Final Report

Road Access Arrangements

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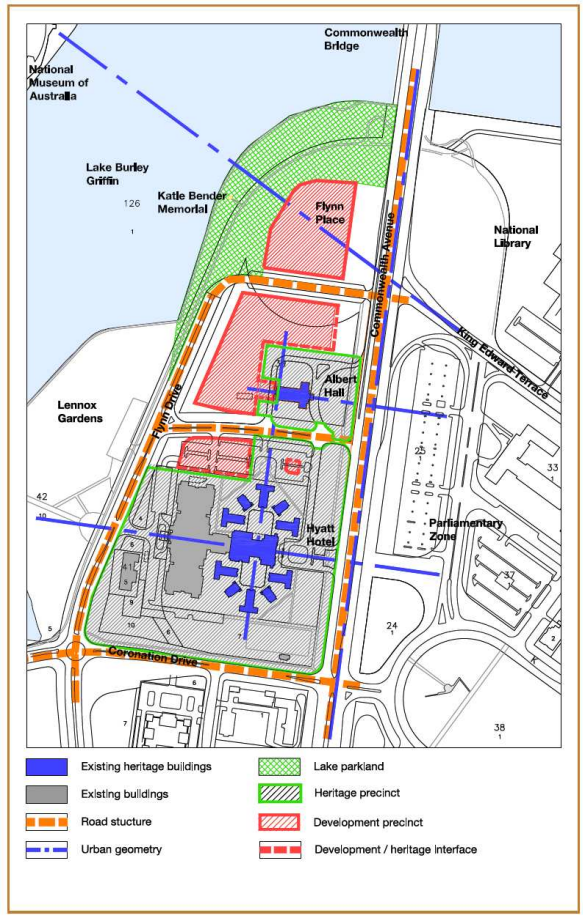
Albert Hall Precinct



April 2007

SMEC

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PREPARATION, REVIEW AND AUTHORISATION

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1 Introduction

1.1 General

Draft Amendment 53: Albert Hall Precinct has been prepared for community consultation and eventual consideration by the Minister for Local Government, Territories and Roads. This amendment (shown in Figure 1) proposes changes to the land use on the western side of Commonwealth Avenue. The proposed road access provision is consistent with the future road network for the Parliamentary Zone illustrated in the National Capital Plan shown in Figure 2. However, **Draft Amendment 53 shows that** King Edward Terrace and Commonwealth Avenue as intersecting at a **signalised four legged intersection rather than a signalised T junction.**

The road network modifications proposed in **Draft Amendment 53** are intended to provide opportunities for more appropriate use of land adjacent to Lake Burley Griffin and to moderate traffic speeds on Commonwealth Avenue. More pedestrian and cycle movements are expected to result from more active use of the area. A proposal to construct a pedestrian bridge from the area to the Acton Peninsula would add to pedestrian activity if the project proceeds.

Commonwealth Avenue is a multilane arterial road with at grade intersections, some with traffic signals, and some with road loops. It currently operates under some level of traffic congestion during morning AM and evening PM peak periods. Generally, it is free flowing throughout the rest of the working days and also during weekends.

The further development of the Albert Hall Precinct as a cultural tourism area is not expected to affect peak period traffic in the area as it will not generate or attract the usual commuter travel that would be the case with residential or office developments. The Precinct is expected to generate higher levels of off peak car travel, bus and coach movements as well as pedestrian traffic.

1.2 Background

SMEC is currently undertaking a comprehensive examination of the Parliamentary Zone (PZ) road network on behalf of the National Capital Authority (NCA) titled the **Parliamentary Zone Traffic Study**. Figure 3 shows the main study area.

The **Parliamentary Zone Traffic Study** involves traffic modelling both at a strategic as well as at an operational level. The strategic traffic modelling is based on a Canberra transport planning model that is mainly used to test the impact of road network changes proposed in the Parliamentary Zone on the neighbouring road network particularly the road network encompassed within the Parliamentary Triangle.

The operational traffic modelling developed by the **Parliamentary Zone Traffic Study** is based on calibrating a micro-simulation model for the road network in the Parliamentary Zone study area. This is being used in testing traffic operability in light of the selected strategic road network options, proposed legible road hierarchy and revised access arrangements within the PZ.

This report draws on the main study for data but its focus is to propose and test a number of access options along Commonwealth Avenue that are necessary to provide appropriate access arrangement to the Albert Hall Precinct. Proposed options are also meant to cause minimum disruption to traffic travelling along Commonwealth Avenue. All of the considered options are consistent with the National Capital Plan and in particular Amendment 33: Parliamentary Zone Review.

The Draft Amendment 53 report is based on the strategic modelling of the main report, and intersection modelling. The intersection analysis undertaken for this report has been confirmed by micro-simulation modelling.

The sustainable transport plan of the ACT government as well as the National Capital Authority vision of having a Parliamentary Zone that is sustainable in all of its components including transport, all in all, is expected to lead to a transport system that better promotes public transport as well as encourages pedestrian and cycling activities. This is consistent with the planning established in the 1970's by the NCDC and reaffirmed in various strategic plans since, including the National Capital Plan.

1.2.1 Parliamentary Zone Review

In 2001, National Capital Plan **Amendment 33: Parliamentary Zone Review (PZR)** was approved by the Australian Parliament. As shown in Figure 2, the proposals included the removal of a section of Flynn Drive and the provision of an at-grade signalised T-intersection between King Edward Terrace and Commonwealth Avenue.

The PZR identified that traffic is an important issue in the Parliamentary Zone and adjacent precincts. It confirmed that Commonwealth and Kings Avenues are major traffic routes connecting the north and south of Canberra and both carry large volumes of peak hour traffic.

In terms of the Parliamentary Zone itself, commuters travelling to and from Civic, Barton and Fyshwick use the east-west roads that go through the Zone, i.e. King Edward, King George and Queen Victoria Terraces leading to a disproportionate amount of through-traffic and as a consequence there are a number of traffic and pedestrian safety problems. These problems include:

1. the speed at which traffic moves along King Edward Terrace;
2. the proximity of a number of intersections;
3. legibility and accessibility for those unfamiliar with the local road network (tourists and infrequent local visitors) when entering and leaving the Parliamentary Zone;
4. the lack of pedestrian crossing points;
5. Poor visibility at intersections and at existing pedestrian crossings;
6. The mix between cars and the large number of commercial vehicles, especially trucks, which use King Edward Terrace, heightens these problems.

To assist in addressing some of the issues the PZR identified a range of improvements to the road layout and design to be introduced progressively. These include:

- Establishing a legible hierarchy in the roads by giving each a different character, drawn from variables such as the road surface and width, avenue planting and directional signage;
- Changing King Edward Terrace from a thoroughfare to a main street to facilitate clear and direct access and egress to/from the Zone and to discourage through traffic and encourage pedestrians and cyclists by:
  - creating 'T' intersections and traffic lights at its junctions with Commonwealth and Kings Avenues;
  - Rationalising the number of entry points to the individual campuses;
  - Adding pedestrian crossing points to provide continuity in the path system.
  - Considering a load limit, with the exception of service vehicles and tourist coaches, as a traffic calming and safety measure;
  - Removing Bowen Place, Flynn Place, and the straight sections of Langton Crescent and Dorothy Tangney Place. These roads were built to a large scale in the expectation that Parliament House would be built on the lakeshore rather than on Capital Hill. Their removal is possible if 'T' intersections are made at the intersections of King Edward Terrace, Commonwealth and Kings Avenues; and
  - Consideration of a speed limit reduction.

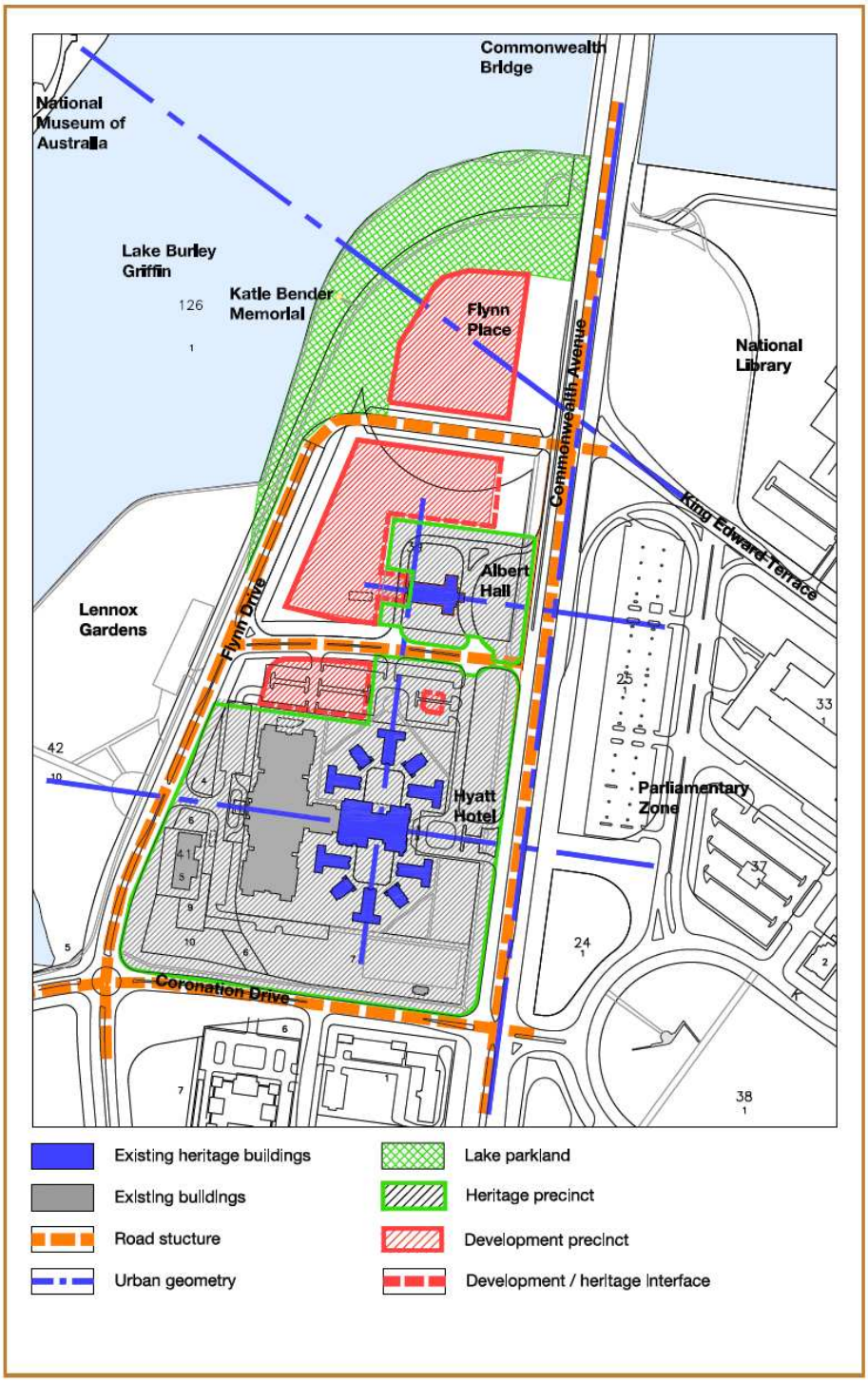


Figure 1: Indicative Urban Structure – Albert Hall Precinct

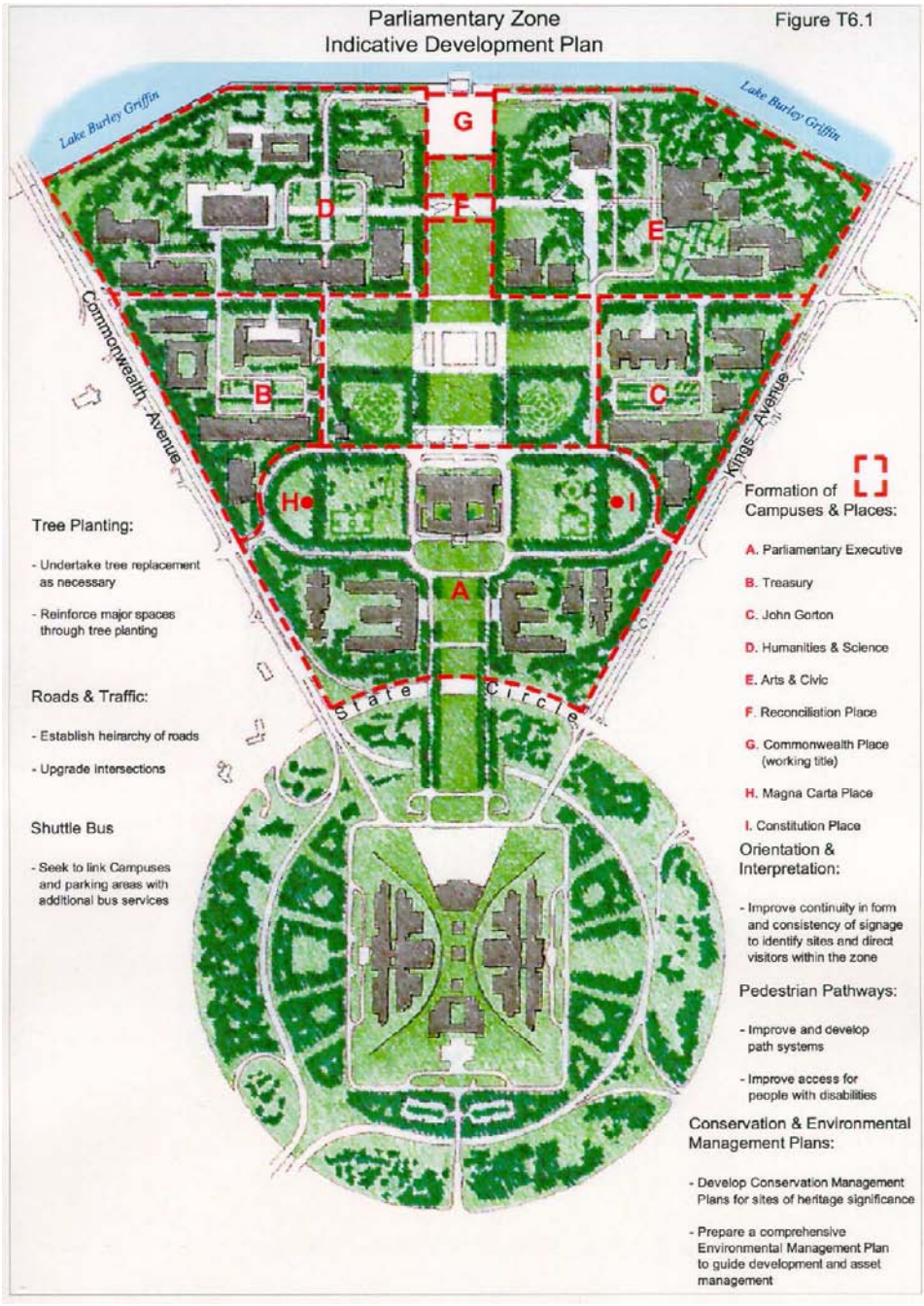


Figure 2: Amendment 33: Parliamentary Zone Review

Figure 3: Main Study Area

2 Objectives

The primary objective of this report is to propose a new indicative access arrangement for the Albert Hall Precinct along Commonwealth Avenue that:

- Allows good vehicle and pedestrian accessibility to the Albert Hall Precinct
- Allows good vehicle and pedestrian accessibility and connectivity between the Parliamentary Zone and the Albert Hall Precinct
- Does not unduly comprise the functionality of Commonwealth Avenue as a main arterial carrying traffic between the north and south areas of Canberra.

3 Methodology

The methodology for this study is detailed in Figure 4. The components of this methodology include:

- Traffic Data Collection
- Calibrating a 2006 strategic transport model for Canberra using TransCAD.
- Coordinate with NCA to develop conceptual options for future access arrangement to the Albert Hall Precinct
- Utilise TransCAD model to obtain future 2021 AM peak traffic predictions along the considered road network.
- Conduct intersection analysis for considered future access arrangements.
- Conduct an evaluation of considered options and identify the preferred option.

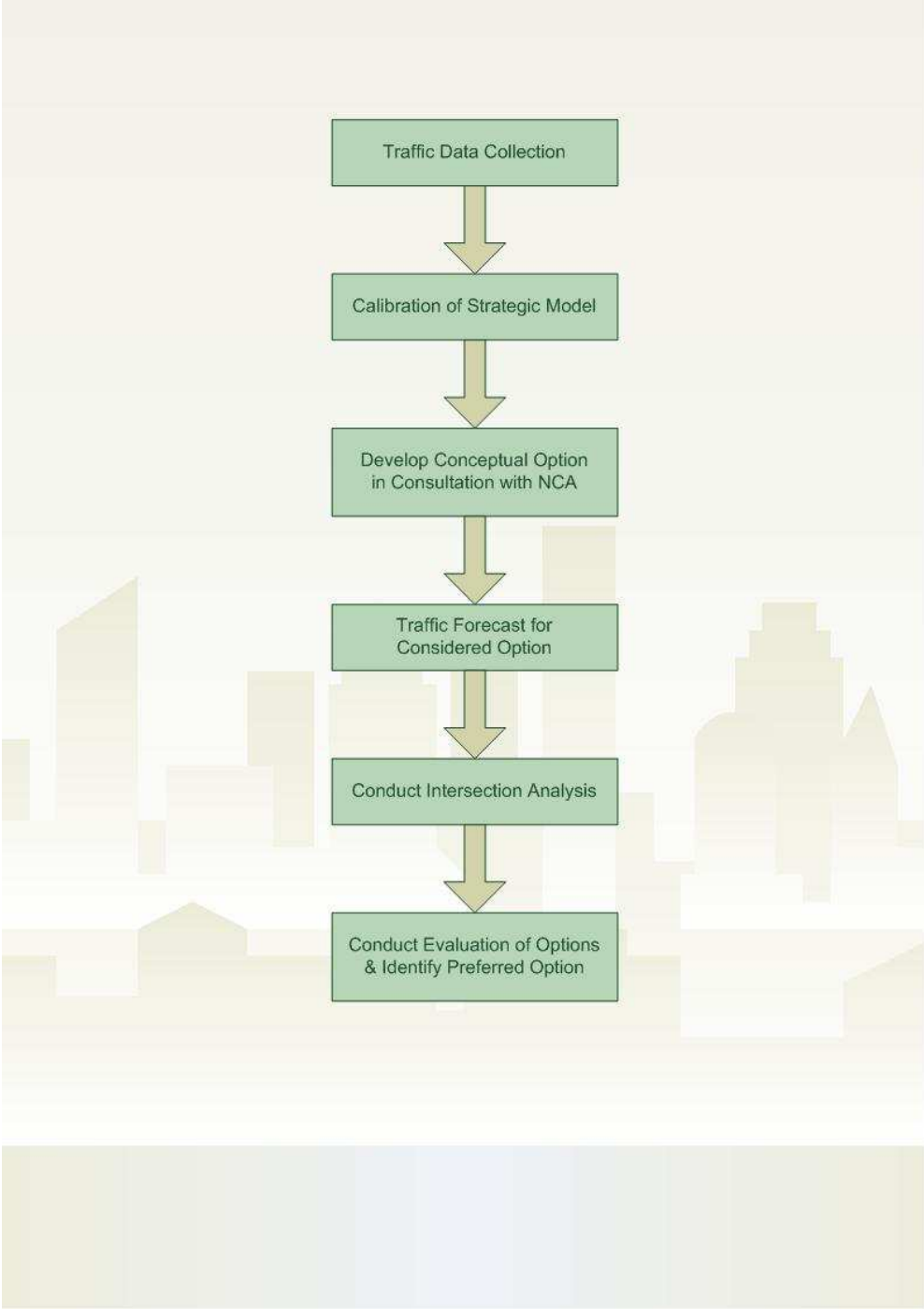


Figure 4: Study Methodology

4 Transport Modelling

In order to calibrate the strategic and operational traffic models to current traffic conditions, SMEC obtained the required supplementary traffic data. The location of these counts is shown in Figure 5. These were selected based on the level of detail in the network modelling and the availability and intensity of ACT traffic counts. SMEC has obtained SCATS counts for all signalised intersections in the area.

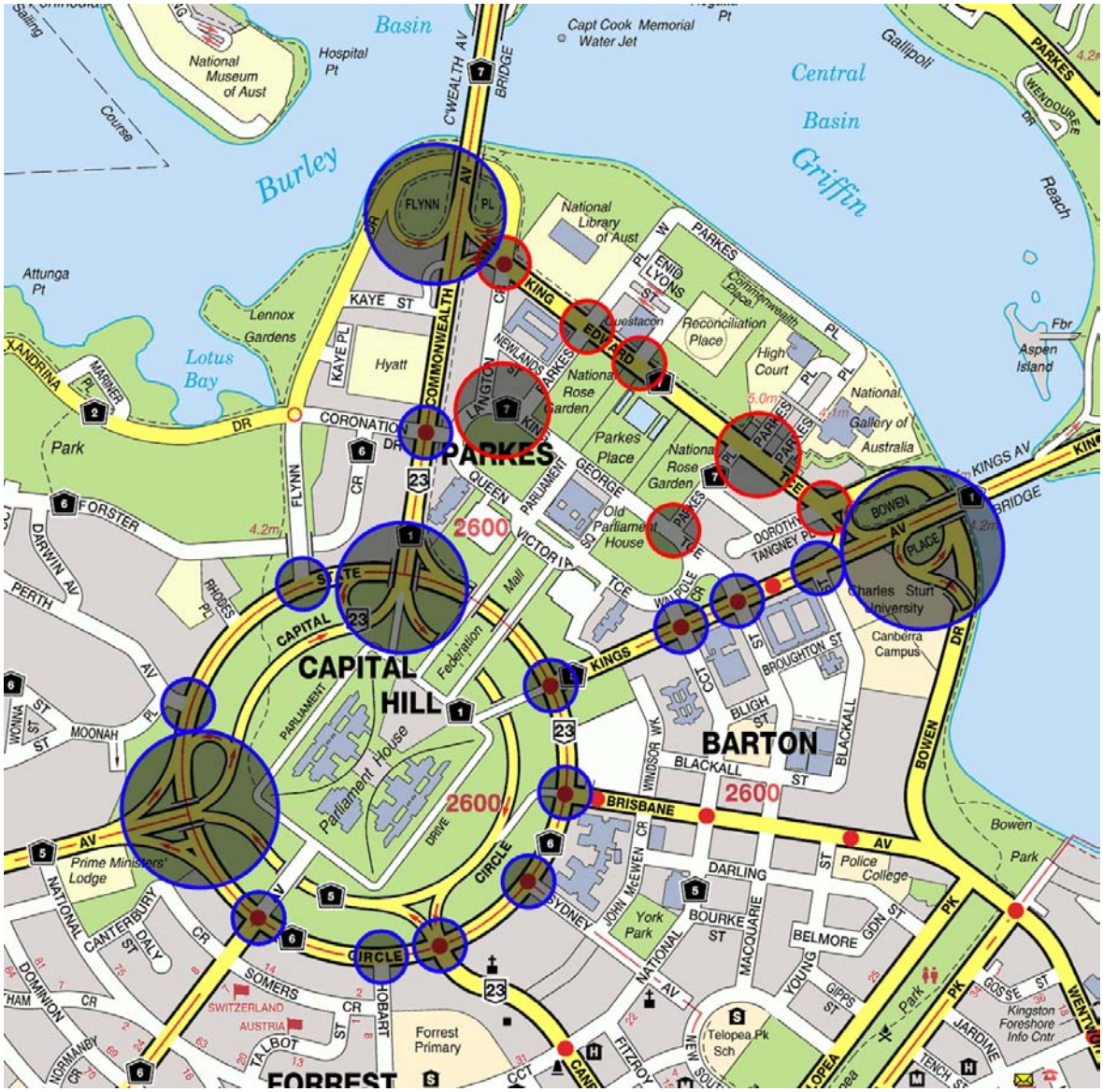


Figure 5: Locations of Traffic Counts Conducted by SMEC

4.1 SMEC TransCAD Strategic Transport Model

SMEC currently maintains a strategic Transport Model for Canberra. This model is based on the ACTPLA land use and population data as well as the basic road network and AM seed matrix provided by ACTPLA. SMEC uses the state of the art transportation modelling software known as TransCAD. TransCAD is a well known package that is designed specifically for use by transportation professionals to store, display, manage, and analyse transportation data. TransCAD combines Geographic Information Systems (GIS) and transportation modelling capabilities in a single integrated platform, providing capabilities that are unique and unmatched. SMEC's TransCAD model will act as a modelling tool which can be used to obtain the impact of land use and road network changes on the traffic circulation in the study area as well as on neighbouring roads. SMEC has used its TransCAD model in several studies in Canberra. Throughout these studies, SMEC was able to refine, update and maintain its TransCAD model.

Using its in house developed transport planning model for Canberra, SMEC calibrated a 2006 traffic model that simulates in a strategic way the traffic flows along the road network constituting the Parliamentary Zone as well as neighbouring roads.

4.2 Calibrating Strategic AM Transport Model for Parliamentary Zone

In order to calibrate SMEC strategic transport model for the AM peak period for the year 2006, several steps are conducted. These are summarised in the following sub-sections.

4.2.1 Liaise with ACTPLA to provide the most appropriate land use, population and socio-economic data file for Canberra

SMEC obtained a March 2005 dated land use and socio economic data file for the city of Canberra from ACTPLA. which reflects the Canberra Spatial Plan.

4.2.2 Review of zoning system in the study area

Based on examining the zoning system adopted in the current SMEC strategic model for Canberra, SMEC decided to adopt the same zoning system. In this context, the current SMEC strategic model contains 807 zones out of which 6 are PZ zones.

4.2.3 Review of road network representation in the study area

All available data for updating the 2006 road network coding was examined. SMEC refined its TransCAD model to develop a better representation of the current road network. TransCAD's GIS facility is unique in providing the opportunity to overlay the modelled network on photograph, PDF files or similar accurate base to assist with network modelling.

- Roads that were not already reflected in the model were added;
- Link information that was no longer relevant was removed;
- Zone information on the endpoint layer was updated;

SMEC has thoroughly reviewed and updated the network coding file especially within the study area. A sub-area network for study area will be extracted from SMEC's larger TransCAD model of Canberra. The network itself is made of nodes connected by links. The sub-area network will be modified to match a more refined zonal system, where required, and to ensure more accurate trip loading. Additional links and centroid connectors will be added where necessary.

4.2.4 Computation of Trip Generation and Attraction in year 2006

SMEC used the 2005 land use files provided by ACTPLA. At the time of this report, SMEC was not able to obtain an update of this file. The 2006 land use and socioeconomic parameters were interpolated. SMEC applied the appropriate trip generation and attraction factors to the land use and socio economic data to obtain generated and attracted trips for the year 2006 for each zone. Trip ends are estimated as a function of population trip making patterns as well as on the trip attraction factors attributed to land use and employment patterns. Such estimate will only include existing developments. Land use and socio economic information for each zone is multiplied by appropriate trip generation and trip attraction factors and summed into in/out trip ends for each zone.

$$GeneratedTrips_i^{2006} = \sum LandUse_i \times TripGenerationFactor$$

$$AttractedTrips_j^{2006} = \sum LandUse_j \times TripAttractionFactor$$

i = Generation (Production) Zones, j = Attraction Zones, i = j

4.2.5 Estimate 2006 Origin/Destination Trip Matrix

SMEC used the provided ACTPLA seed matrix with the 2006 generated and attracted trips in an effort to estimate an initial 2006 Origin /Destination matrix. The available seed origin-destination (O/D) matrix was recalibrated for the year 2006 using the computed trip ends. This is done using the matrix estimation facility in TransCAD and employing the Fratar factoring method for the generated and attracted trips. Fratar method is a form of Doubly Constrained Growth Factor Method. This method iteratively adjusts the values to match the total number of trip ends produced by the land use data. By this method individual trips from one zone to another will be scaled so that the total to and from trips balance, and the totals are matched to the trips ends. If the pattern in the seed matrix is appropriate, this process gives a good distribution of trips and OD matrix.

4.2.6 Estimate 2006 Origin/Destination Trip Matrix Based on Traffic Counts

SMEC used the initially estimated O/D matrix with the collected key traffic counts in an effort to estimate a 2006 Origin /Destination matrix that can be used for traffic assignment. The TransCAD matrix estimation from traffic counts module was utilised. This method iteratively adjusts the matrix so as when assigned it produces a loaded road network that is matching to a great extent with the utilised relevant traffic counts.

4.2.7 Calibrate model against observed traffic counts

The 2006 strategic transport model is calibrated by conducting an assignment run using the estimated O/D matrix and comparing the assigned flows on the road network with the relevant collected 2006 traffic counts. This process is reiterated until an acceptable convergence between model flows and observed flows is reached. Several runs were performed until an acceptable degree of convergence was reached. The basic objective of using assignment techniques is to assign trips in the calibrated 2006 O/D matrix and load these as flows onto the 2006 road network, thus producing a loaded road network with 2006 traffic flows.

The modelled flows were compared to actual traffic counts in the Origin/Destination estimation process and are within acceptable limits. In this context, the model is considered to be calibrated and can be used for further study.

The GEH Statistic is a formula used in traffic engineering, traffic forecasting, and traffic modelling to compare two sets of traffic volumes. The GEH Statistic gets its name from Geoffrey E. Havers, who invented it in the 1970s while working as a transport planner in

London, England. Its mathematical form is similar to a chi-squared test, however it is an empirical formula that has proven useful for a variety of traffic analysis purposes. The formula for the "GEH Statistic" is:

$$GEH = \sqrt{\frac{2(M-C)^2}{M+C}}$$

Where *M* represents the traffic volume from the traffic model (or new count) and *C* represents the real-world traffic count (or the old count). A generally accepted measure of the accuracy of a transport model is based on 85% of the GEH values being less than 5 and 100% being less than 10.

5 Options of Proposed Access Arrangement

The strategic transport modelling has been undertaken to provide future traffic predictions in the year 2021 in light of the proposed options for road access arrangement to the Albert Hall Precinct to enable informed decisions with respect to the development of the future road network for the study area. In particular the model can provide traffic information sufficient to :

- Examine plans for a future road network
- Provide a structure for evaluation of the traffic and transport implications of the proposed road network
- Identify current and evolving traffic problems and issues

There have been five conceptual access arrangement options identified in discussion with the NCA as potential road network changes along Commonwealth Avenue to allow for access to and from the Albert Hall Precinct with minimum disruption to through traffic along Commonwealth Avenue. These are detailed in Table 5-1.

Table 5-1: Access Options to Albert Hall Precinct

Option	Description
1	A new 4 leg intersection at Commonwealth Avenue/King Edward Terrace/ New Albert Hall Access road with 4 phase signal control allowing all turning movements. This is accompanied by retaining access to Albert Hall Precinct via Kaye street and Coronation Drive.
2	A new 3 leg intersection at Commonwealth Avenue/King Edward Terrace with 3 phase signal control. This is accompanied by retaining access to Albert Hall Precinct via Kaye Street and Coronation Drive.
3	A new 3 leg intersection at Commonwealth Avenue/King Edward Terrace with 2 phase signal control. This is accompanied by retaining access to Albert Hall Precinct via Kaye street and Coronation Drive.
4	A new 3 leg intersection at Commonwealth Avenue/King Edward Terrace with 2 phase signal control. This is accompanied by a new signalized 3 phase T intersection at Kaye Street/Commonwealth Avenue to provide a recognisable access to the Albert Hall Precinct from both north and southbound carriageways of Commonwealth Avenue.
5	A new 4 leg intersection at Commonwealth Avenue/King Edward Terrace/ New Albert Hall Access road with 2 phase signal control. This is accompanied by introducing a new signalized 2 phase T intersection at Kaye street/Commonwealth Avenue to provide a recognisable access to the Albert Hall Precinct from both north and southbound carriageways of Commonwealth Avenue.

5.1 Estimate Future Trip Ends

In this step, the 2021 trip ends are estimated for each of the traffic zones. Trip ends are estimated as a function of population trip making patterns as well as on the trip attraction factors attributed to land use patterns. Such estimate will include future developments.

5.2 Estimate Future 2021 Origin/Destination Trip Matrix

The 2006 calibrated origin-destination (O/D) matrix is updated for the year 2021 using the computed 2021 trip ends. This is done using the matrix estimation facility in TransCAD and employing the Fratar factoring method for the generated and attracted trips. Forecasts of future expected inter-zonal trips is vital as these are meant to represent the demand expected to utilize the road network. The calibrated 2006 O/D matrix will be balanced against future trip ends and newly calibrated future O/D matrix can be then obtained. This is followed by using a balancing procedure known as the average weighted sum to balance the rows and columns to produce an equal sum.

5.3 Source and Compile Future network coding data

Representations of future road networks are developed. This is mainly done by updating the base year network to represent the five considered road network access options in the study area.

5.4 Conduct Assignment Runs Using TransCAD

Using traffic assignment techniques, future 2021 O/D matrices will be assigned onto their respective future road networks. In order to model the effects of possible congestion that will develop during the later forecast years, stochastic equilibrium assignment technique was used. Such assignment technique assumes that a driver route choice is based on his/her perception and trade off of travel time and capacity. As a result of this step, future demands are loaded as traffic flows onto expected future:

- 2021 (road network option 1)
- 2021 (road network option 2)
- 2021 (road network option 3)
- 2021 (road network option 4)
- 2021 (road network option 5)

The main output of this modelling exercise would be to obtain a loaded road network for the Parliamentary Zone and neighbouring roads. This includes various midblock portions of major roads in the study area.

6 Intersection Analysis

This preliminary study utilises traffic forecasts for Commonwealth Avenue and connecting roads to assess intersection performance for various options. The computer software SIDRA Intersection was used to determine relative performance of the options. The relative performance is expressed as a Level of Service (LOS). According to aaSidra and the Highway Capacity Manual, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-min analysis period. Definitions of Level of Service by Austroads for a general case are included below.

LOS A describes operations with very low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favourable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LOS B describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

LOS C describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D describes operations with control delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with control delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

Table 6-1: Intersection Level of Service According to Signal Control Delay

Level of Service	Control Delay (d) per Vehicle in Seconds	
	Signals and Roundabouts	Stop and Give-Way
A	d ≤ 10	d ≤ 10
B	10 < d ≤ 20	10 < d ≤ 15
C	20 < d ≤ 35	15 < d ≤ 25
D	35 < d ≤ 55	25 < d ≤ 35
E	55 < d ≤ 80	35 < d ≤ 50
F	80 < d	50 < d

Figures 6 to 10 show the intersection configuration, phasing, overall LOS and queue length for the access options considered.

All options have been analysed with no intervention to Coronation Drive/Commonwealth Avenue intersection. As shown in Figure 11, this intersection is currently operating at LOS E and is expected to deteriorate to LOS F in 2021 as shown in Figure 12. This demonstrate that the deterioration in LOS at Coronation Drive/Commonwealth Avenue intersection is mainly caused by increase in traffic volumes regardless of Albert Hall Precinct Access Arrangements.

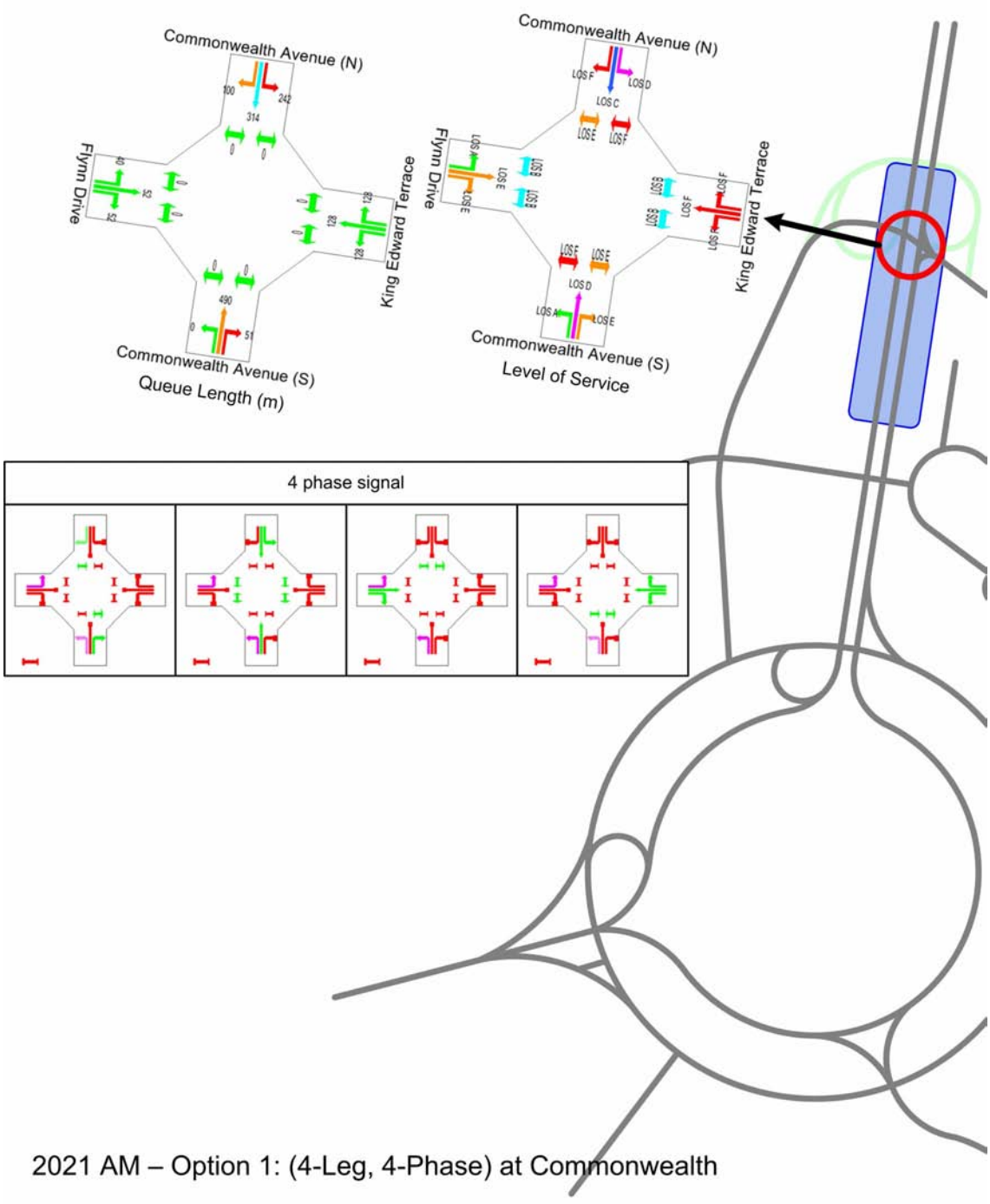


Figure 6: Option 1 Performance AM 2021

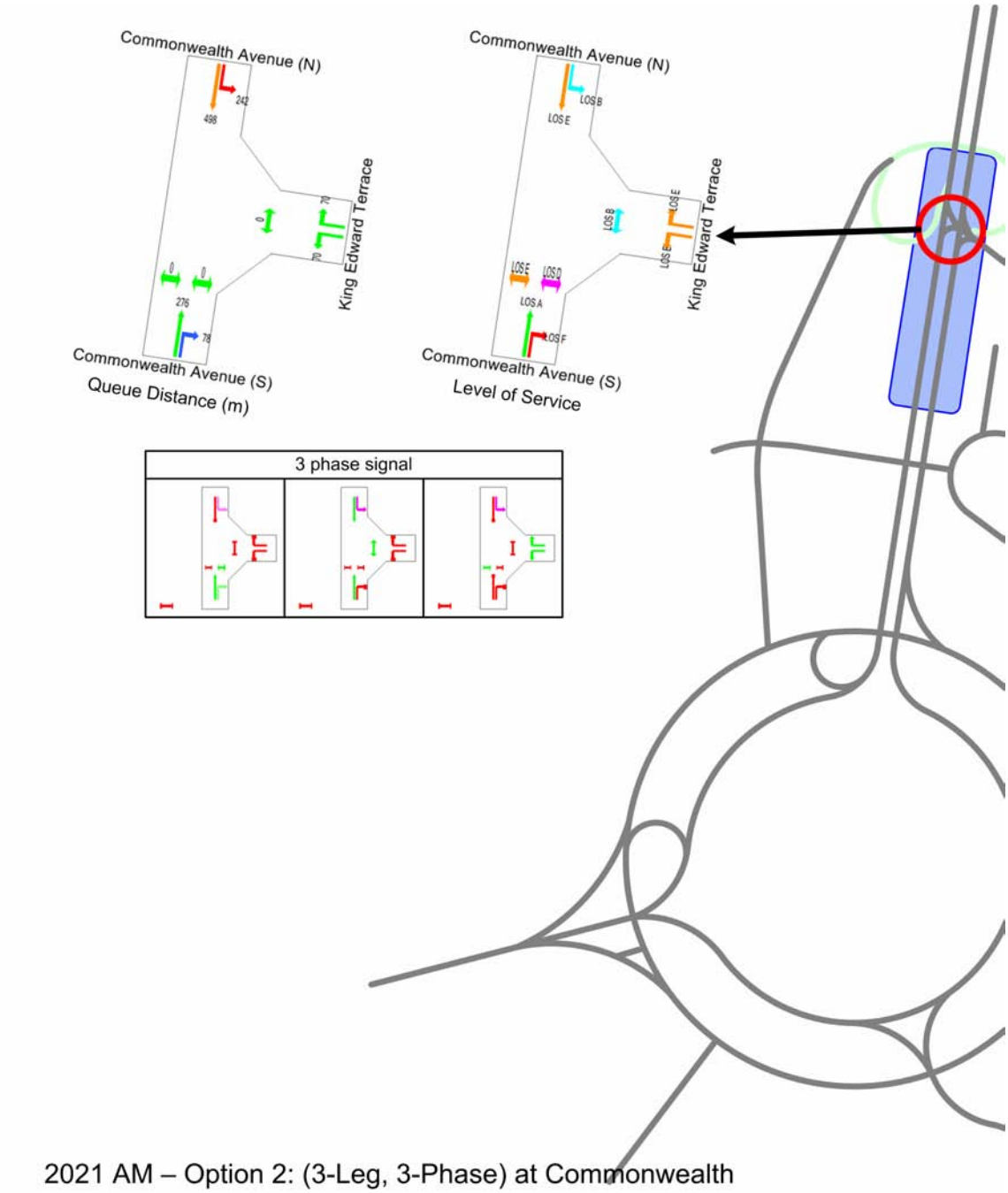


Figure 7: Option 2 Performance AM 2021

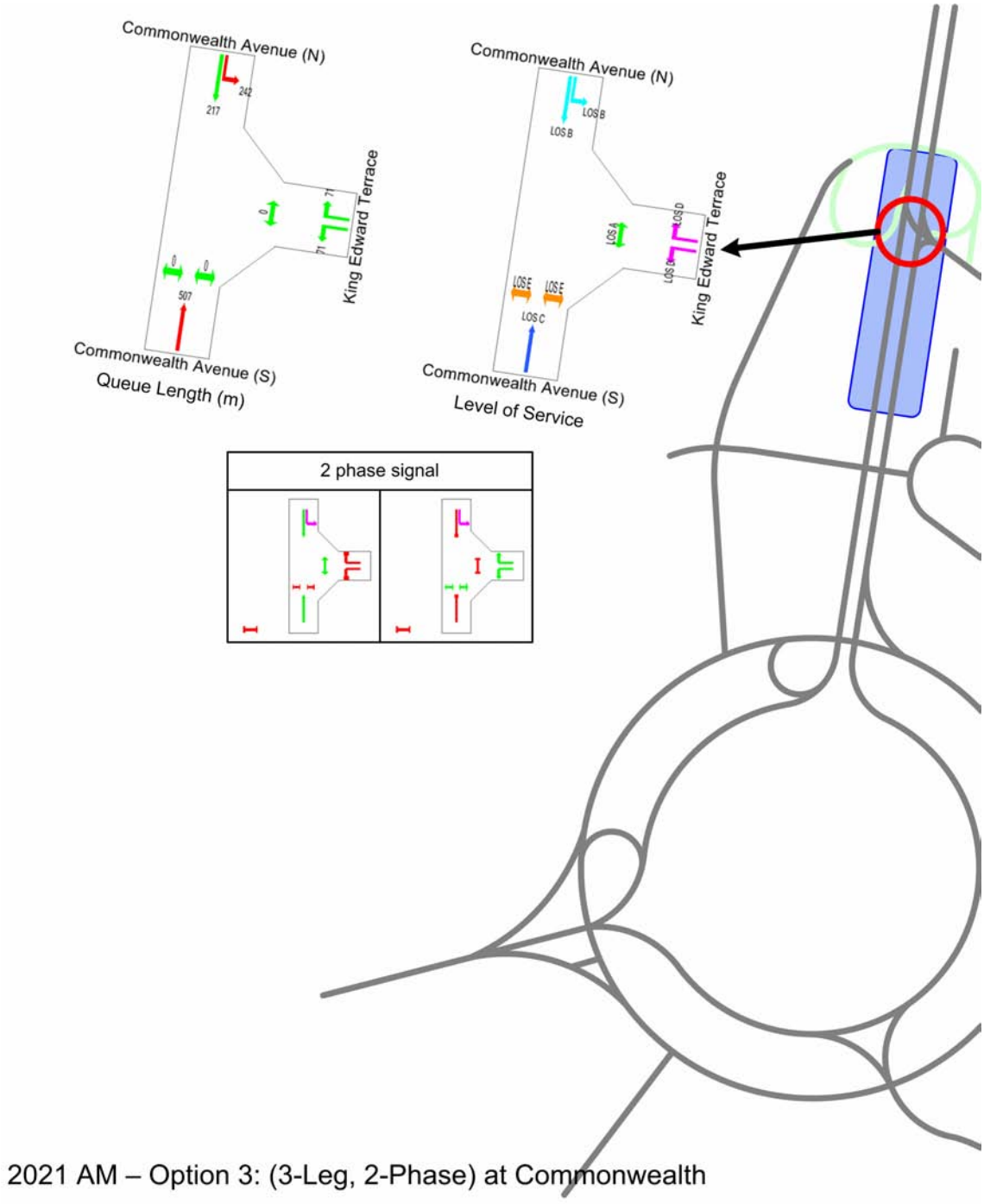


Figure 8: Option 3 Performance AM 2021

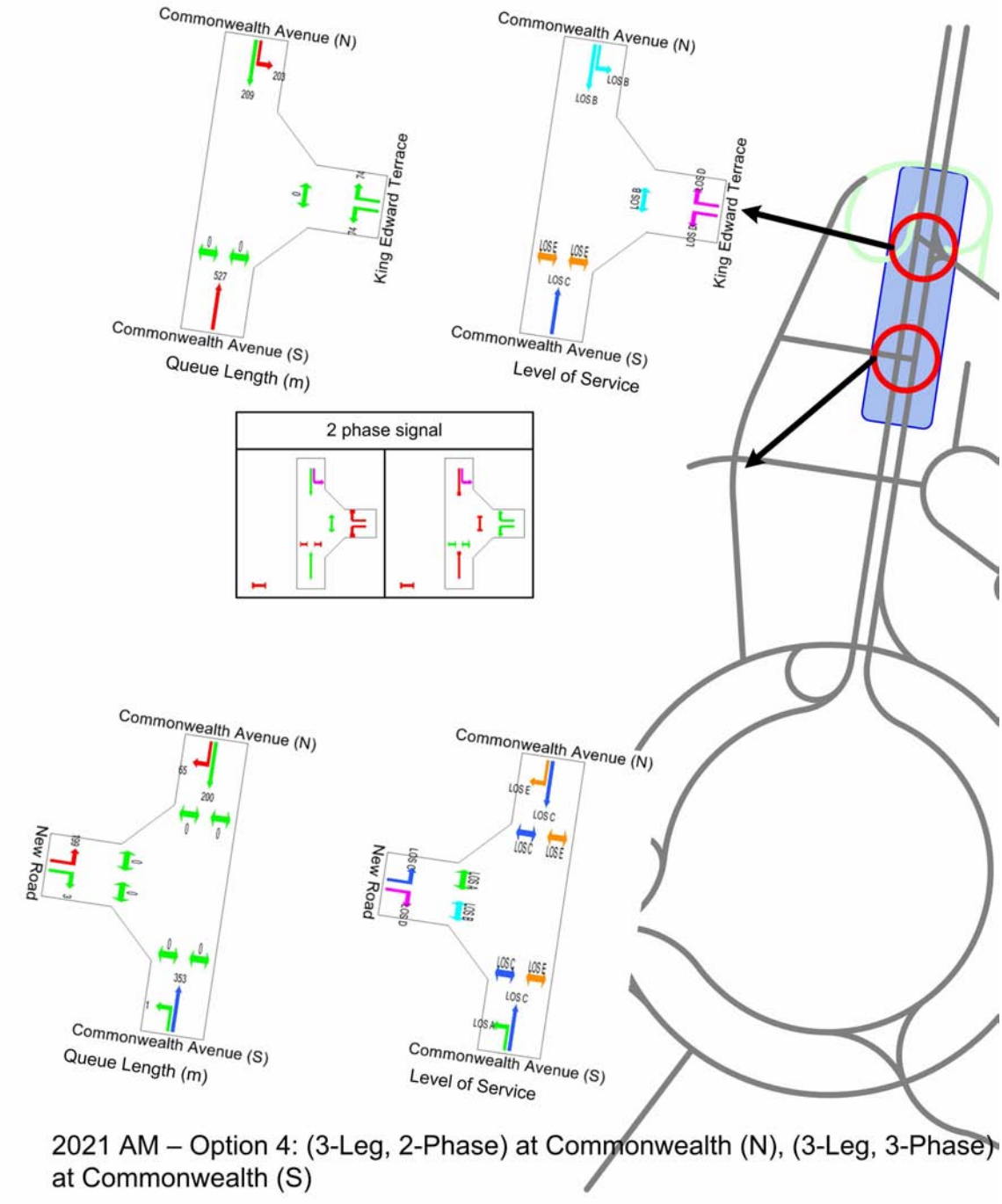


Figure 9: Option 4 Performance AM 2021

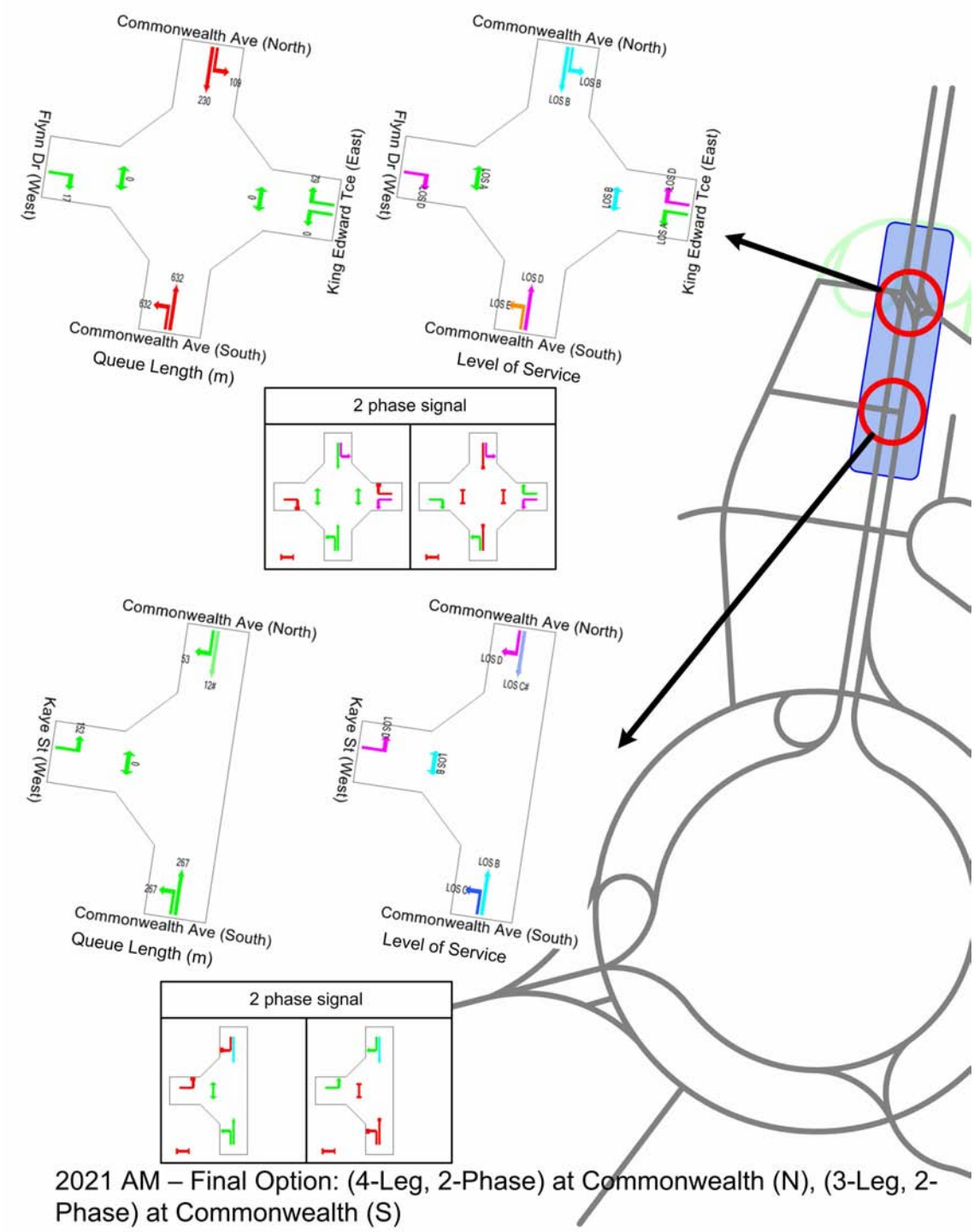


Figure 10: Option 5 Performance AM 2021

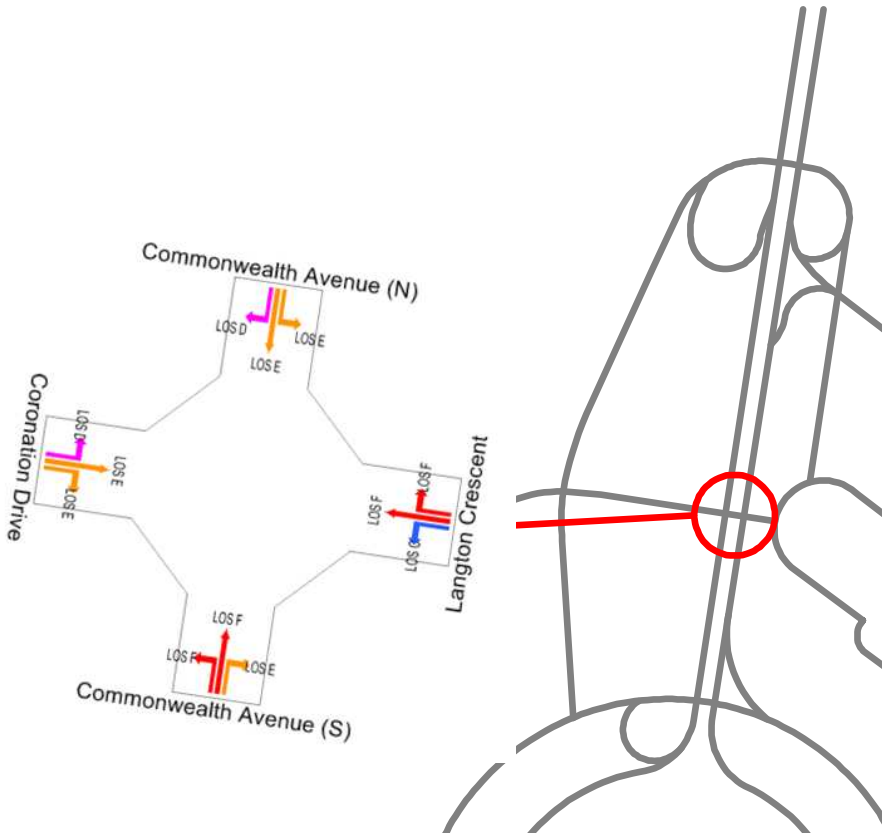


Figure 11: Coronation Drive/Commonwealth Avenue Intersection Performance AM 2006

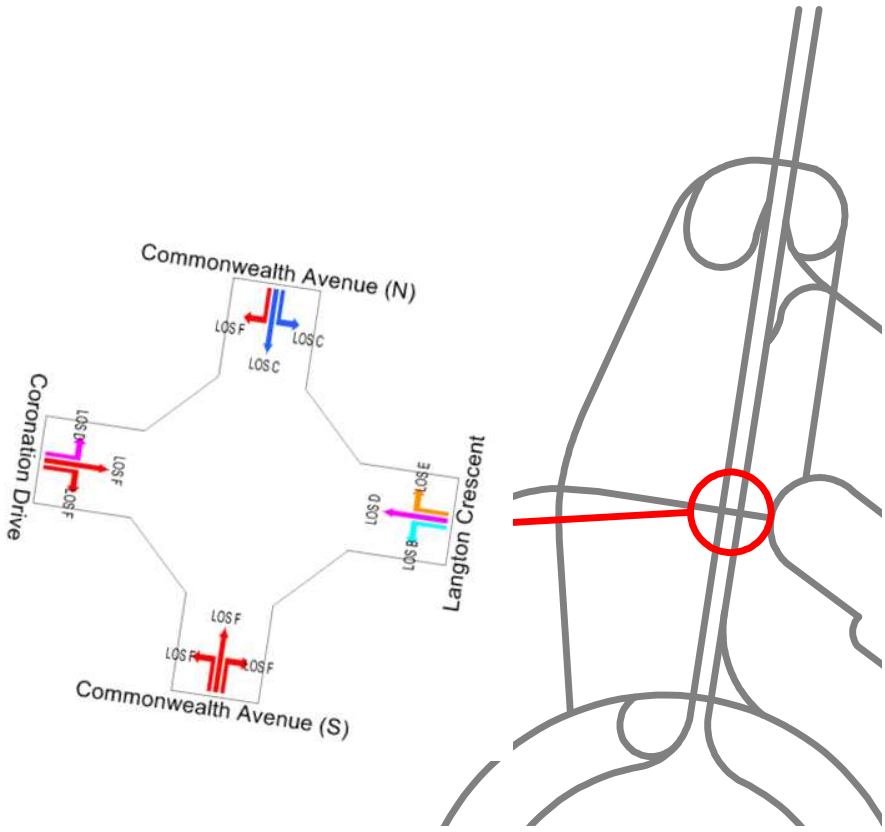


Figure 12: Coronation Drive/Commonwealth Avenue Intersection Performance AM 2021

7 Options Evaluation

A comparison of the five options is shown in Table 7-1. The table shows the overall LOS for each of the proposed intersection options, their advantages and limitations as well as the recommended action.

Table 7-1: Option Evaluation in 2021

Option	Overall LOS*	Overall LOS**	Advantages	Limitations	Recommended Action
1	F	NA	Allowing all turning movements at proposed intersection to and from Parliamentary Zone and Albert Hall. Connectivity between PZ and AH More Visible Entry Point to PZ and AH	Unacceptable congestion and delays at intersection due to expected operation at LOS F	Reject due to traffic congestion
2	E	NA	Allowing most of the main turning movements More Visible Entry Point to PZ	No direct connectivity between PZ and AH No provision to direct access from/to Albert Hall Precinct Intersection expected to operate at capacity	Reject due to traffic congestion
3	D	NA	Allowing some of the main turning movements More Visible Entry Point to PZ	No direct connectivity between PZ and AH No provision to direct access from/to Albert Hall Precinct Intersection expected to operate at satisfactory LOS	Consider Other Better Options
4	D	D	Allowing some of the main turning movements Provision to direct access from/to Albert Hall Precinct More Visible Entry Point to PZ	No direct connectivity between PZ and AH Intersection expected to operate at satisfactory LOS	Consider Other Better Options

5	D	C	▪ Allowing major turning movements at proposed intersection to and from Parliamentary Zone and Albert Hall. ▪ Connectivity between PZ and AH ▪ More Visible Entry Point to PZ and AH ▪ Option allows for extra access point to the Albert Hall Precinct and causes minimum disruption to through traffic via Commonwealth Avenue which has some spare capacity etc.	Intersection expected to operate at satisfactory LOS	Consider as a viable option

(*) King Edward Terrace/ Commonwealth Avenue Intersection

(**) Kaye Street/ Commonwealth Avenue Intersection

It is clear from this comparison that option 5 can be considered as the most preferable option in relative terms. In this context, detailed AM and PM peak intersection analyses of this option are presented in Appendix A.

7.1 Components of Preferred Access Arrangement

The recommended intersection layouts provide for the movements shown in Figure 13. The following represents the main components for the preferred access arrangement:

1. Introduction of a two phase 4 leg signalized intersection between Commonwealth Avenue and King Edward Terrace with a new leg allowing for access to the Albert Hall Precinct.
2. Maintaining the left turn into Kaye Street. This is accompanied by introduction of signalized right turn from Commonwealth Avenue (south) into Kaye Street as well as a new left turn out of Kaye Street.
3. Allowing for sufficient lane storage for vehicles turning right from Commonwealth Avenue (south) and into Kaye Street.
4. Coordination of the two newly introduced signalized intersections “green wave” to minimize disruption of through traffic heading north along Commonwealth Avenue to suit peak demands, see Appendix B. It is difficult to have signal progression along Commonwealth Avenue in both directions at a single peak period
5. Traffic signals operated with timings and offsets set to minimize the need for stops and ensure that the new intersections are in harmony with the existing traffic signals at Coronation Drive.
6. All the turns and manoeuvres that were conducted using the current arrangement including Flynn Place loops are catered for as follows:
   - Left Turn from Commonwealth North and into King Edward Terrace is maintained
   - Left turn from King Edward Terrace and into Commonwealth South is maintained
   - Manoeuvring via the Flynn loop from King Edward Terrace and into Commonwealth North is replaced by a new direct right turn from the intersection. This is configured with 3 lane capacity to allow for a quick discharging of peak traffic in a short time.
   - Limited traffic is currently doing the U turn manoeuvring along the loop from Commonwealth south and back to Commonwealth North. This can be still catered for at Coronation Drive intersection.
7. To reinforce the introduction of option 5 and to maximize road safety, some additional traffic control measures can be developed. These include the following measures:
   - A variable speed limit of 50-60km/h interfaced with SCATS system (and speed camera/s) so that speeds can be matched to signal progression speed that is compatible with signal cycle time

- This variable speed zone should encompass the pedestrian traffic signals north of Commonwealth Ave Bridge that are used for Floriade and other special events
- Advance signal warning signs facing southbound traffic

8. The bus stops are maintained in their current locations at both ends of the Pedestrian Subway.

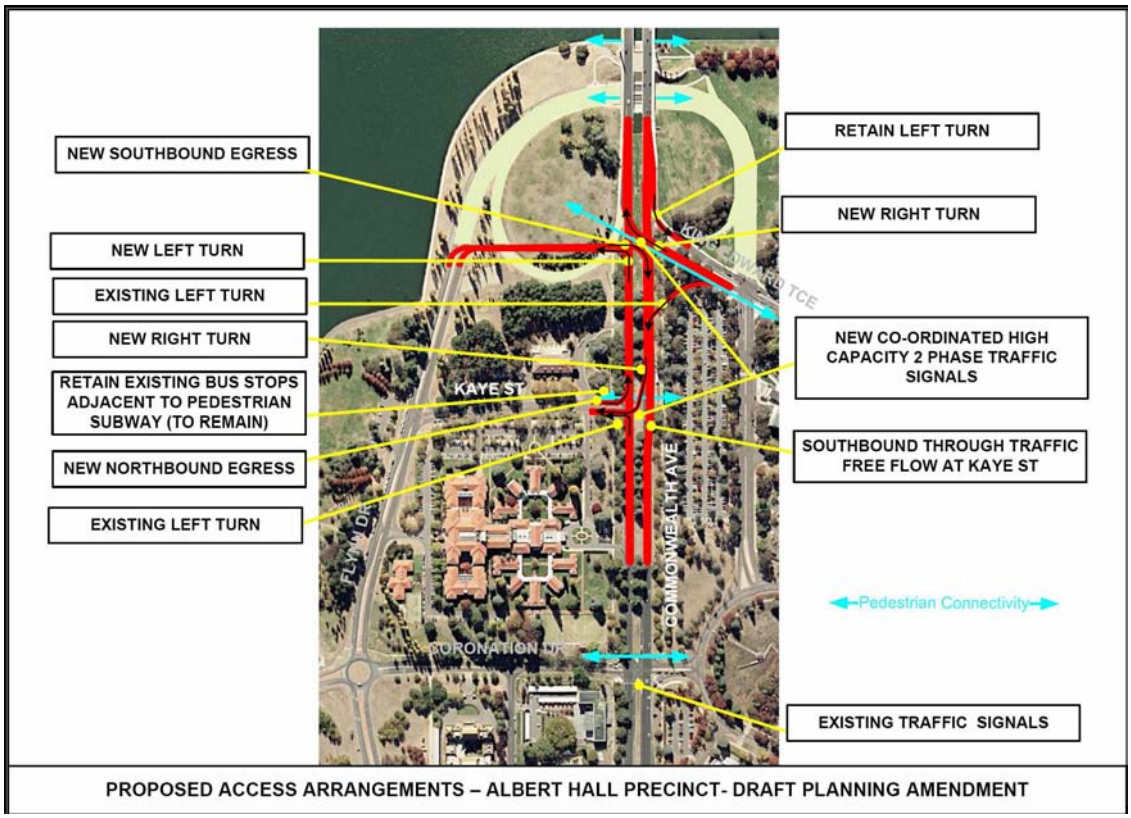


Figure 13: Preferred Layout of Road Access Arrangement to Albert Hall Precinct – General View

7.2 Advantages of Preferred Access Arrangement

Introducing a two phase signalized 4 leg intersection at Commonwealth/King Edward Terrace will:

- Provide access and egress point from/to Parliamentary Zone via King Edward Terrace.
- Provide access and egress point from/to the Albert Hall Precinct via new access road.

The new access arrangement achieves the desired level of accessibility to the Albert Hall Precinct via two main entrance and exit points. This is considered as providing very good accessibility to the Albert Hall Precinct.

The new access arrangement achieves good vehicle and pedestrian accessibility and connectivity between Parliamentary Zone and Albert Hall Precinct via two main entrance and exit points.

The proposed geometric configuration and phasing of the signalized 4 leg intersection is developed to minimize interruption to through northbound and southbound traffic travelling along Commonwealth Avenue. This is achieved by providing more lane discharging capacity thus allowing the discharging of opposing right turns in a short green time period

The new access arrangement results in an increase of one extra pedestrian crossing using the signalised intersection. This will improve pedestrian accessibility and connectivity between the Parliamentary Zone and Albert Hall Precinct

Maintaining the bus stops at both ends of the existing Pedestrian subway will continue to cater for and encourage bus riding.

Over the long term and with the introduction of new development, the new access arrangement will lead to a more appropriate transport system along the section of Commonwealth Avenue bordering the Parliamentary Zone. It will help bring about a change in car driver behaviour along that section through reduction of speed and driving more cautiously taking more account of pedestrians and cyclists.

Reduction of sealed road areas will also allow better use of lakeside parklands and visitor legibility.

8 Conclusion and Recommendations

8.1 Conclusion

This study proposed several options for new access arrangement for the Albert Hall Precinct along Commonwealth Avenue. These were modelled, analysed, compared and evaluated. Such process led to the conclusion that option 5 was the preferred option. This option includes the introduction of a new 4 leg intersection at Commonwealth Avenue/King Edward Terrace/ New Albert Hall Access road with 2 phase signal control. This is accompanied by introducing a new signalized 2 phase T intersection at Kaye street/Commonwealth Avenue to provide a recognisable access to the Albert Hall Precinct from both north and southbound carriageways of Commonwealth Avenue. This option is expected to:

- allow good vehicle and pedestrian accessibility to the Albert Hall Precinct
- allow good vehicle and pedestrian accessibility and connectivity between the Parliamentary Zone and the Albert Hall Precinct
- not unduly comprise the functionality of Commonwealth Avenue as a main arterial carrying traffic between the north and south areas of Canberra.

8.2 Recommendations

The recommended detailed layout of the preferred road access arrangement option is shown in Figure 14. The intersection layouts would be further refined following more detailed analysis (including micro-simulation) and after topographic survey and preliminary design is undertaken. It is expected that capacity improvements to the Commonwealth Avenue/Coronation Drive intersection may be required in due course.

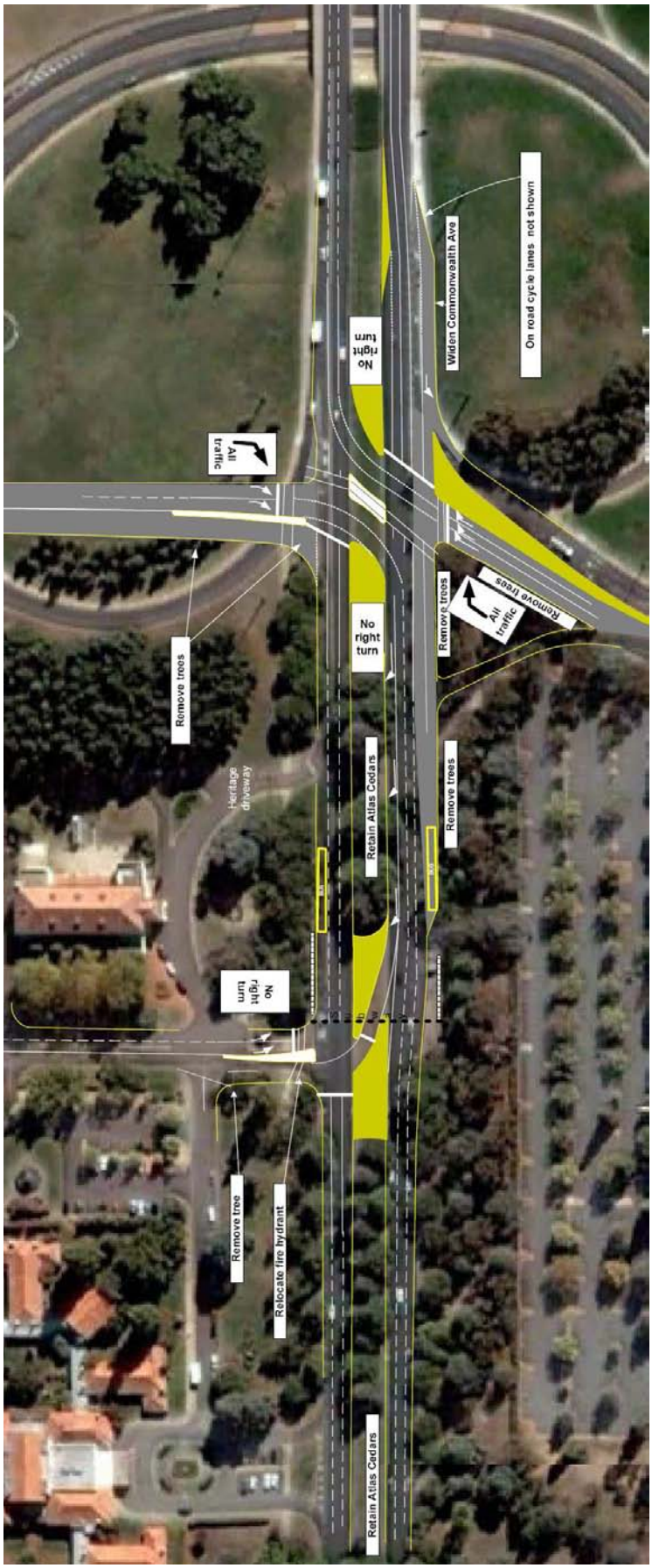
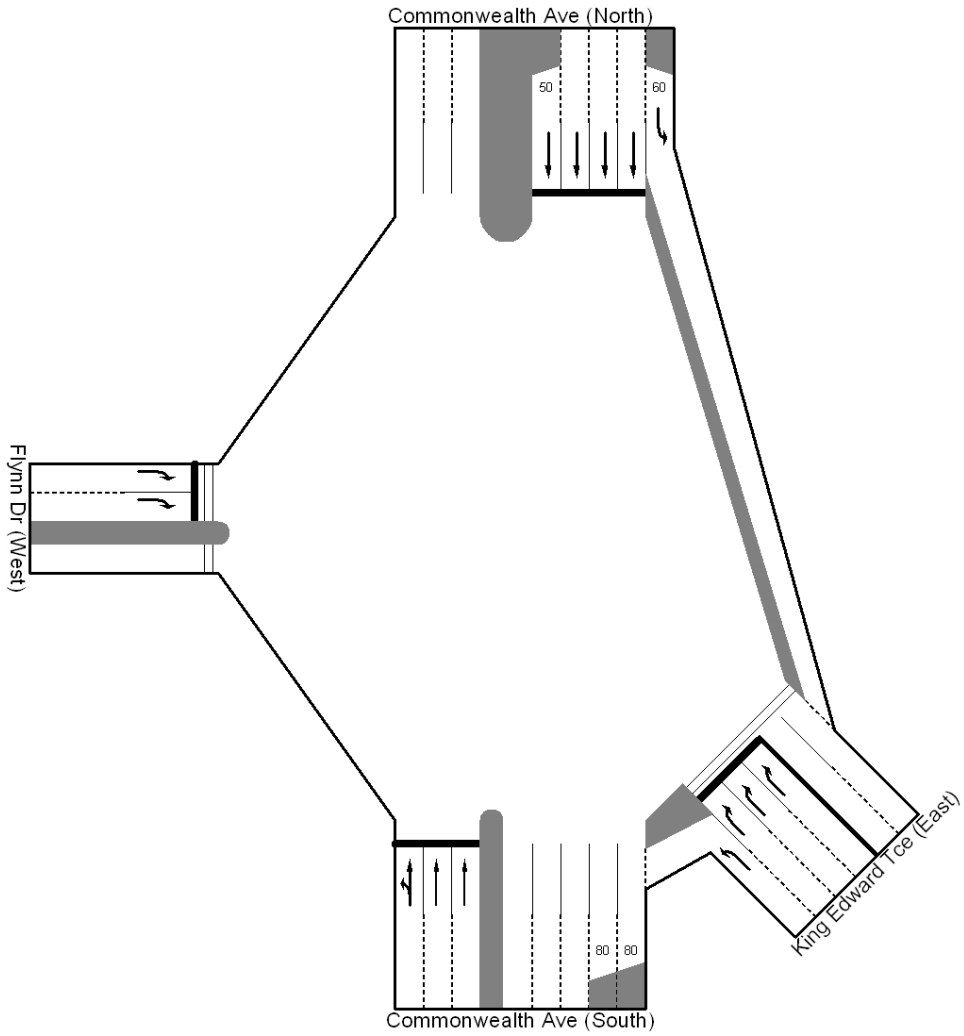


Figure 14: Recommended Layout – Detailed View

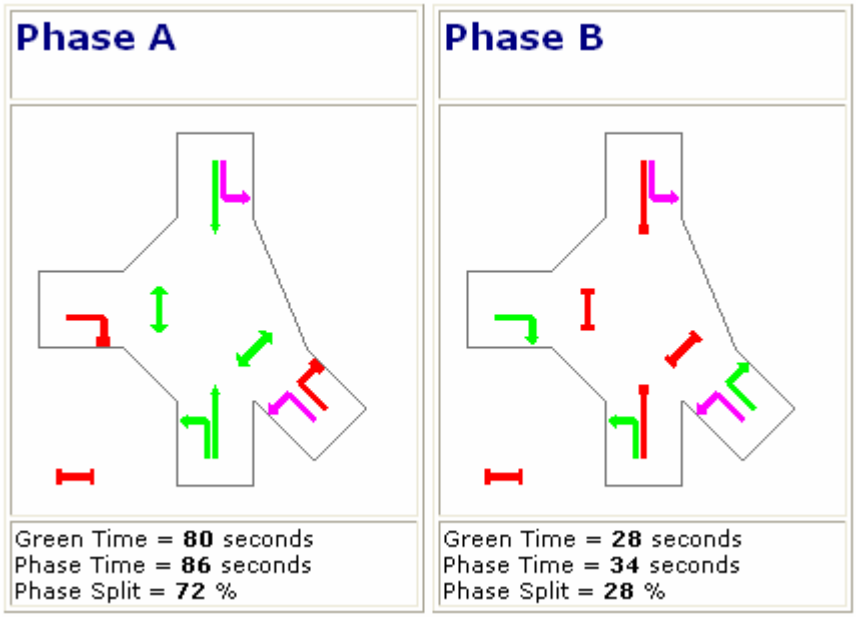
Appendix A – Detailed Results of Intersection Analysis

Commonwealth Avenue / King Edward Terrace proposed Intersection 2021 AM

Proposed Geometric Configuration (Diagonal 4-legged Layout):

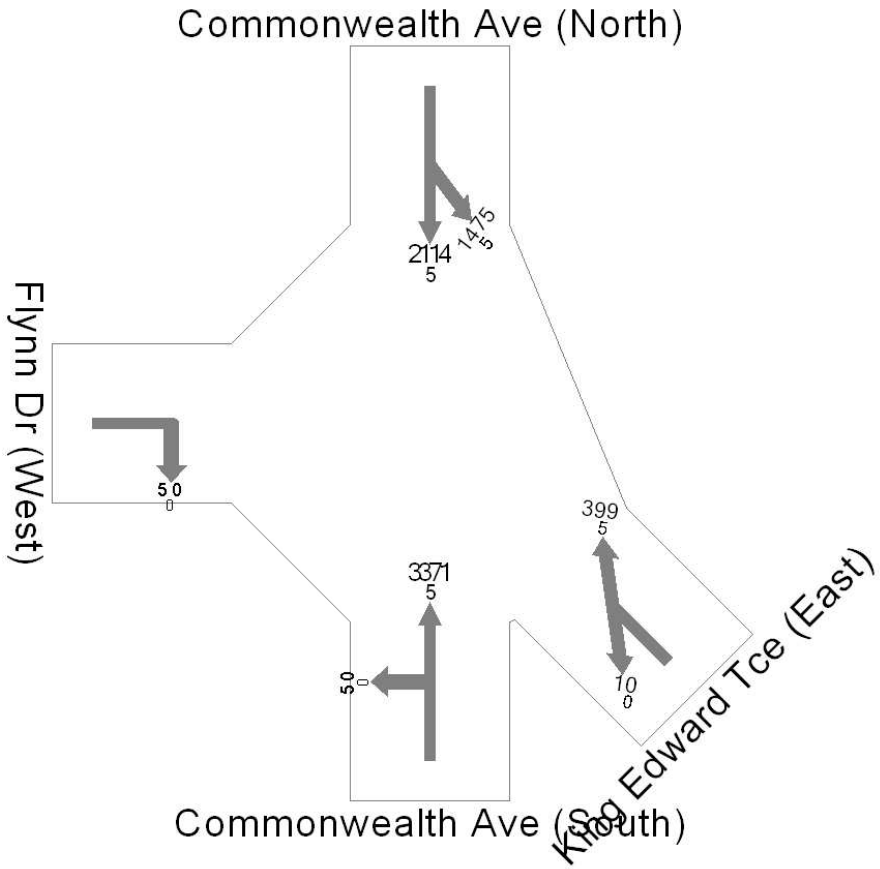


Proposed Signal Optimised Phasing & Cycle Time:



Total Cycle Time = 120 seconds (selected as Coronation Drive Intersection to achieve signal coordination)

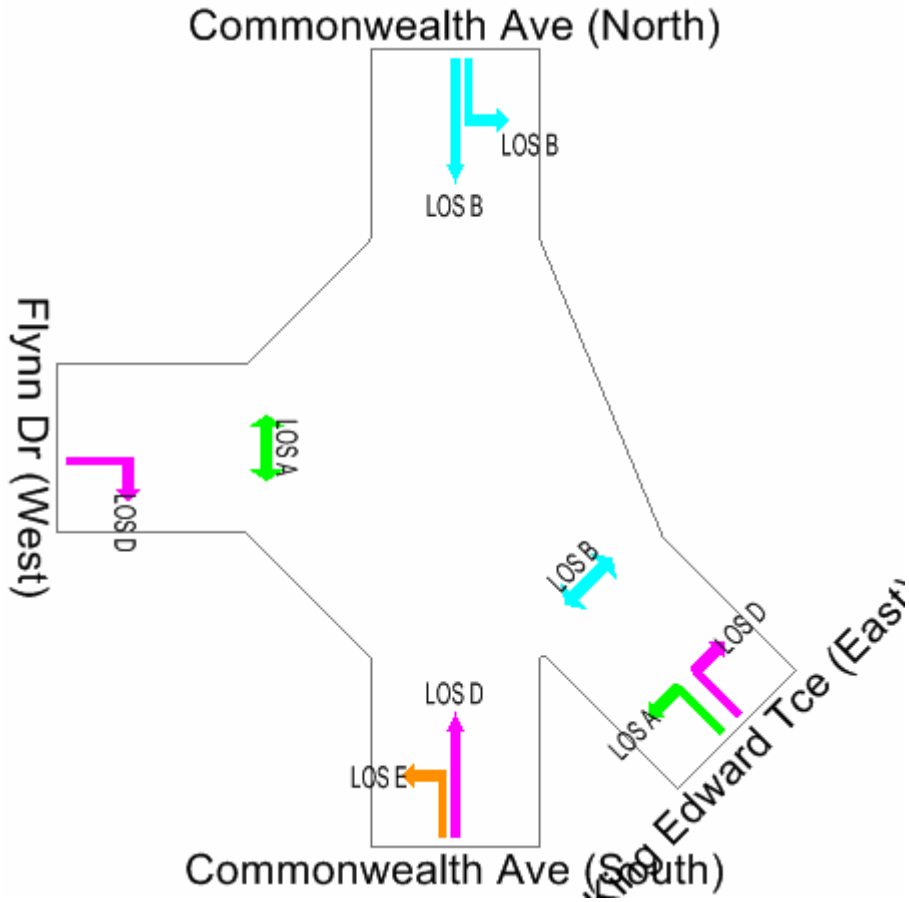
2021 Forecast Turning Movement:



Legend

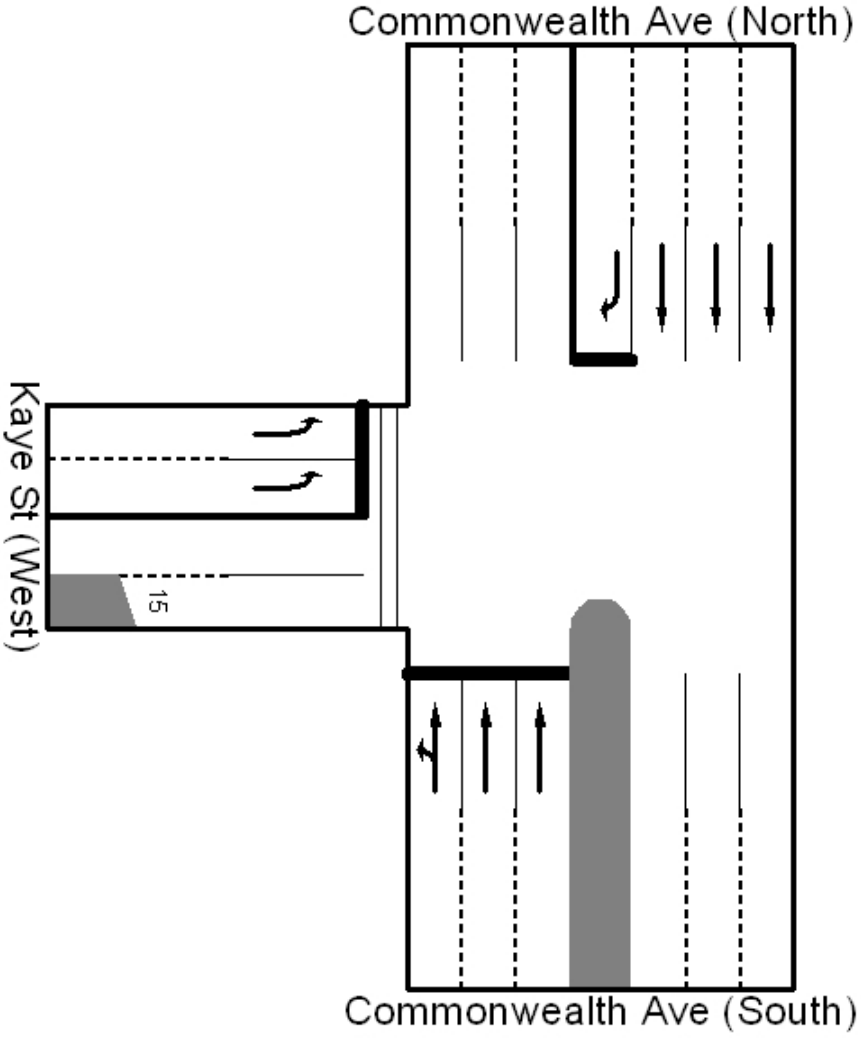
Light Vehicle

Level of Service (LoS)

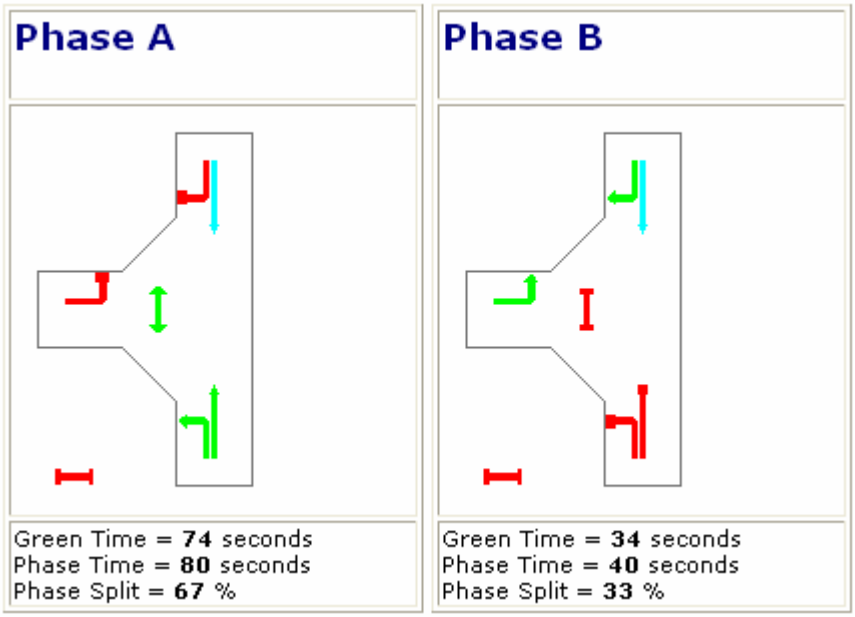


Overall LoS = C

Proposed Geometric Configuration for Commonwealth Ave / Kaye St

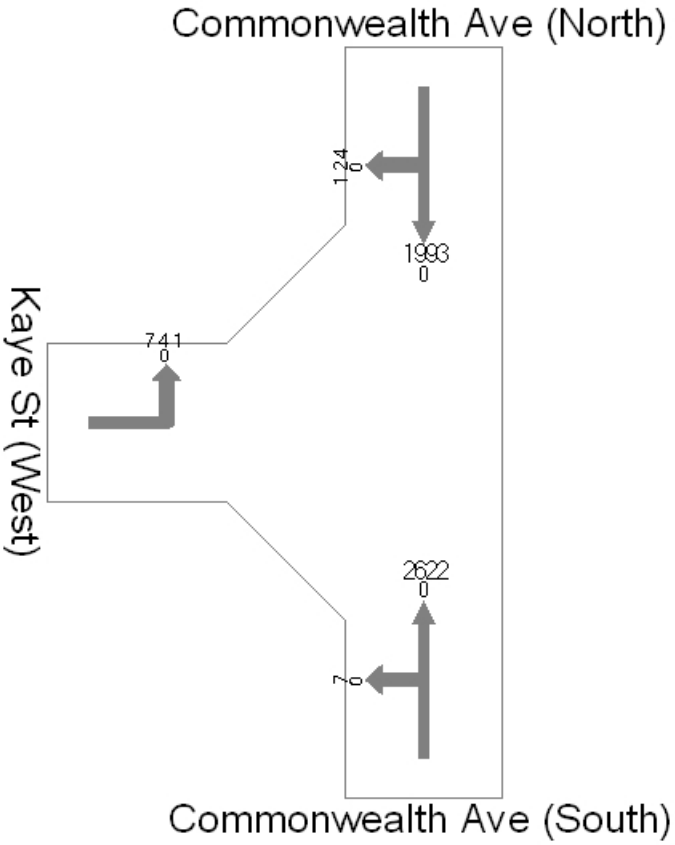


Proposed Signal Optimised Phasing & Cycle Time:



Total Cycle Time = 120 seconds (selected as Coronation Drive Intersection to achieve signal coordination)

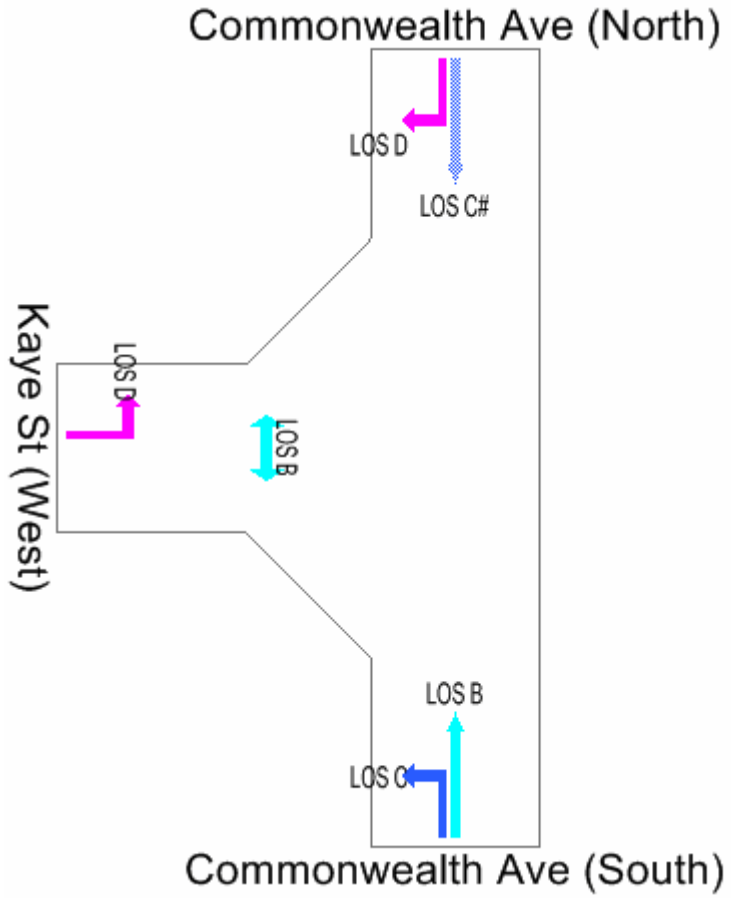
2021 Forecast Turning Movement:



Legend

Light Vehicle

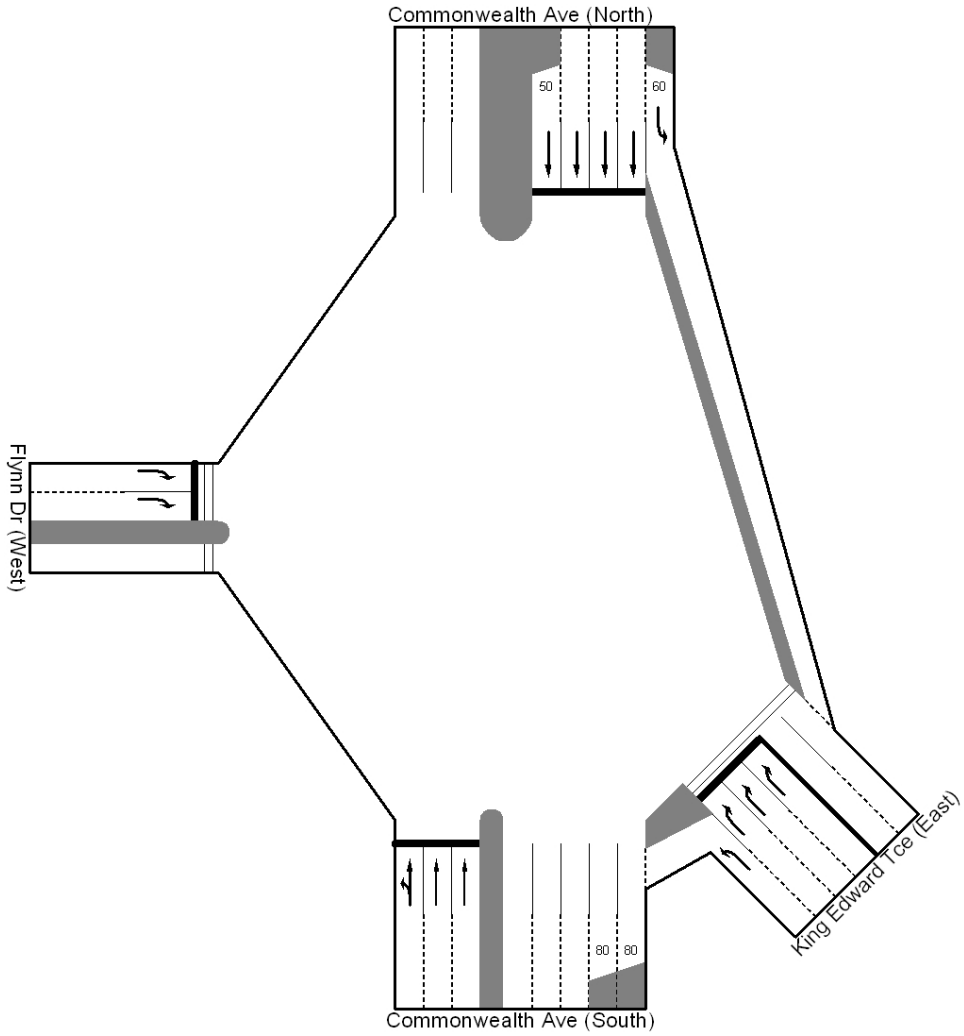
Level of Service (LoS)



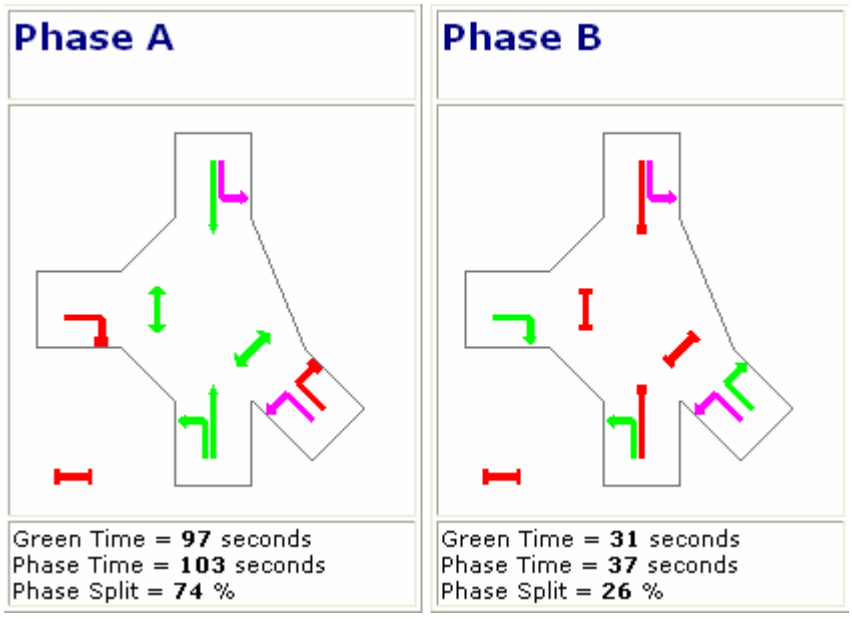
Overall LoS = B

Commonwealth Avenue / King Edward Terrace proposed Intersection 2021 PM

Proposed Geometric Configuration (Diagonal 4-legged Layout):

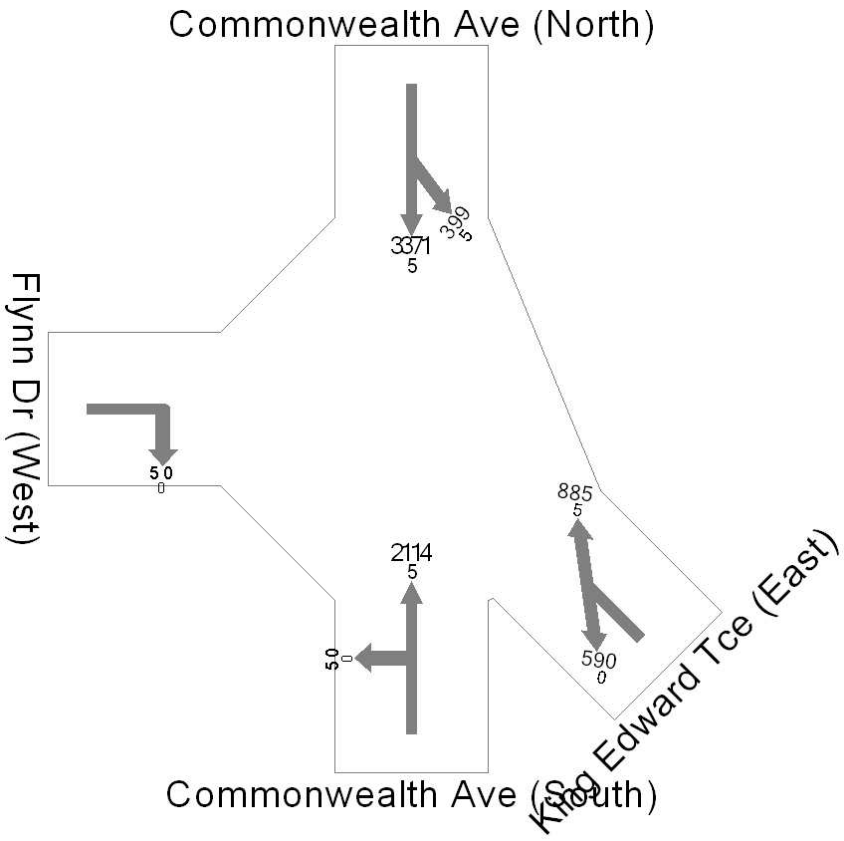


Proposed Signal Optimised Phasing & Cycle Time:



Total Cycle Time = 140 seconds

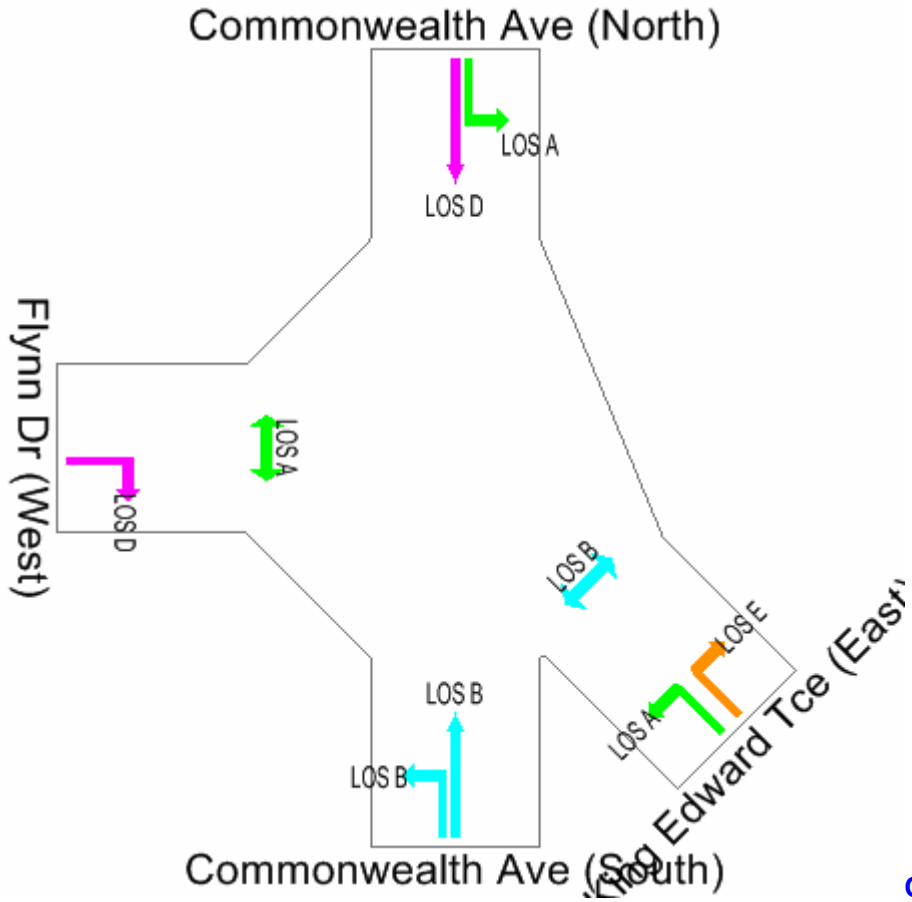
2021 Forecast Turning Movement:



Legend

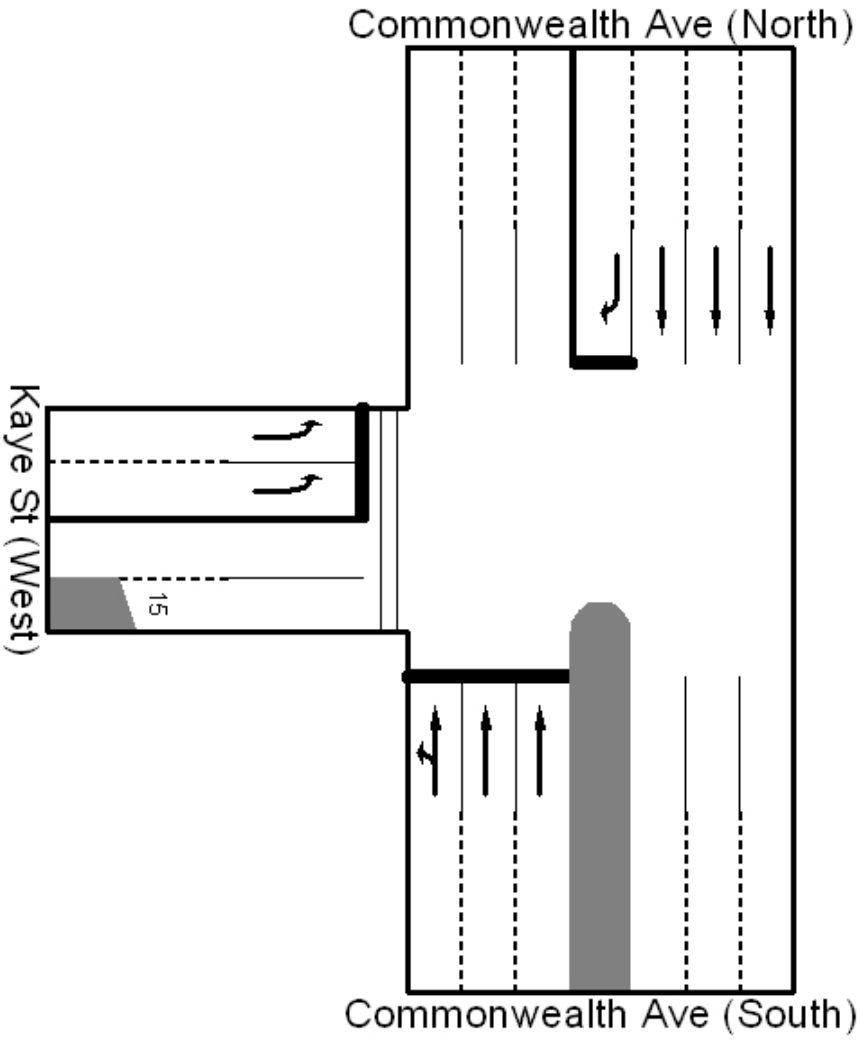
Light Vehicle

Level of Service (LoS)

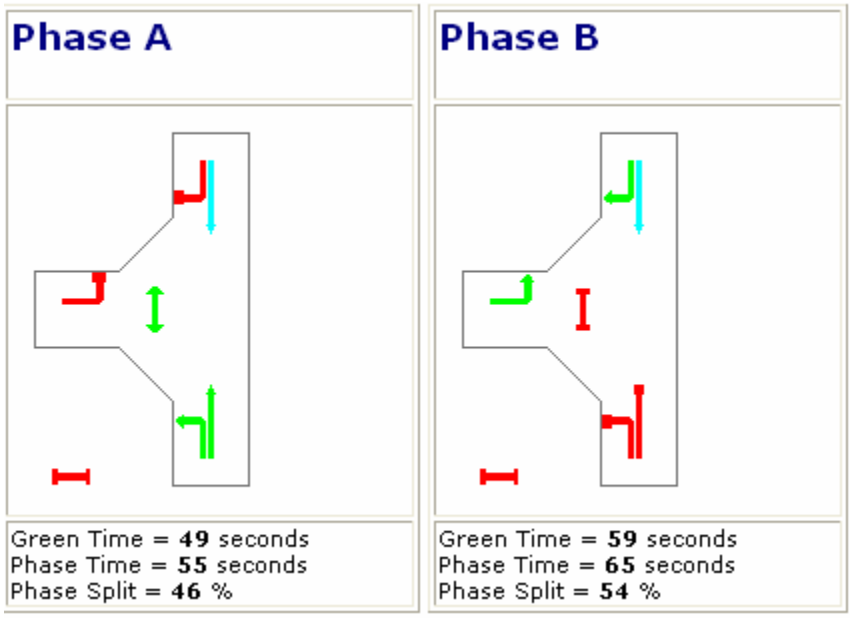


Overall LoS = C

Proposed Geometric Configuration for Commonwealth Ave / Kaye St

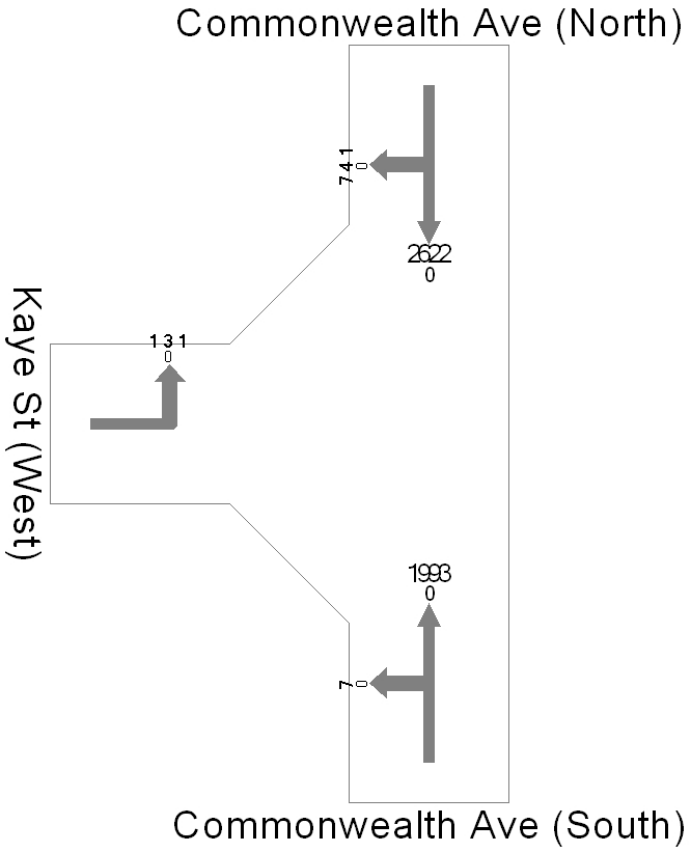


Proposed Signal Optimised Phasing & Cycle Time:



Total Cycle Time = 120 seconds (selected as Coronation Drive Intersection to achieve signal coordination)

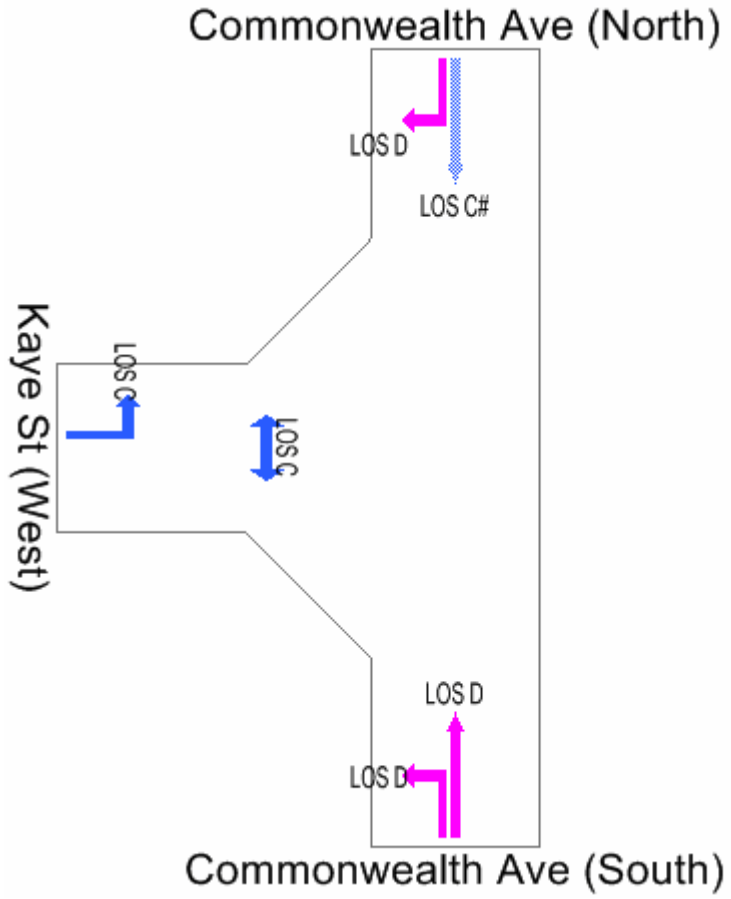
2021 Forecast Turning Movement:



Legend

Light Vehicle

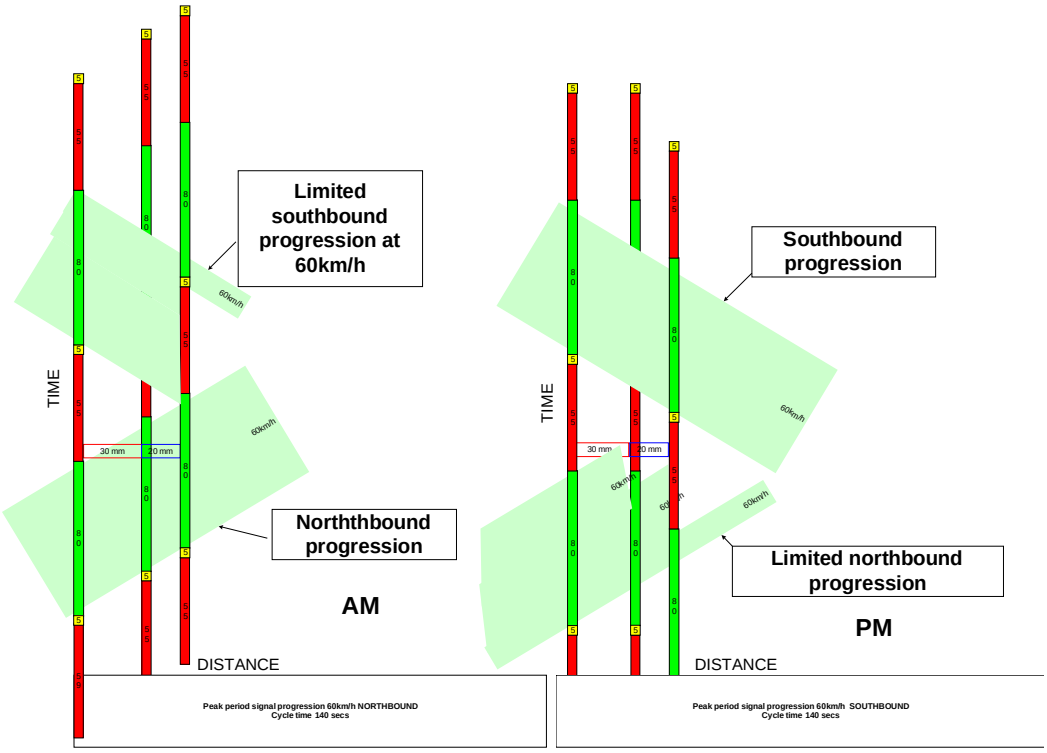
Level of Service (LoS)



Overall LoS = C

Appendix B – Traffic Signal Progression Possibilities

The following figure shows traffic signal progression possibilities for the peak period operations, when signal cycle times may be 140 seconds[1]. In the AM peak, the traffic signal timing offsets could be adjusted to provide a green wave for northbound traffic. At the same time, only limited signal progression is feasible for southbound traffic. Conversely, in the evening peak, if signal progression is facilitated for southbound traffic, then only limited progression is feasible northbound.

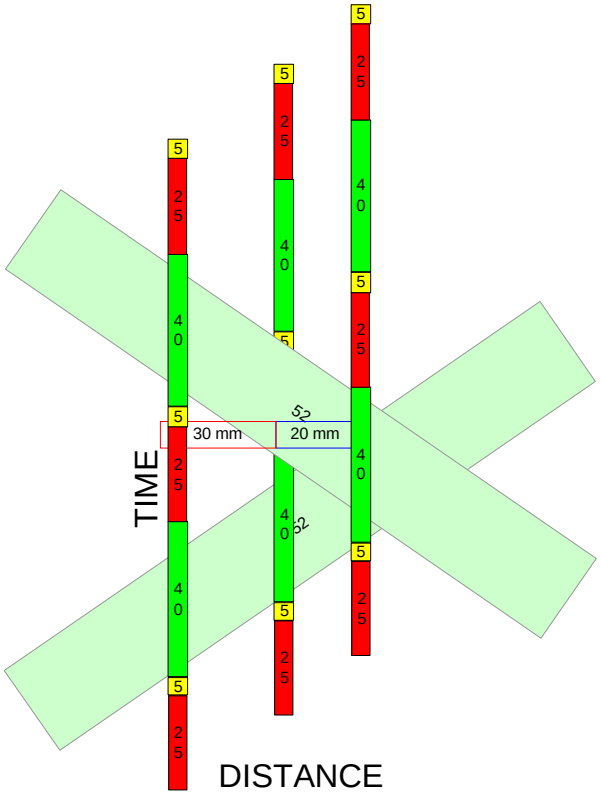


Traffic Signal Progression (Peak periods)

In off peak periods, cycle times may be reduced to perhaps 70 seconds. As shown in the following figure, this facilitates the provision of signal progression in both directions simultaneously, especially if the speed limit is reduced to about 50km/h.

Note that southbound traffic is not halted at Kaye St, so progression through two sets of signals is required, compared with three sets for northbound traffic.

[1] Traffic signals can accommodate more traffic if cycle times are relatively long as the "lost time" due to orange lights and all red periods is reduced. To reduce delays in off peak operation, shorter cycle times are used.



Off peak signal progression 52km/h NORTHBOUND and SOUTHBOUND
Cycle time 70 secs

Traffic Signal Two Way Progression (52km/h Off peak)