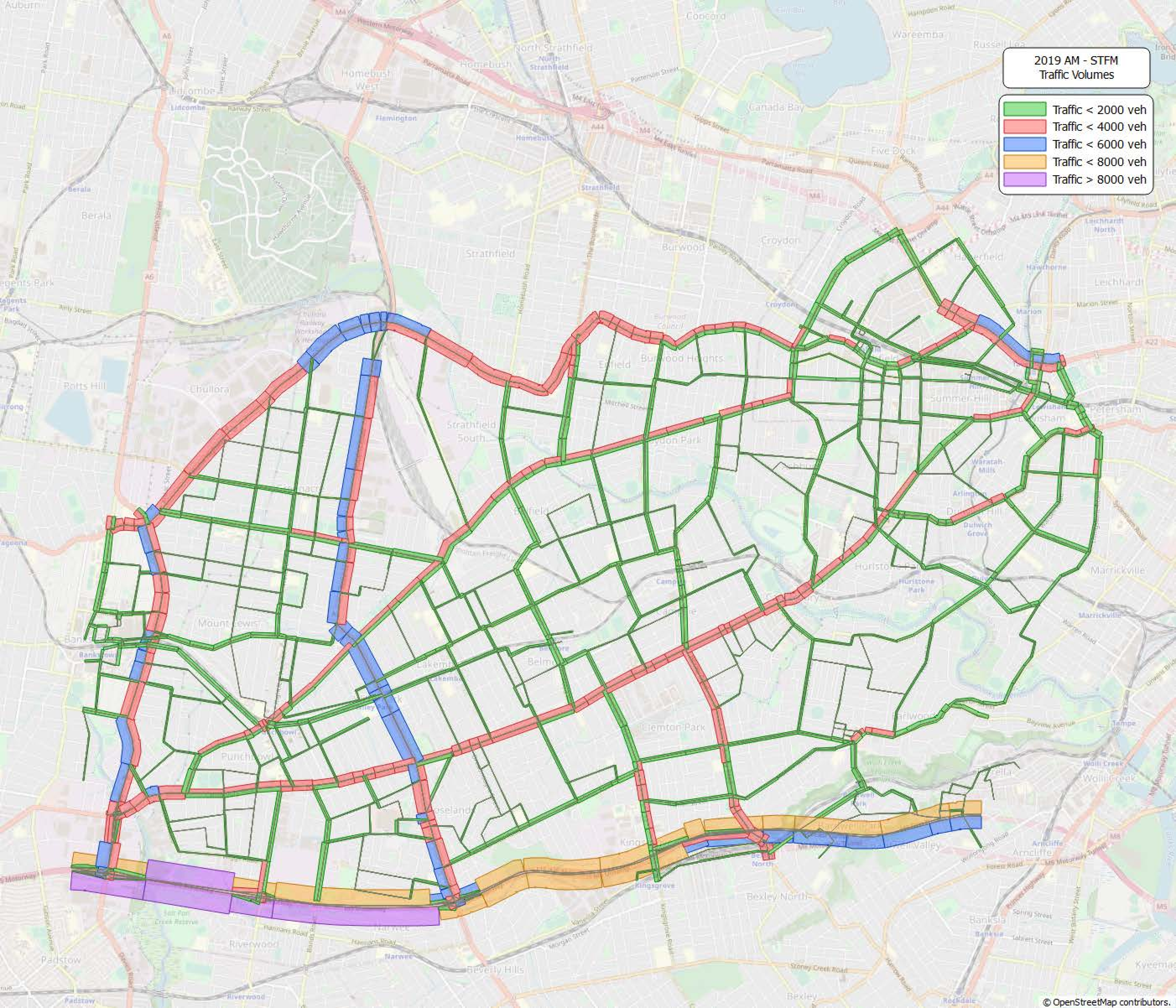
2019 AM - STFM
Level of Services

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

2019 AM - STM
Select Link Analysis

Select Link Traffic Volume

300 600 900 1200 1500


2019 AM - STFM
Traffic Volumes
Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh
Concord
Homebush
North Strathfield
Homebush West
Lidcombe
Berala
Strathfield
Burwood
Croydon
Haberfield
Leichhardt
Canada Bay
Five Dock
Chullora
Potts Hill
Enfield
Burwood Heights
Strathfield South
Summer Hill
Lewisham
Petersham
Dulwich Hill
Hurlstone Park
Marrickville
Mount Lewis
Lakemba
Belmore
Punchbowl
Roselands
Campsie
Clemton Park
Earlwood
Kingsgrove
Bexley North
Riverwood
Padstow
Narwee
Beverly Hills
Bexley
Arncliffe
Banksia
Wolli Creek
Tempe
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2019 PM - STFM
Level of Services

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

2019 PM - STM
Select Link Analysis

Select Link Traffic Volume

300 600 900 1200 1500

2019 PM - STFM
Traffic Volumes

- Traffic < 2000 veh
- Traffic < 4000 veh
- Traffic < 6000 veh
- Traffic < 8000 veh
- Traffic > 8000 veh

2026 AM - STFM
Level of Services

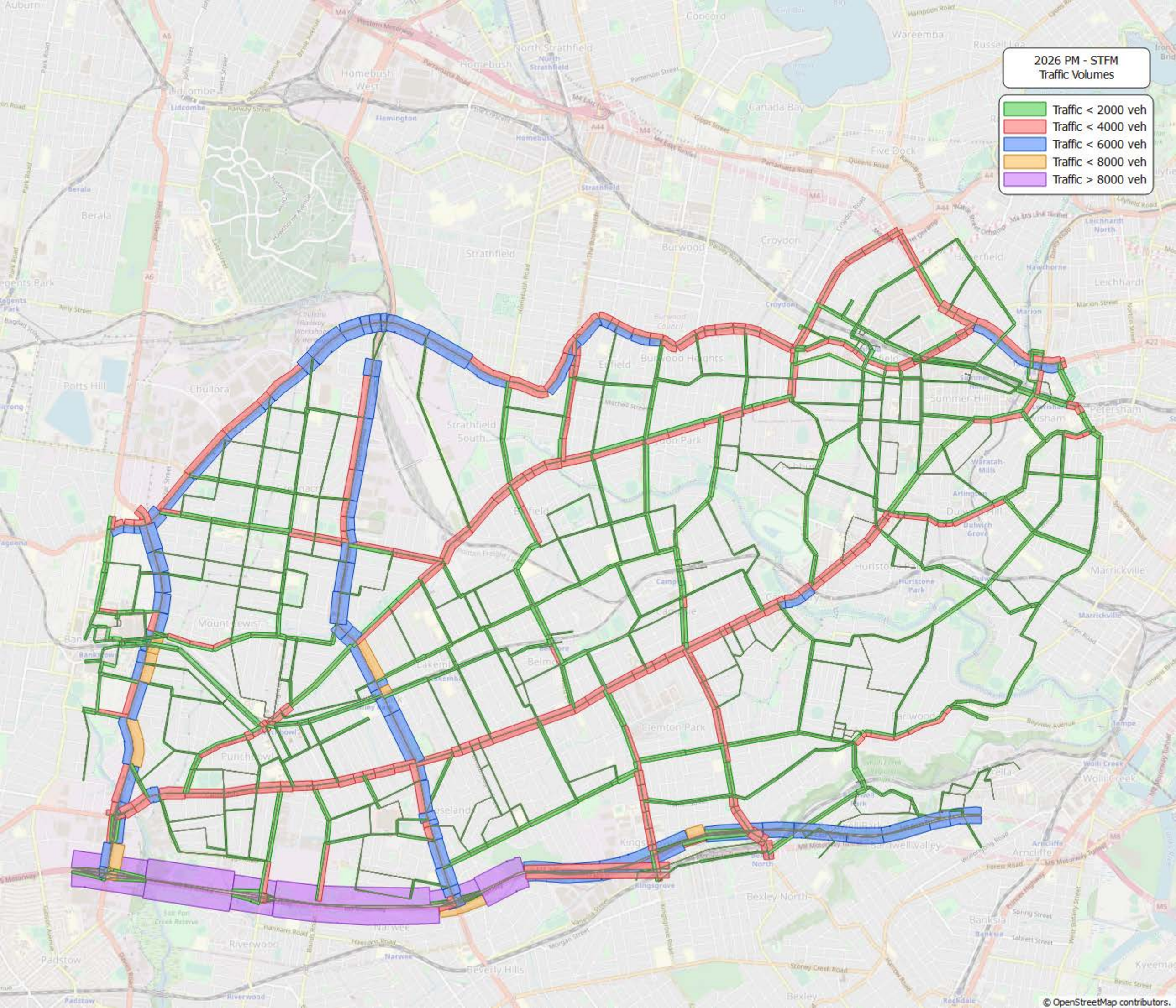
- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

2026 AM - STFM
Traffic Volumes

Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh

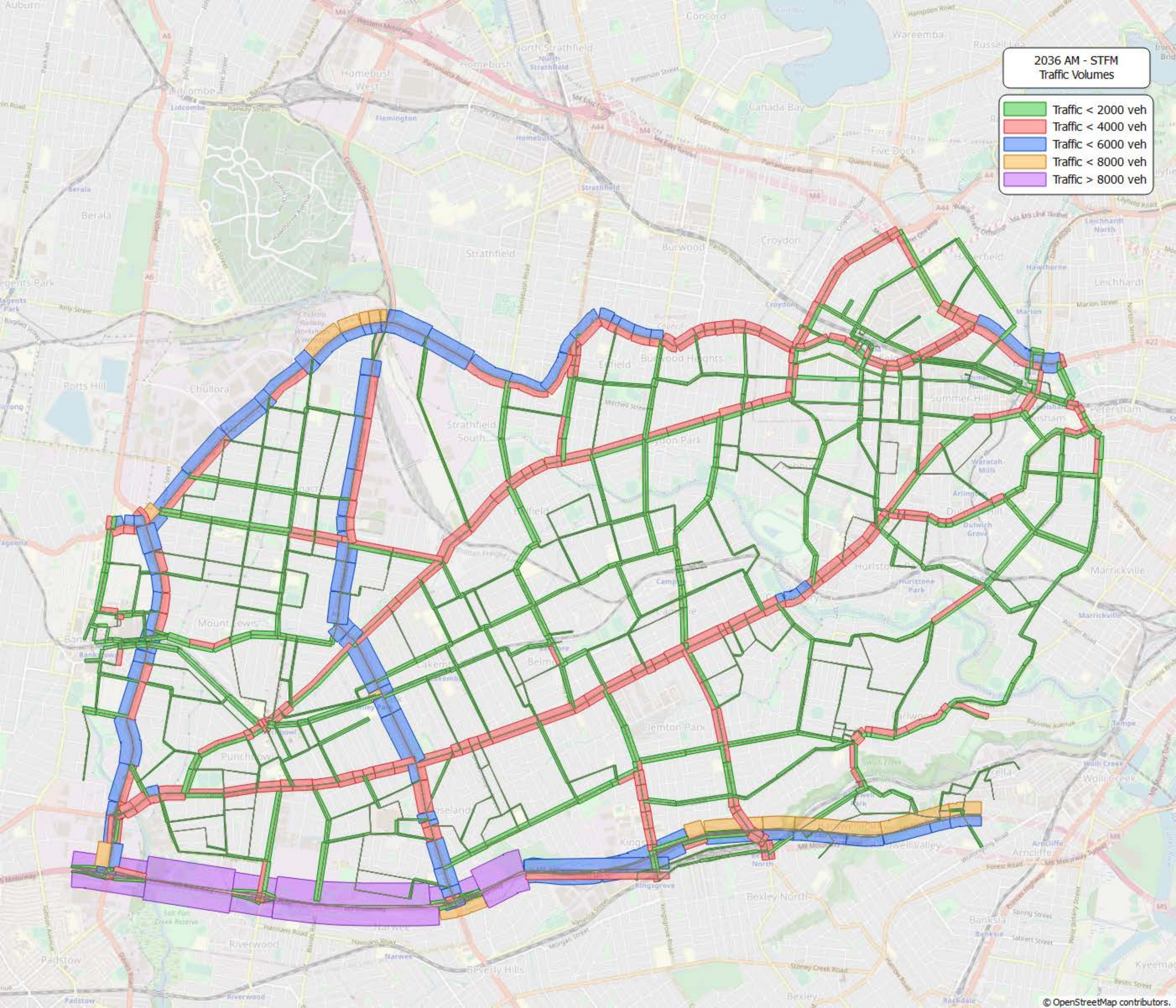
2026 PM - STFM
Level of Services

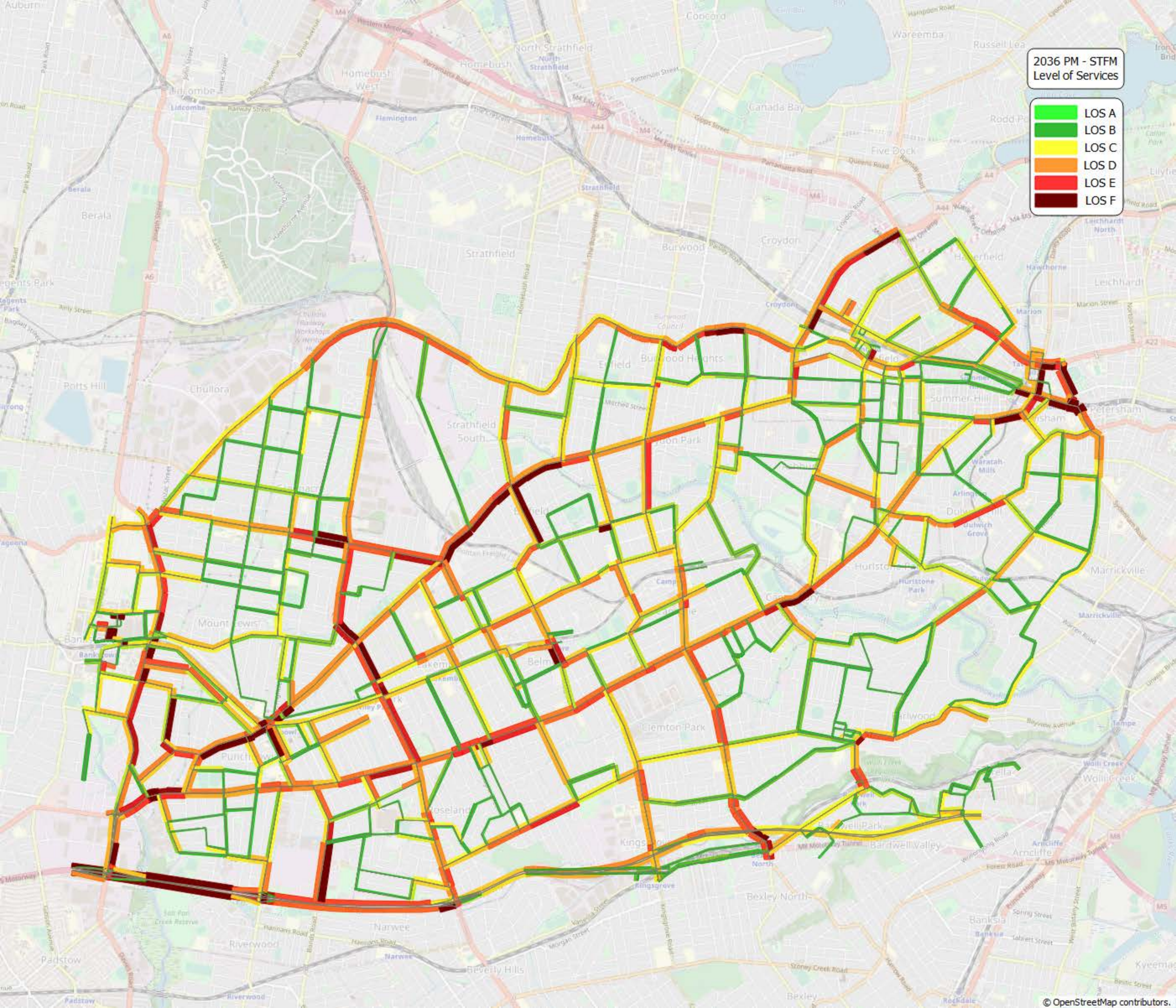
- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F


2026 PM - STFM
Traffic Volumes
Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh
© OpenStreetMap contributors.

2036 AM - STFM
Level of Services

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F


2036 AM - STFM
Traffic Volumes
Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh
© OpenStreetMap contributors.


2036 PM - STFM
Level of Services
LOS A
LOS B
LOS C
LOS D
LOS E
LOS F
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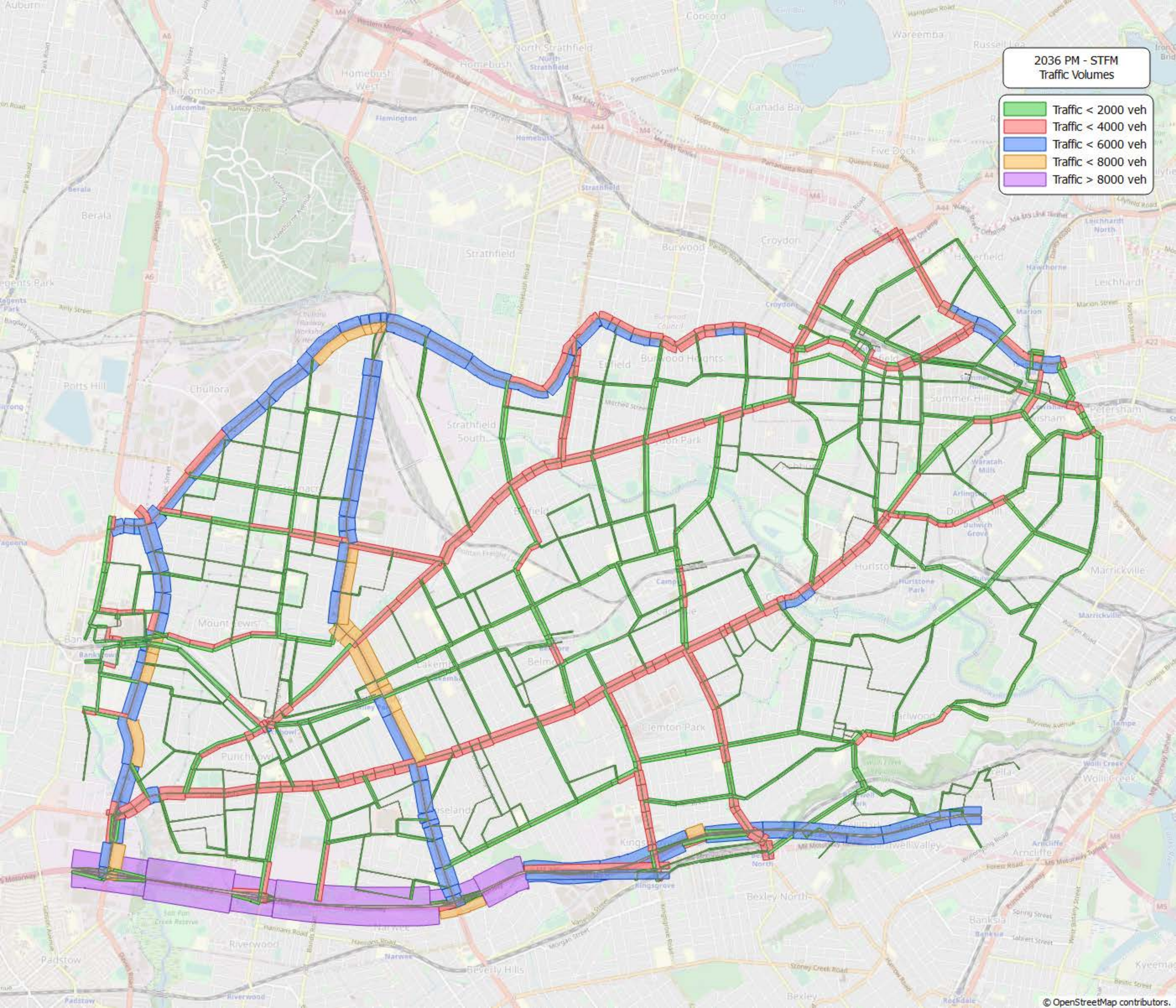
2036 PM - STFM
Traffic Volumes
Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh
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Option Results

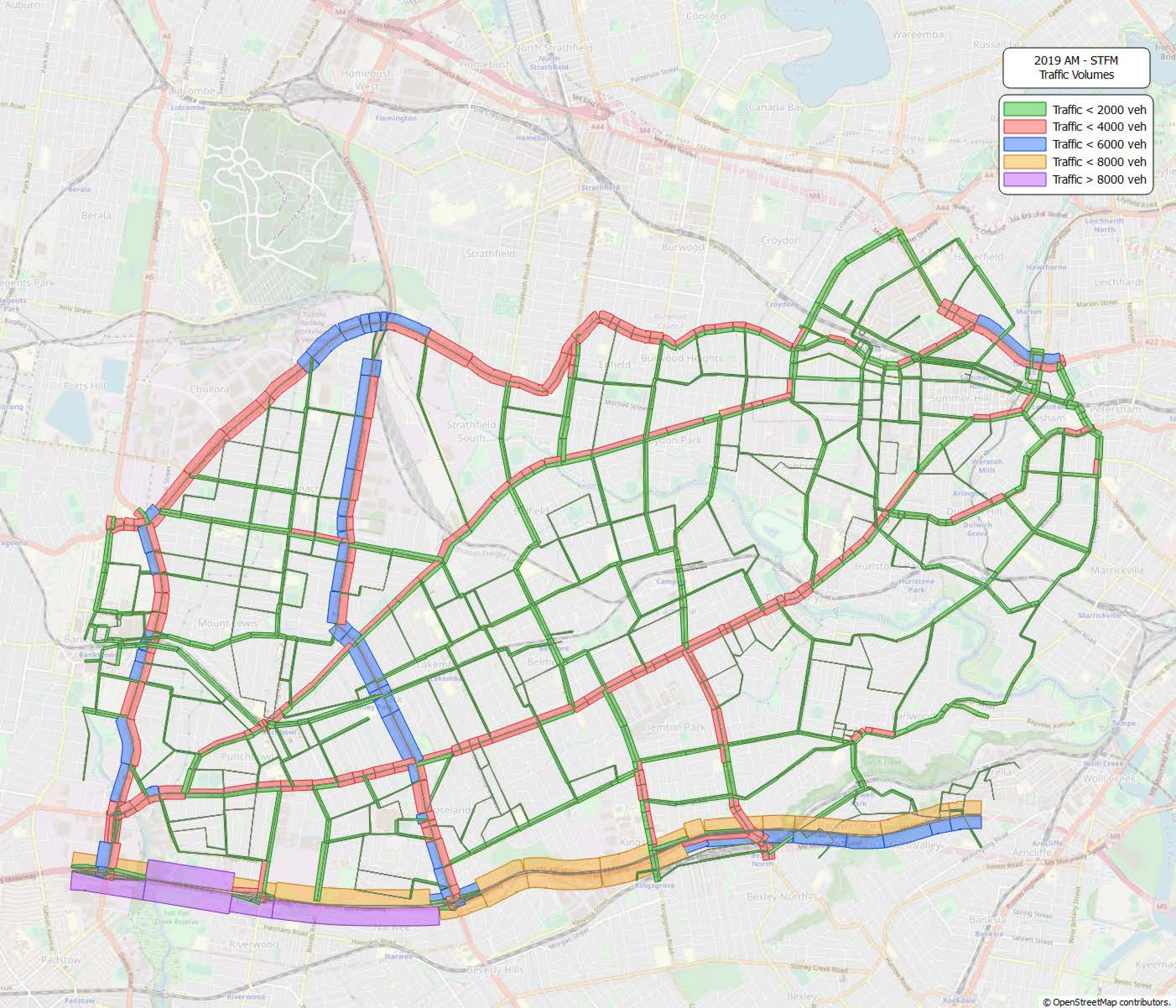
2019 AM - STFM
Level of Services

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

2019 AM - STM
Select Link Analysis

Select Link Traffic Volume

300 600 900 1200 1500


2019 AM - STFM
Traffic Volumes
Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh
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2019 PM - STFM
Level of Services

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

2019 PM - STM
Select Link Analysis

Select Link Traffic Volume

300 600 900 1200 1500

2019 PM - STFM
Traffic Volumes

- Traffic < 2000 veh
- Traffic < 4000 veh
- Traffic < 6000 veh
- Traffic < 8000 veh
- Traffic > 8000 veh

2026 AM - STFM
Level of Services

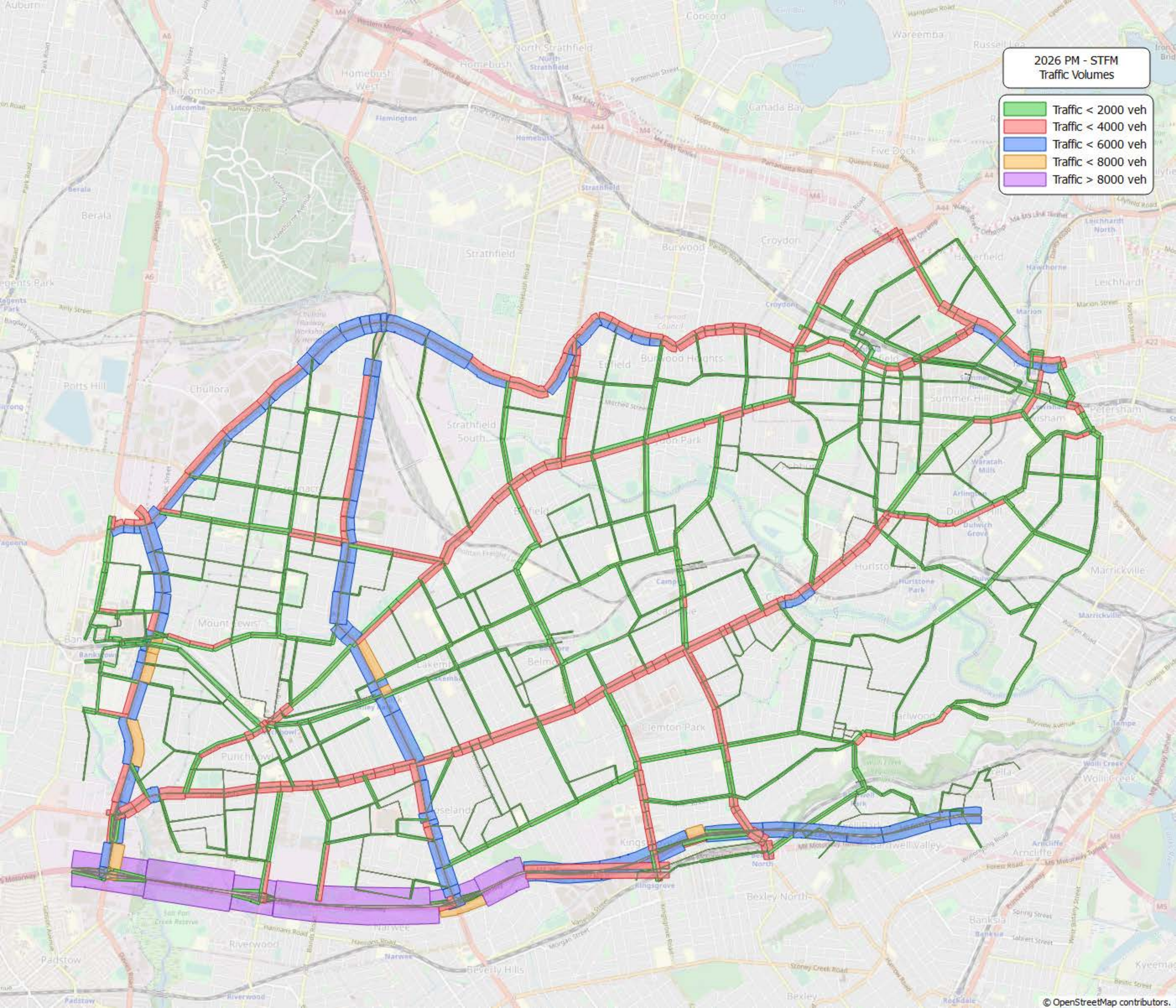
- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

2026 AM - STFM
Traffic Volumes

Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh

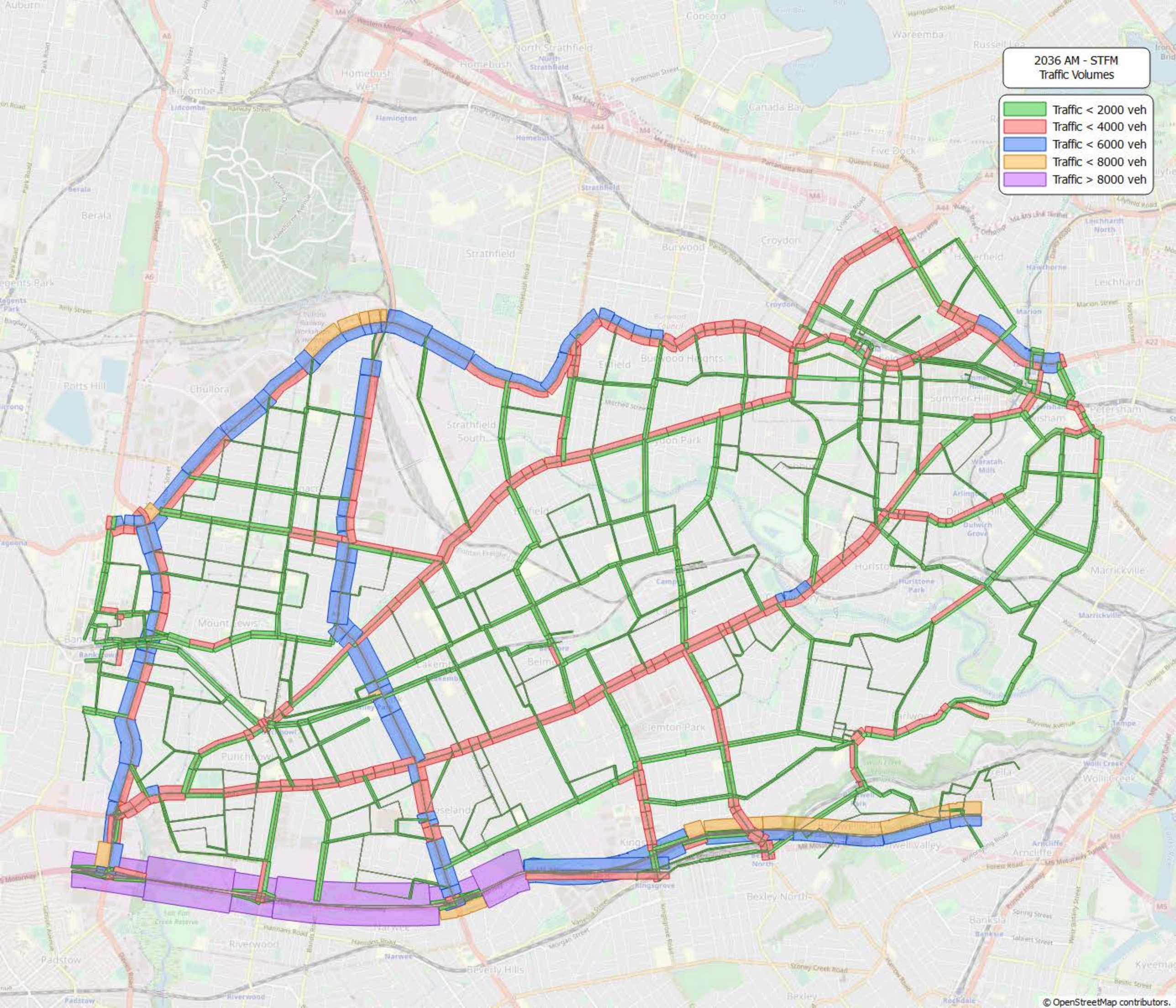
2026 PM - STFM
Level of Services

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F


2026 PM - STFM
Traffic Volumes
Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh
© OpenStreetMap contributors.

2036 AM - STFM
Level of Services

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F


2036 AM - STFM
Traffic Volumes
Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh
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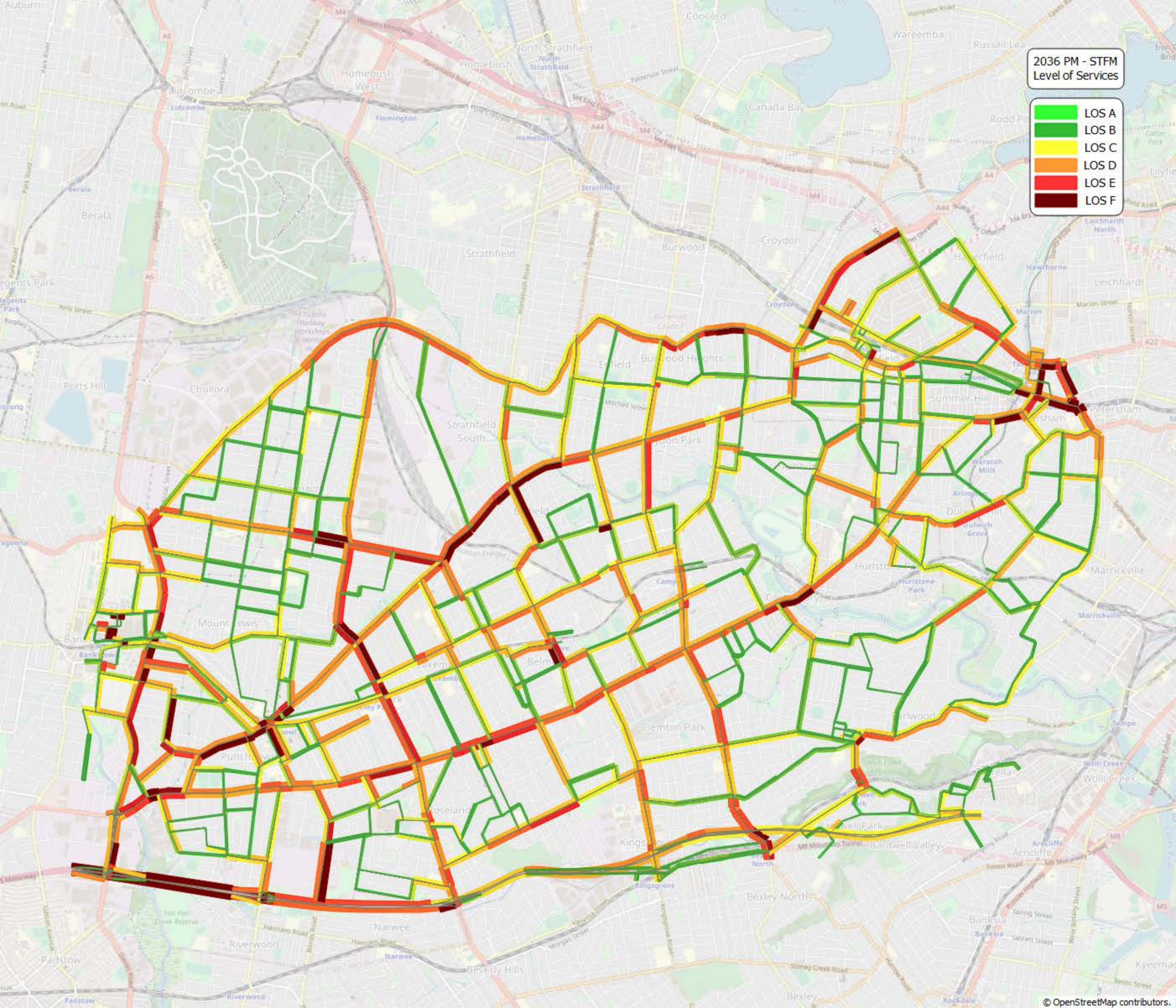
2036 PM - STFM
Level of Services
LOS A
LOS B
LOS C
LOS D
LOS E
LOS F
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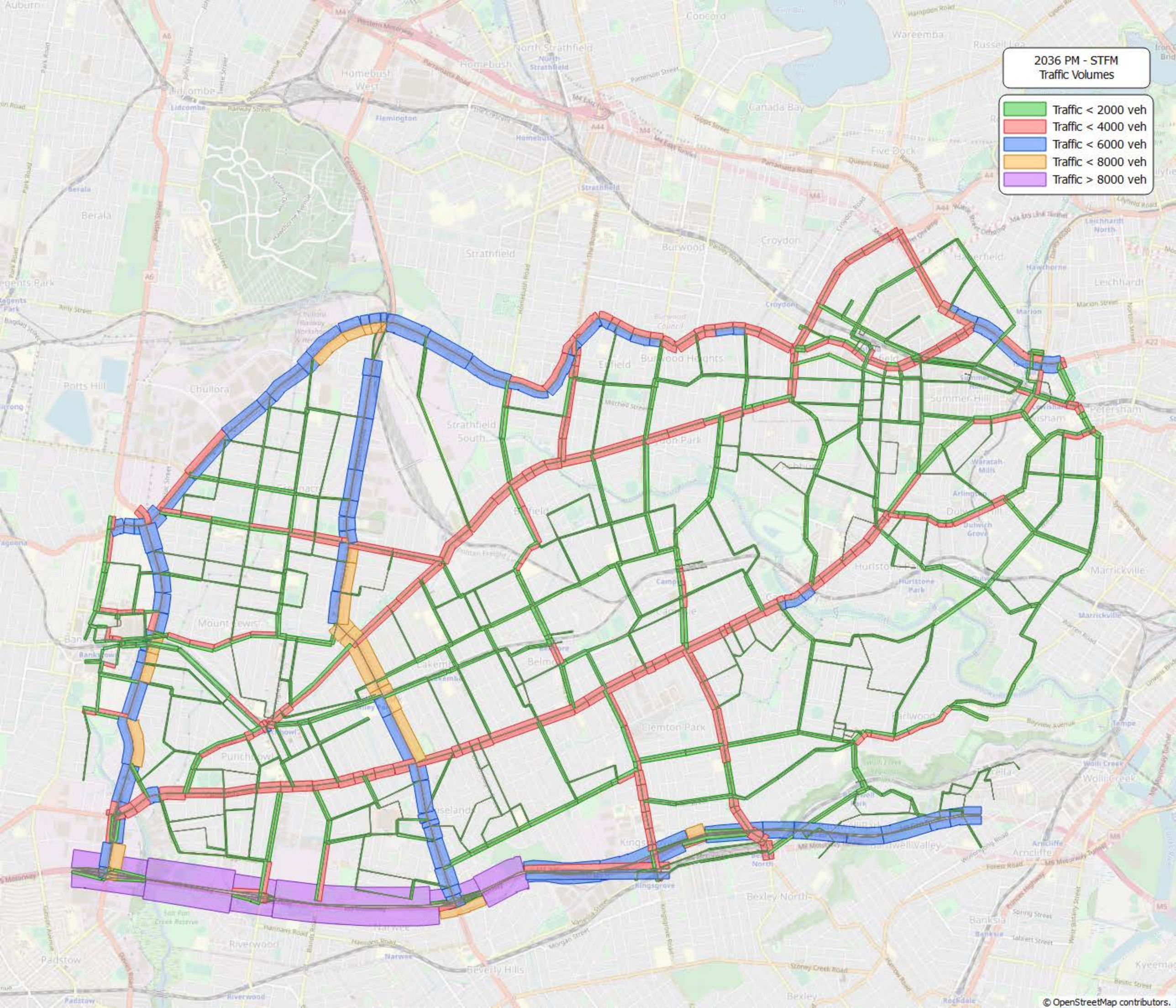
2036 PM - STFM
Traffic Volumes
Traffic < 2000 veh
Traffic < 4000 veh
Traffic < 6000 veh
Traffic < 8000 veh
Traffic > 8000 veh
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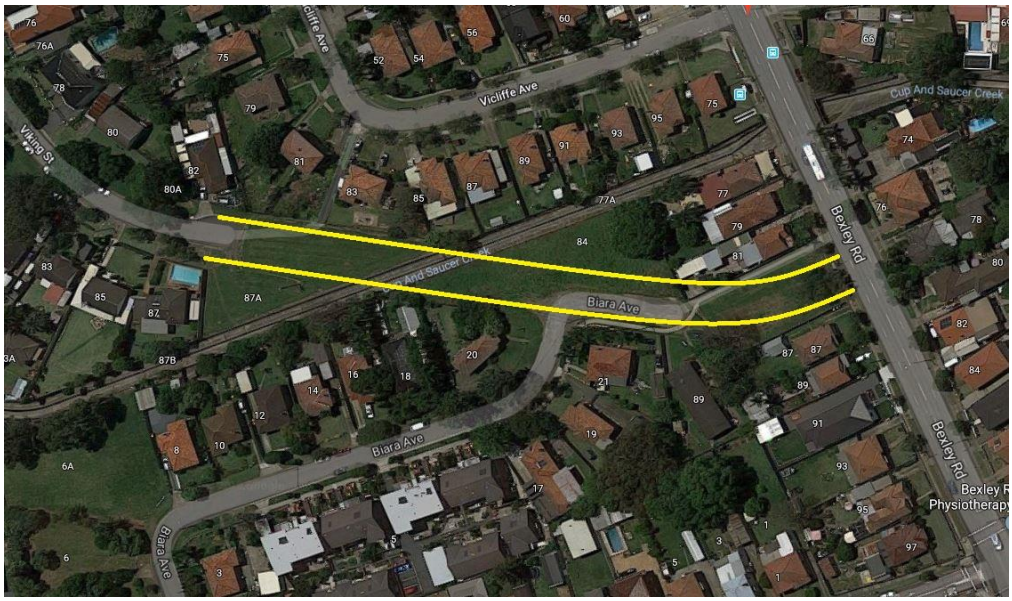
B.WEST CAMPSIE ALTERNATIVE ROUTE - KEY FEATURES

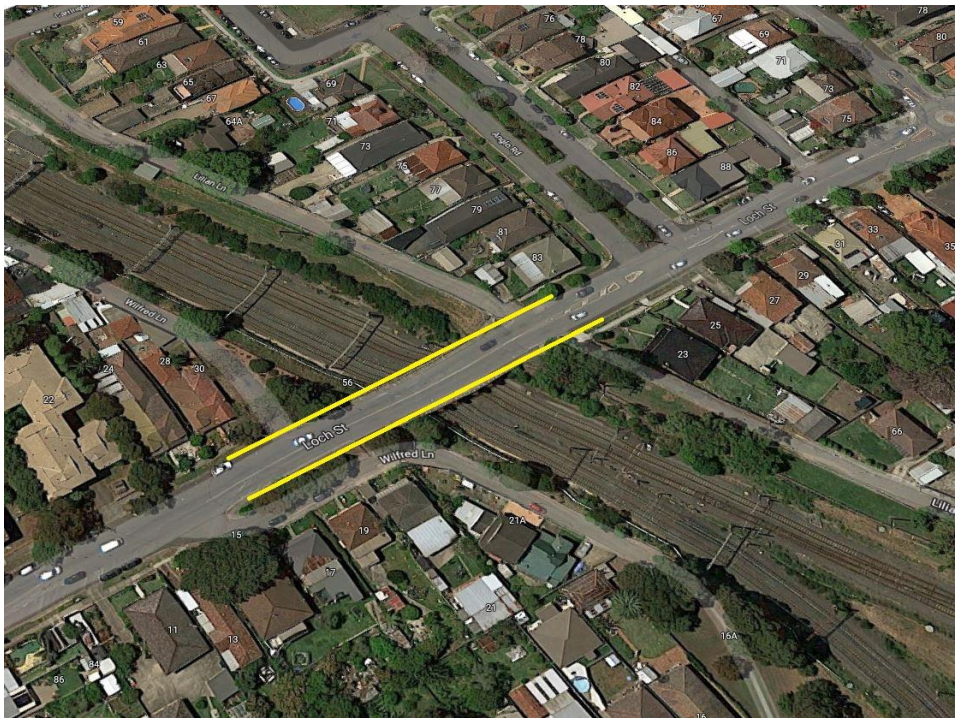
B



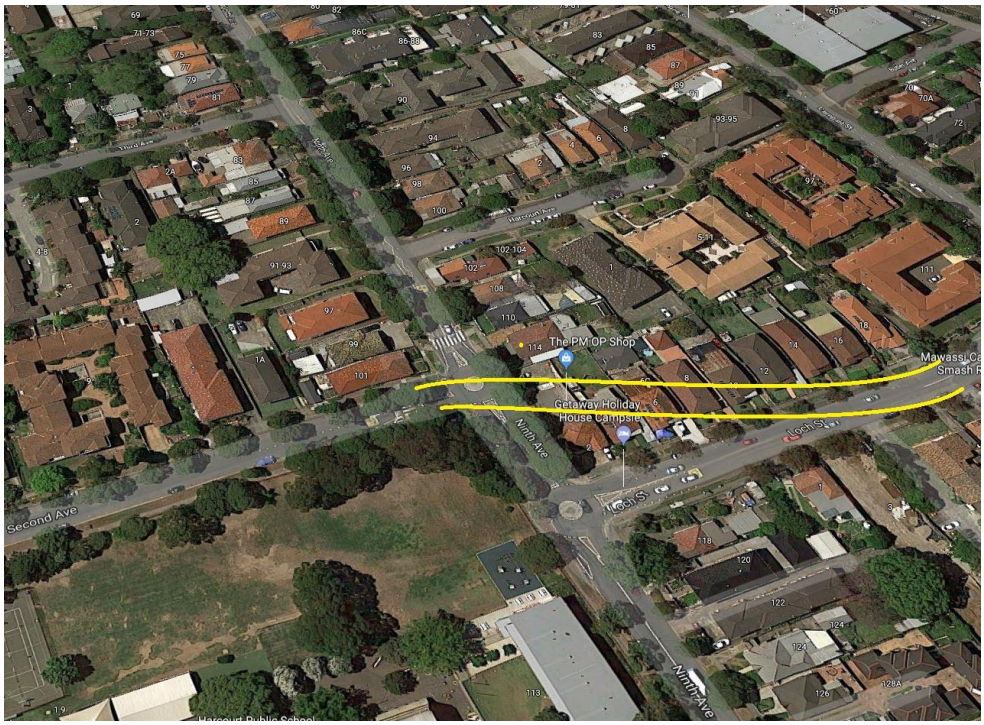
Southern end, connection from Bexley Road

Viking Street/Canterbury Road/Orissa Street

Orissa Street to Loch Street



Loch Street Rail Bridge and poor serviceability east along railway



Loch Street/ Ninth Avenue/ Second Street

Utilising land within Harcourt School

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