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**Prepared for**  
Department of Treasury and Finance

**Our reference: 14547T rep-f01**

1 September 2017

**Proposed Residential Rezoning**

87-103 Manningham Street,  
Parkville

traffic:impact

**ratio:**consultants

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**Prepared for:**

Department of Treasury and Finance  
Our reference 14547T rep-f01

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# 1 Introduction:

Ratio Consultants was commissioned by the Department of Treasury and Finance (DTF) to review at a strategic level the transport and parking aspects of the proposed rezoning of the site at 87-103 Manningham Street, Parkville from General Residential Zone to Residential Growth Zone.

An indicative framework plan prepared by DKO Architecture sets out potential built form outcomes across the site showing a number of residential buildings at varying heights. We have been instructed to assume up to 400 dwellings being constructed on the site. A central u-shaped road reserve is shown on the plan with suggested access points to Manningham Street and a secondary potential access point to McIntyre Lane.

This report has been prepared to address the traffic and parking needs of the proposed rezoning, and is based on surveys and observations in the vicinity of the site and on previous studies of similar developments elsewhere in Melbourne.

Further detailed transport and parking analysis will be required at the planning permit stage.

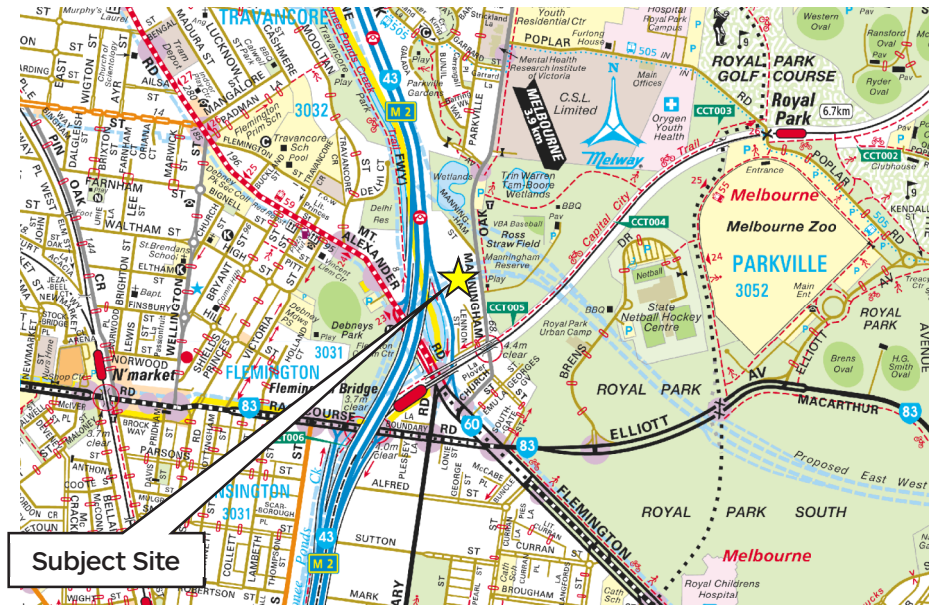
## 2 Existing Conditions:

### 2.1 Location and Environment

The subject site is a relatively large parcel of land in the inner-city suburb of Parkville, with a site area of approximately 1.149 hectares. The land is situated between Citylink (Tullamarine Freeway) and Manningham Street and is located opposite Royal Park to the east. It has frontage to Manningham Street and also has a connection to McIntyre Lane to the south. The land is currently zoned General Residential Zone – Schedule 1.

Figures 2.1 and 2.2 below describe the site location and surrounding context.

**Figure 2.1: Site Location**



Source: Melways Edition 42

**Figure 2.2: Aerial View of the Site and Surrounds**



Source: [www.nearmap.com](http://www.nearmap.com)

The subject site is currently occupied by a number of two-storey multi-unit dwelling buildings containing some 57 dwellings.

There are five existing crossovers along the Manningham Street frontage which serve a number of dwellings on the subject site.

The majority of dwellings on the subject site are accessed from McIntyre Lane which connects to the southern edge of the subject site. An internal road provides access to residential buildings and communal parking areas.

## 2.2 Road Network

**Manningham Street** is a Local Collector Road and is the main road frontage for the subject site. It provides a key access route for the local catchment to the arterial roads of Flemington Road to the south and Brunswick Road to the north. To the south of the subject site, Manningham Street continues as a Local Road to the south of the intersection with Church Street. Church Street connects to Flemington Road. After the intersection with Church Street, Manningham Street then becomes Southgate Street which becomes an entry only road from Flemington Road. To the north of the subject site, Manningham Street continues as Oak Street. At this point a short stub road named Manningham Street provides access to a number of properties before terminating. Oak Street continues north to its intersection with Park Street. Fleming Street provides the nearest connection to Brunswick Road.

In the vicinity of the site, Manningham Street provides direct access to a number of residential properties. It has the following characteristics:

- It has a carriageway width of approximately 12.5 metres.
- One traffic lane is provided in each direction with a painted central median.
- Unrestricted kerbside parallel parking is allowed on the western side only. Kerbside parking is prohibited on the eastern side.
- On-road bicycle lanes are provided in each direction.
- Constructed footpaths are provided on each side.
- It has a posted speed limit of 50km/hr.

**Figure 2.3: Manningham Street looking north past the subject site**



**Figure 2.4: Manningham Street looking south past the subject site**



**McIntyre Lane** is a Local Road which connects to Manningham Street. It provides direct access to residential properties including the subject site. Yates Lane connects to both Manningham Street and Heathcote Road to the south. Heathcote Road also provides a local access point to the Citylink offramp.

McIntyre Lane is approximately 6.0m wide. With the exception of a single marked parking space located towards a dog leg at the northern end, parking is prohibited along its length. For the majority of its length, McIntyre Lane is sufficiently wide to cater for simultaneous two-way traffic flow.

Figure 2.5 and 2.6 below describes the existing condition.

**Figure 2.5: McIntyre Lane looking north from Yates Lane towards the subject site**



**Figure 2.6: McIntyre Lane looking south from the subject site towards Yates Lane**



**Heathcote Road** is a Local Road operating east-west between Manningham Street and the Citylink offramp, where it connects via an exit-only stop-controlled intersection. The subject site has access to Heathcote Road via Yates Lane.

## 2.3 Traffic Conditions

### Existing Peak Hour Turning Movements

The existing peak hour turning movements in the vicinity of the site were surveyed on Thursday 10 August 2017 between 7:30am-9:30am and 4:30pm-6:30pm at the following intersections:

**Figure 2.7: Manningham Street / McIntyre Lane;**



**Figure 2.8: Heathcote Road / Yates Lane;**



**Figure 2.9: Brunswick Road / Fleming Street; and**

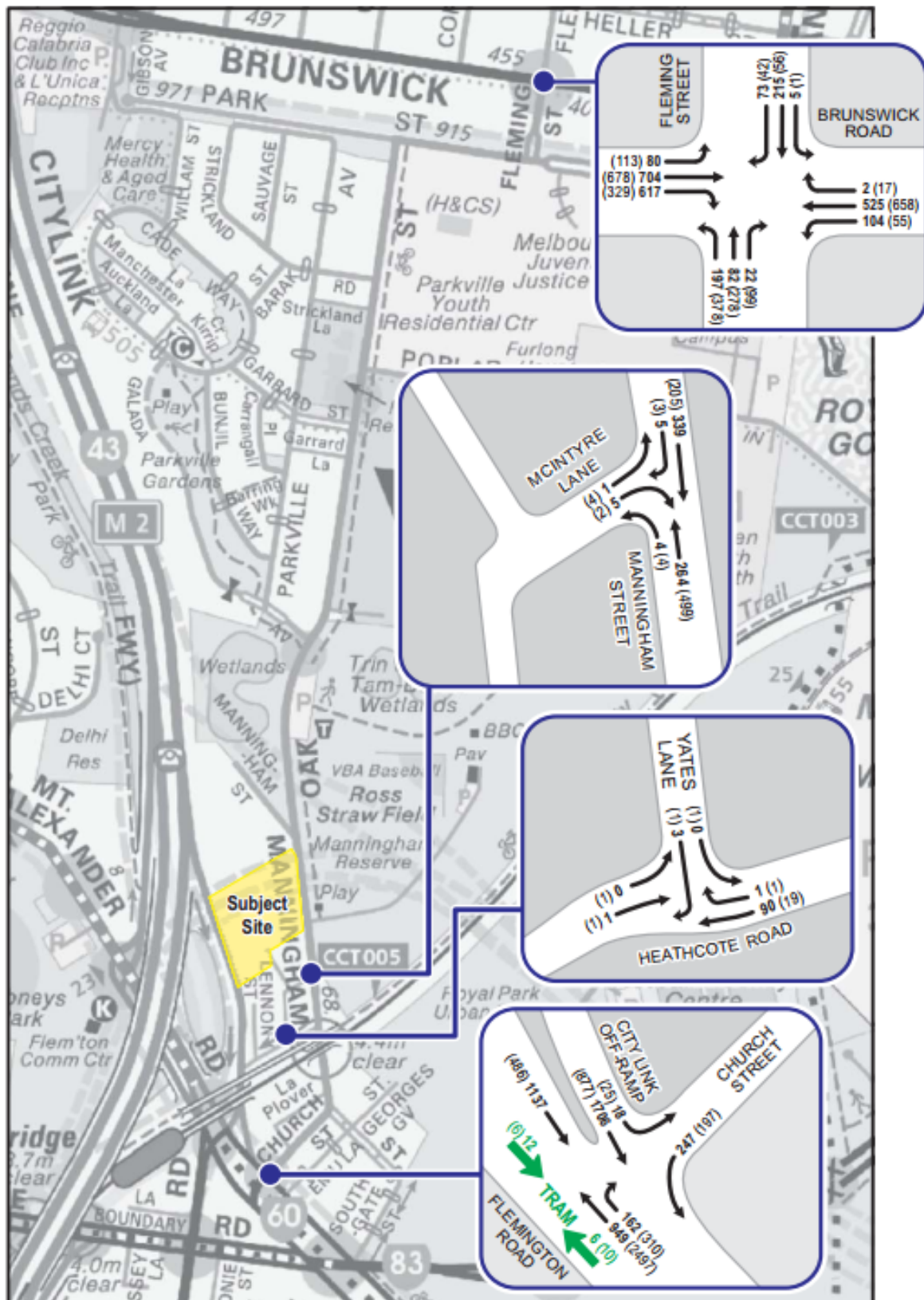


**Figure 2.10: Flemington Road / Church Street.**



The overall network peaks were recorded as being between 7:30am-8:30am in the AM peak and between 5:15pm-6:15pm in the PM peak. The peak hour results are provided in Figure 2.11 and Appendix A.

Figure 2.11: Existing Peak Hour Turning Movements



XX - AM PEAK: 7:30am - 8:30am (XX) - PM PEAK: 5:15pm - 6:15pm

## Existing Intersection Operation

The existing operation of the surveyed intersections was analysed using SIDRA Intersection. The parameters used to assess the intersections are summarised below.

**Degree of Saturation (D.O.S.)** is a ratio of arrival (or demand) flow to capacity. Degrees of saturation above 1.00 represent oversaturated conditions and degrees of saturation below 1.00 represent under saturated conditions. The D.O.S. ratings are detailed in Table 2.

Although operating conditions with a degree of saturation of close to 1.00 are undesirable, it is acknowledged that this level of congestion is typical of many metropolitan intersections during the AM and PM peak hours.

**Table 2.1: Degree of Saturation Ratings**

Degree of Saturation (D.O.S.)	Rating
Up to 0.6	Excellent
0.61 – 0.70	Very Good
0.71 – 0.80	Good
0.81 – 0.90	Fair
0.91 – 1.00	Poor
Greater than 1.00	Very poor

The **95th percentile queue length (95<sup>th</sup>ile queue)** is the value below which 95 percent of all observed cycle queue lengths fall, or 5 percent of all observed queue lengths exceed.

**Average Delay** is the average time, in seconds, that vehicles can be expected to wait at an intersection.

The results for the AM and PM peaks are provided in Table 2. and

Table 2. respectively, whilst detailed results are attached in Appendix B.

**Table 2.2: SIDRA Results - Existing Operation - AM Peak**

Intersection	Existing Conditions		
	D.O.S.	95%ile Queue (m)	Average Delay (s)
Manningham Street / McIntyre Lane	0.19	0.2	0.2
Heathcote Road / Yates Lane	0.05	0.1	0.4
Brunswick Road / Fleming Street	0.77	128.7	23.9
Flemington Road / Church Street	0.46	95.8	9.8

**Table 2.3: SIDRA Results - Existing Operation – PM Peak**

Intersection	Existing Conditions		
	D.O.S.	95%ile Queue (m)	Average Delay (s)
Manningham Street / McIntyre Lane	0.27	0.3	0.2
Heathcote Road / Yates Lane	0.01	0	0.8
Brunswick Road / Fleming Street	0.75	96.8	21.3
Flemington Road / Church Street	0.38	71.7	9.9

Review of the results indicates the following:

- Manningham Street / McIntyre Lane intersection is currently operating within the ‘Excellent’ category during both the AM and PM peak periods, with minimal queuing and delays.
- Heathcote Road/Yates Lane intersection is currently operating within the ‘Excellent’ category during both the AM and PM peak periods, with minimal queuing and delays.
- Brunswick Road/Fleming Street intersection is currently operating within the ‘Good’ category during both the AM and PM peak. High volume of traffic turning into Fleming Street is resulting in long queues and delays on the east and west legs of the intersection.
- Flemington Road/Church Street intersection is currently operating within the ‘Excellent’ category during both the AM and PM peak periods.

## 2.4 Parking Conditions

Unrestricted kerbside parallel parking is available along the western side of the Manningham Street frontage of the subject site. The demand for these spaces is observed to be moderately high during the day.

## 2.5 Sustainable Transport

### Public Transport

The subject site has very good access to public transport, with tram, bus and train services operating within close proximity of the site.

The nearest train station is Flemington Bridge Station for the Upfield Line, located approximately 700 meters from the subject site. The Newmarket Station on the Craigieburn Line is a 1.7 km walk but is also accessible via Tram Route 57.

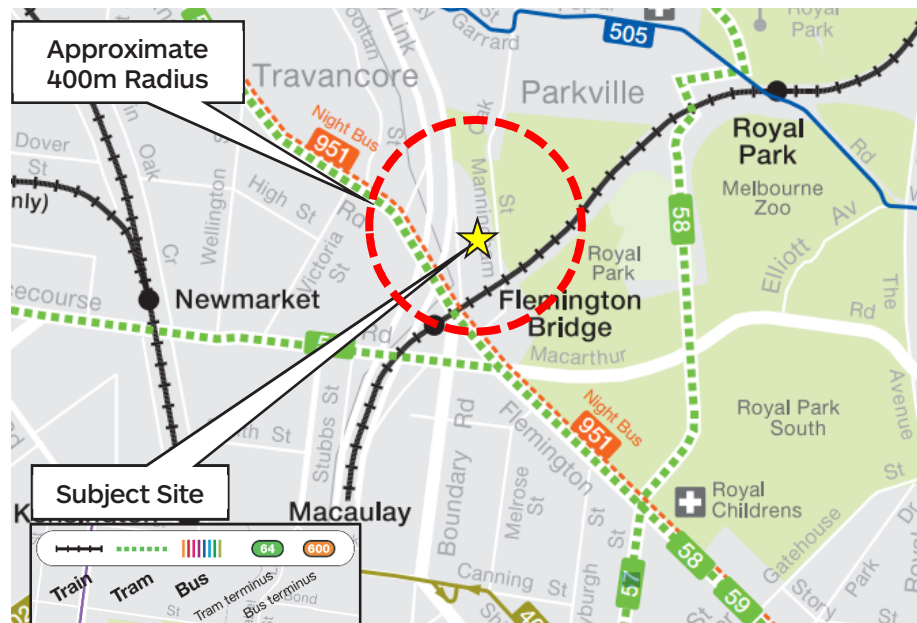
The public transport services available in the vicinity of the site are detailed in

Table 2.4 and are illustrated in Figure 2.12.

**Table 2.4: Public Transport Provision**

Service	Route No's	Route	Nearest Stop	Approximate Walking Distance
Bus	505	Moonee Ponds – Melbourne University (via Parkville Gardens)	Parkville Avenue	650m
	951 (Night Bus)	Moonee Ponds – Brunswick West – Pascoe Vale - Glenroy	Mooltan Street / Mt Alexander Road	1.1km
Tram	59	Airport West – City (Flinders Street Station)	Boundary Road / Flemington Road	500m
	57	West Maribyrnong – City (Flinders Street Station)	Melrose Street	800m
	58	West Coburg - Toorak	Melbourne Zoo / Royal Park	1.5km
Train	Upfield Line		Flemington Bridge Station	700m
	Craigieburn Line		Newmarket Station	1.7km (accessible via tram route 57)

**Figure 2.12: Public Transport Map**



## Bicycle Network

The subject site has good access to Melbourne's bicycle network. Specifically:

- On-street bicycle lane along the site frontage on Manningham Street begins at the northern end of the site, to join the Royal Park in the south.
- The Capital City Trail is a 29km long shared path circling Melbourne City and is accessible midway on Manningham Street, with access to the Flemington Bridge Rail Station.

**Figure 2.13: Capital City Trail**



## 3 The Proposal:

### 3.1 General

It is proposed to rezone the land from General Residential Zone to Residential Growth Zone.

An indicative framework plan prepared by DKO Architecture sets out potential built form outcomes across the site showing a number of residential buildings at varying heights. We have been instructed to assume up to 400 dwellings being constructed on the site.

### 3.2 Proposed Internal Streets

A central u-shaped road reserve is shown on the plan with two suggested access points to Manningham Street and a secondary potential access point to McIntyre Lane.

**Figure 3.1: Excerpt from DKO indicative framework plan**



It is recommended that internal roads be designed to cater for two-way traffic. Consideration should also be given for emergency vehicle access as well as waste collection vehicles. The detailed arrangement of any internal roads will be considered as part of the permit applications that would follow the rezoning of the land if approved.

The indicative framework plan also shows the retention of a vehicular connection to McIntyre Lane to the south.

### 3.3 Vehicle Access to Parking

Vehicle access to parking is indicatively shown as follows:

- Basement car parking with access from the u-shaped internal road;
- Garage parking for the townhouse components with either direct access from the u-shaped internal road or via a shared access driveway off the internal road;

The existing crossovers to the site will be removed and reinstated with kerb and channel.

Service vehicle (including waste collection vehicle) access is proposed to be available via the internal road.

### **3.4 Pedestrian Access**

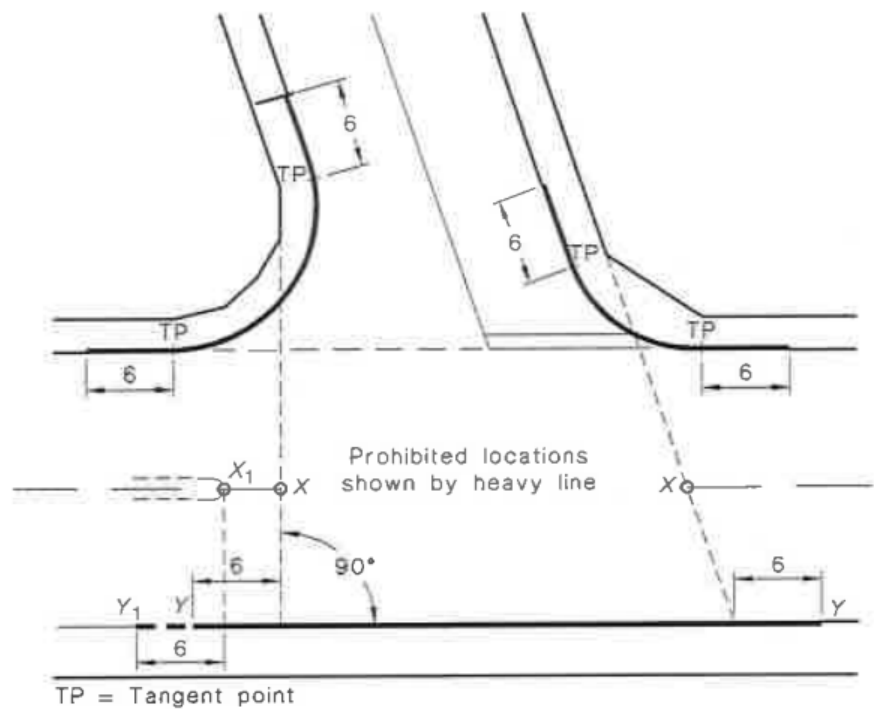
Pedestrian access to the buildings on the site to the primary Manningham Street frontage should be considered as part of the internal road design. This could include the provision of a dedicated pedestrian path on one or both sides of the internal road with connections to the footpath on the Manningham Street frontage.

## 4 Access Assessment:

The indicative framework plan shows two direct connections onto Manningham Street. There are a number of factors to be considered at the detailed design stage in determining the appropriate locations of the crossovers:

- Crossovers should be located clear of the 'prohibited zone' surrounding the intersection of Manningham Street / Oak Street as per Figure 4.1 below.

**Figure 4.1: Prohibited zone as defined at Figure 3.1 of AS/NZS2890.1:2004**



- There are a number of electricity/lighting poles located along the site frontage. To avoid the costly relocation of these poles, crossovers should be located at least 1.0m clear of poles.
- Crossovers should be located clear of any tree protection zones associated with trees that need to be retained either on-site or within the verge.
- There are a number of services located within the verge such as Telstra pits as well as a number of side-entry drainage pits in the drainage channel. These should be considered when locating the proposed crossovers at the permit application stage.

A feature and level survey has been undertaken by Cardno which is attached to Appendix C and illustrates the items for consideration listed above. There are numerous opportunities along the site frontage where vehicular access could be established.

## 5.1 Clause 52.06 Parking Requirements

Parking requirements for residential developments are set out under Clause 52.06 of the Victoria Planning Scheme, which was last updated on 25 May 2017 through the incorporation of Amendment VC133. The purpose of the Clause, among other things, is:

- To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.
- To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.
- To support sustainable transport alternatives to the motor car.
- To promote the efficient use of car parking spaces through the consolidation of car parking facilities.
- To ensure that car parking does not affect the amenity of the locality.
- To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

The statutory car parking requirements relevant to the proposed rezoning are detailed in Table 5.1.

**Table 5.1: Clause 52.06 Parking Requirements**

Use	Requirement
Dwellings	1 space to each one or two bedroom dwelling
	2 spaces to each three or more bedroom dwelling (with studies or studios that are separate rooms counted as bedrooms)
	1 space for visitors to every 5 dwellings for developments of 5 or more dwellings

Under Clause 52.06-6 of the Planning Scheme, the Responsible Authority is able to reduce the parking requirements (including to zero), provided the applicant satisfies the responsible authority that the provision of car parking is justified on the basis of:

- The car parking demand likely to be generated by the use;
- Whether it is appropriate to allow fewer spaces to be provided than the number likely to be generated by the use.

## 5.2 Recommended Parking Rates

Car ownership data for residents living within the suburb of Parkville obtained from the Australian Bureau of Statistics (ABS) 2016 Census. Average car ownership and non-car ownership rates for one, two and three bedroom apartments in the Parkville suburb are set out in Table 5.2.

**Table 5.2: ABS 2011 Census Car Ownership Data - Suburb of Parkville**

Dwelling Type		Average Car Ownership	Non-car ownership
Semi-detached, row or terrace house, flat, unit or apartment.	1 Bedroom	0.70 cars per dwelling	36%
	2 Bedroom	0.97 cars per dwelling	23%
	3 Bedroom	1.38 cars per dwelling	15%

The site is well located for future residents who choose not to own a car, noting the site's close proximity to numerous sustainable transport options as detailed in Section 2.5.

Based on the above, it is recommended that resident parking is provided generally in accordance with the following indicative rates for future development on the site:

- **0.7 spaces to each one bedroom dwelling;**
- **0.9 spaces to each two bedroom dwelling; and**
- **1.5 spaces to each three bedroom dwelling.**

### Visitors

Empirical surveys of visitor parking demands of residential developments in inner urban suburbs of the City indicate that visitor parking demand varies throughout the day, with peak demands occurring between 6.00pm and 9.00am.

Previous surveys conducted by Cardno Pty Ltd between 6:00am Friday 19 November 2010 to midnight Saturday 20 November 2010 at apartment developments located at 127 & 147 Beach Street, Beacon Cove demonstrated peak visitor parking demands during business hours between 9.00am and 5.00pm on a weekday of 0.06 spaces per apartment, with higher figures of 0.09 spaces per apartment outside weekday business hours.

Based on the foregoing, it is recommended that on-site visitor parking is provided generally in accordance with the following indicative rate for future developments on the site:

- **0.1 visitor spaces to each dwelling.**

## 6 Bicycle Parking:

The provisions set out under Clause 52.34-3 (Bicycle Facilities) of the Planning Scheme require that bicycle parking for the relevant uses be provided at the rates shown in Table 6.1.

**Table 6.1: Bicycle Parking Statutory Requirements**

Use	Requirement
Dwellings	In developments of four or more storeys, 1 to each 5 dwellings for residents
	In developments of four or more storeys, 1 to each 10 dwellings for visitors

For future development on the site, bicycle parking should be provided in accordance with the requirements set out in Table 6.1 as a minimum.

Notwithstanding the above, in consideration of sustainable transport initiatives and the site's proximity to Melbourne's bicycle network, it is recommended that a bicycle parking provision in excess of the statutory requirements is considered for residents, with bicycle parking provided generally in accordance with the following indicative rates:

- **1 resident bicycle space to each dwelling.**
- **1 visitor bicycle space to each 10 dwellings.**

## 7.1 Traffic Generation

### Residents

In consideration of the locality of the site, it is estimated that the residential component of the development will generate traffic at a rate of 3 daily vehicle movements per dwelling with an allocated car space, inclusive of 0.3 peak hour vehicle movements per dwelling with an allocated car space during the AM and PM peak hours.

Applying the above rates to the 400 dwellings proposed, results in an anticipated daily traffic volume of 1,200 daily vehicle movements, including an anticipated 120 peak hour vehicle movements during the AM and PM peak hours.

Traffic generation during the AM peak hour typically comprises 20% inbound movements and 80% outbound movements whilst traffic generation during the PM peak hour typically comprises 60% inbound movements and 40% outbound movements.

The resultant anticipated residential traffic generation is summarised in Table 7.1.

**Table 7.1: Anticipated Traffic Generation**

AM Peak			PM Peak		
Inbound	Outbound	Total	Inbound	Outbound	Total
24	96	120	72	48	120

## 7.2 Traffic Distribution

Based on observations of traffic arrival and departure patterns to and from the precinct, the following estimates have been adopted for the subject site.

### Morning peak period:

#### OUTBOUND

- 1/3 of outbound traffic will depart to the north towards Brunswick Road via Fleming Road.
- 1/3 of outbound traffic will depart to the south towards Flemington Road via Church Street.
- 1/3 of outbound traffic will depart via the Citylink offramp via Yates Lane and Heathcote Road.

#### INBOUND

- 50% of arrival traffic will approach from the north from Brunswick Road via Fleming Road.
- 50% of arrival traffic will approach from the south from Flemington via Church Street.

### Afternoon peak period:

#### OUTBOUND

- 60% of outbound traffic will depart to the north towards Brunswick Road via Fleming Road.
- 30% of outbound traffic will depart to the south towards Flemington Road via Church Street.
- 10% of outbound traffic will depart via the Citylink offramp via Yates Lane and Heathcote Road.

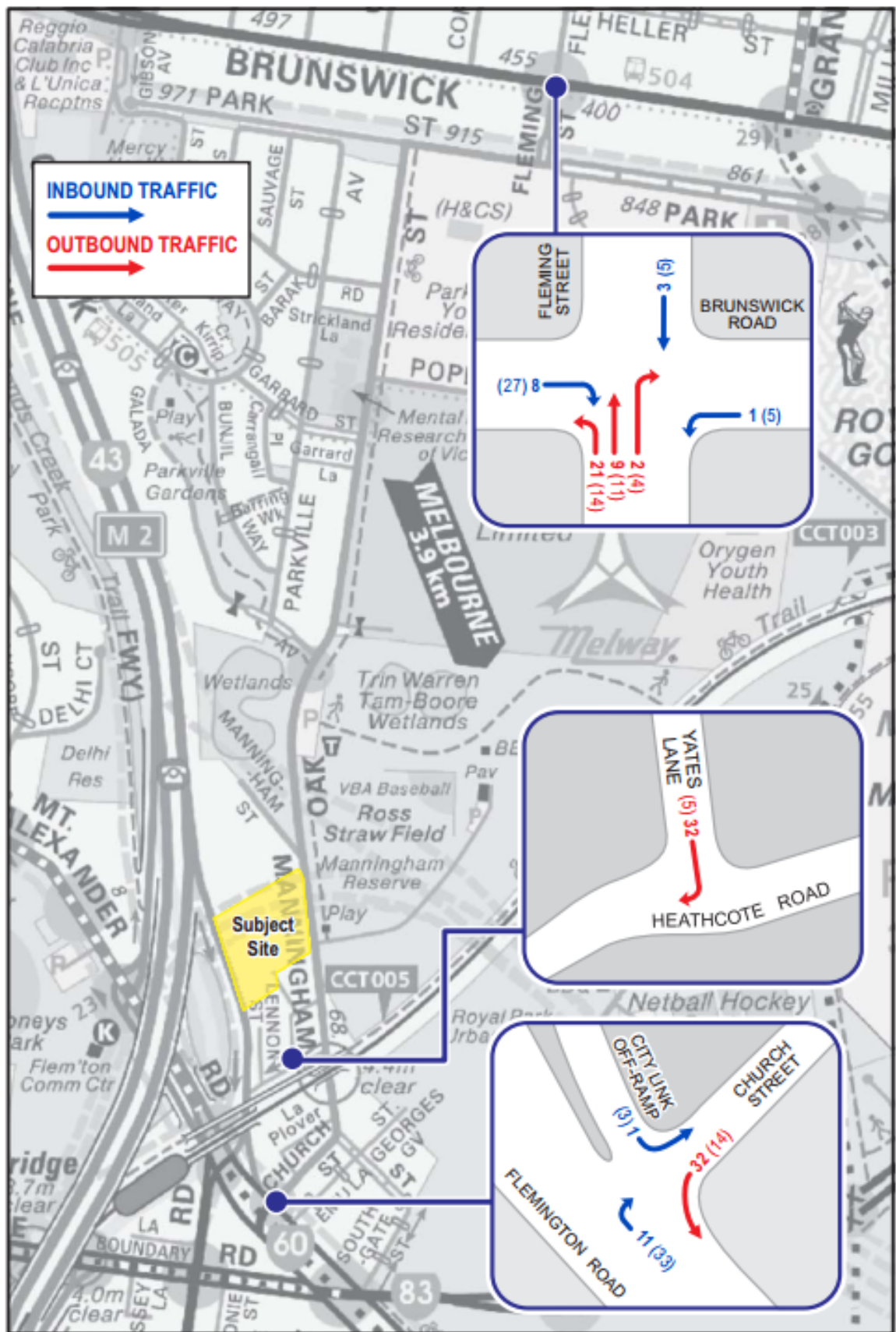
#### **INBOUND**

- 50% of arrival traffic will approach from the north from Brunswick Road via Fleming Road.
- 50% of arrival traffic will approach from the south from Flemington via Church Street.

The anticipated traffic generation of the proposal is subsequently detailed in Figure 7.1, whilst the anticipated post development volumes are provided in Figure 7.2. Both figures are also provided in Appendix AA.

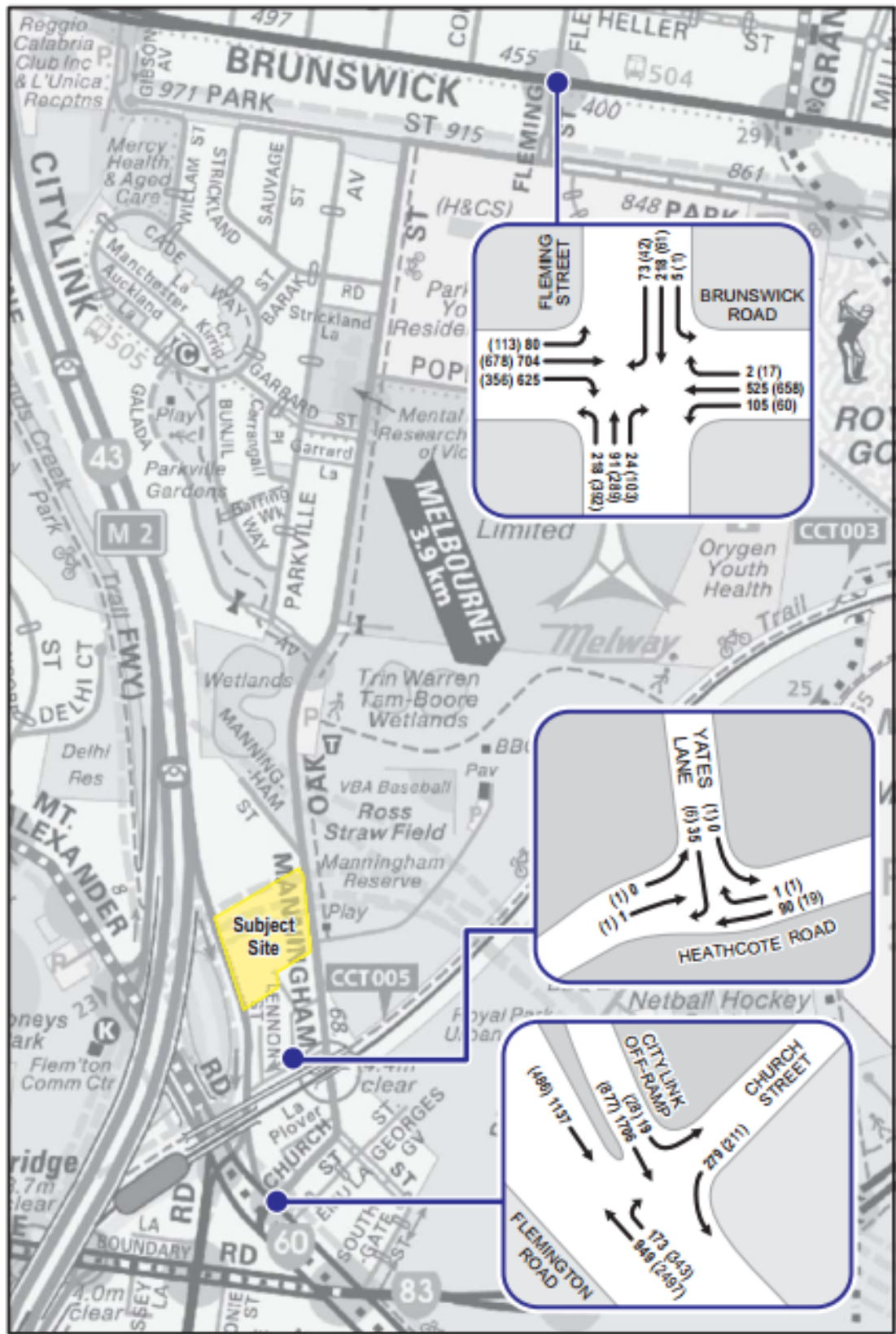
The proposed site access points onto Manningham Street have been analysed. Two access points have been modelled in accordance with the indicative framework plan (see Figure 7.3). A further scenario reducing the number of direct access points to one has also been modelled to determine whether this would also be appropriate from a traffic capacity perspective (see Figure 7.4).

Figure 7.1: Anticipated Traffic Generation



XX - AM PEAK: 7:30am - 8:30am (XX) - PM PEAK: 5:15pm - 6:15pm

**Figure 7.2: Anticipated Post Development Volumes**  
(Includes existing volumes plus anticipated traffic generation of proposed rezoning)



XX - AM PEAK: 7:30am - 8:30am (XX) - PM PEAK: 5:15pm - 6:15pm

Figure 7.3: Anticipated Post Development Volumes – Site Access to Manningham Street – 2 Access Point Option

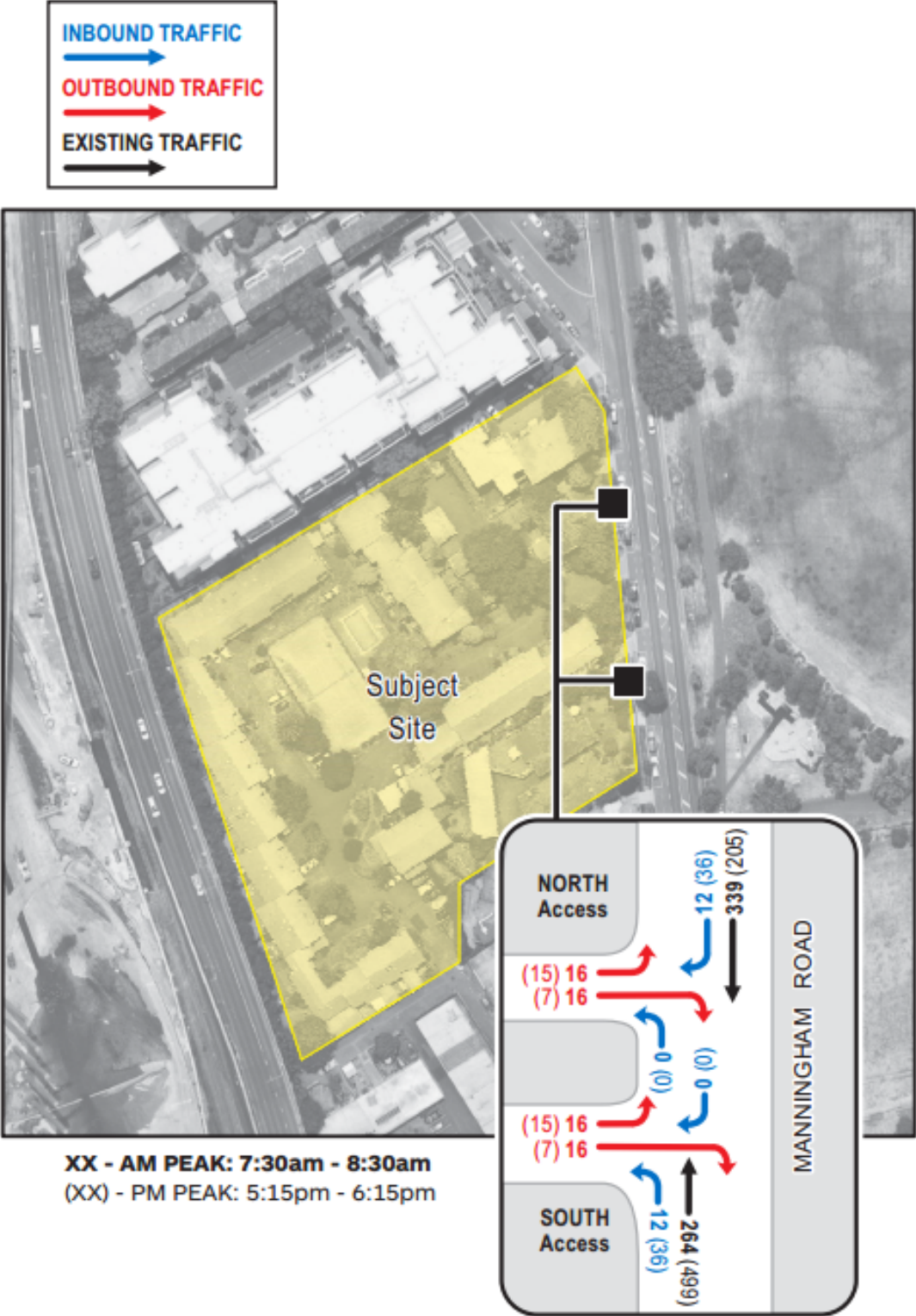
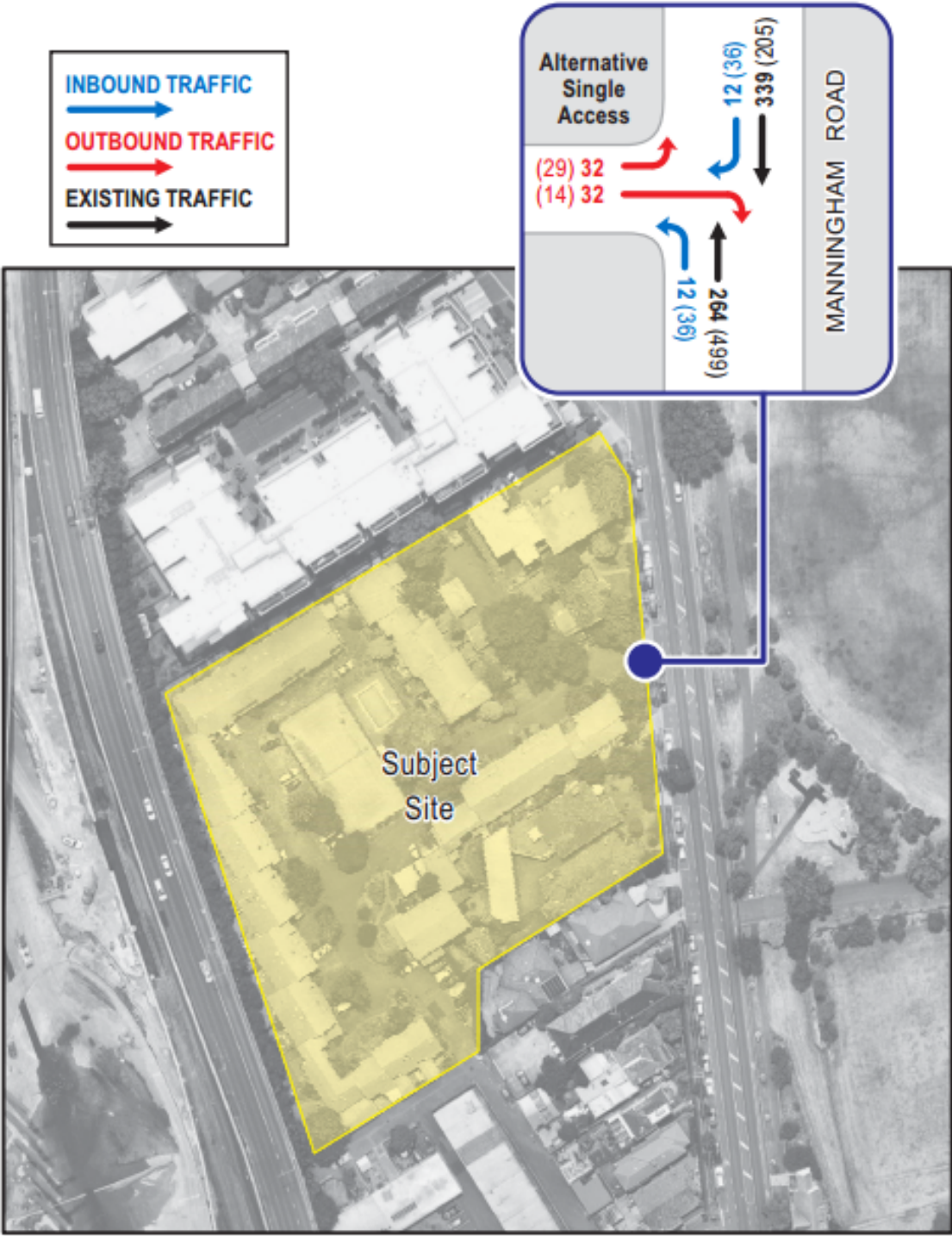


Figure 7.4: Anticipated Post Development Volumes – Site Access to Manningham Street – 1 Access Point Option



XX - AM PEAK: 7:30am - 8:30am (XX) - PM PEAK: 5:15pm - 6:15pm

## 7.3 Traffic Impacts

In order to assess the impact of the proposal, a SIDRA analysis of the post development conditions has been undertaken.

The results are compared against the existing conditions in Table 7.2 and Table 7.3 respectively. Detailed SIDRA results are provided in Appendix BB.

**Table 7.2: SIDRA Results - Post Development Operation - AM Peak**

Intersection	Existing Conditions			Post Development Conditions		
	D.O.S.	95%ile Queue (m)	Average Delay (s)	D.O.S.	95%ile Queue (m)	Average Delay (s)
Heathcote Road / Yates Lane	0.05	0.1	0.4	0.05	0.8	1.9
Brunswick Road / Fleming Street	0.77	128.7	23.9	0.78	133.6	24.1
Flemington Road / Church Street	0.46	95.8	9.8	0.47	98.8	10.4
North Access / Manningham Street	Proposed Site Access			0.20	1.1	0.6
South Access / Manningham Street	Proposed Site Access			0.20	1.1	3.5
Alternate Single Access / Manningham Street	Site Access (Alternate Option)			0.20	2.2	1.2

**Table 7.3: SIDRA Results – Post Development Operation – PM Peak**

Intersection	Existing Conditions			Post Development Conditions		
	D.O.S.	95%ile Queue (m)	Average Delay (s)	D.O.S.	95%ile Queue (m)	Average Delay (s)
Heathcote Road / Yates Lane	0.01	0	0.8	0.01	0.1	1.8
Brunswick Road / Fleming Street	0.75	96.8	21.3	0.65	101.3	21.7
Flemington Road / Church Street	0.38	71.7	9.9	0.41	76.8	10.5
North Access / Manningham Street	Proposed Site Access			0.28	0.8	0.6
South Access / Manningham Street	Proposed Site Access			0.30	0.8	0.6
Alternate Single Access / Manningham Street	Site Access (Alternate Option)			0.30	1.7	1.1

A review of the results indicates that the affected intersections are expected to operate under similar conditions to the existing conditions, with only minor increases to queues and delays.

#### **Heathcote Road / Yates Lane**

The Heathcote Road / Yates Lane intersection will continue to operate with negligible delays and queues in both the morning and afternoon peak periods.

#### **Brunswick Road / Fleming Street**

The Brunswick Road / Fleming Street intersection is expected to continue to operate under 'Good' conditions during the morning peak period, with queue lengths increasing by just 5m (approximately 1 vehicle length) and average delays increasing slightly. In the afternoon peak period, the worst-case degree of saturation on the southern approach slightly decreases with the increase in traffic, resulting in conditions going from 'Good' to 'Very Good' post development. This is due to the slightly altered signal phase timings which favours the southern approach. The queue lengths increase by up to 5m (approximately 1 vehicle length) with minor increase in delays. This is a minor reduction in performance and is therefore acceptable.

#### **Flemington Road / Church Street**

The Flemington Road / Church Street intersection has slightly increased compared with the existing conditions, but is expected to operate within capacity during both the AM and PM peak respectively, whilst delays and queues remain manageable.

#### **Site Access onto Manningham Street**

Both the dual and single access options to Manningham Street show negligible queuing and delays for traffic entering and exiting the site. From a traffic capacity perspective, it would be acceptable to provide either one or two access points onto Manningham Street.

Overall, it is concluded that the traffic anticipated to be generated by the proposal can be accommodated by the existing road network, without any mitigating works required.

## 8 Conclusions:

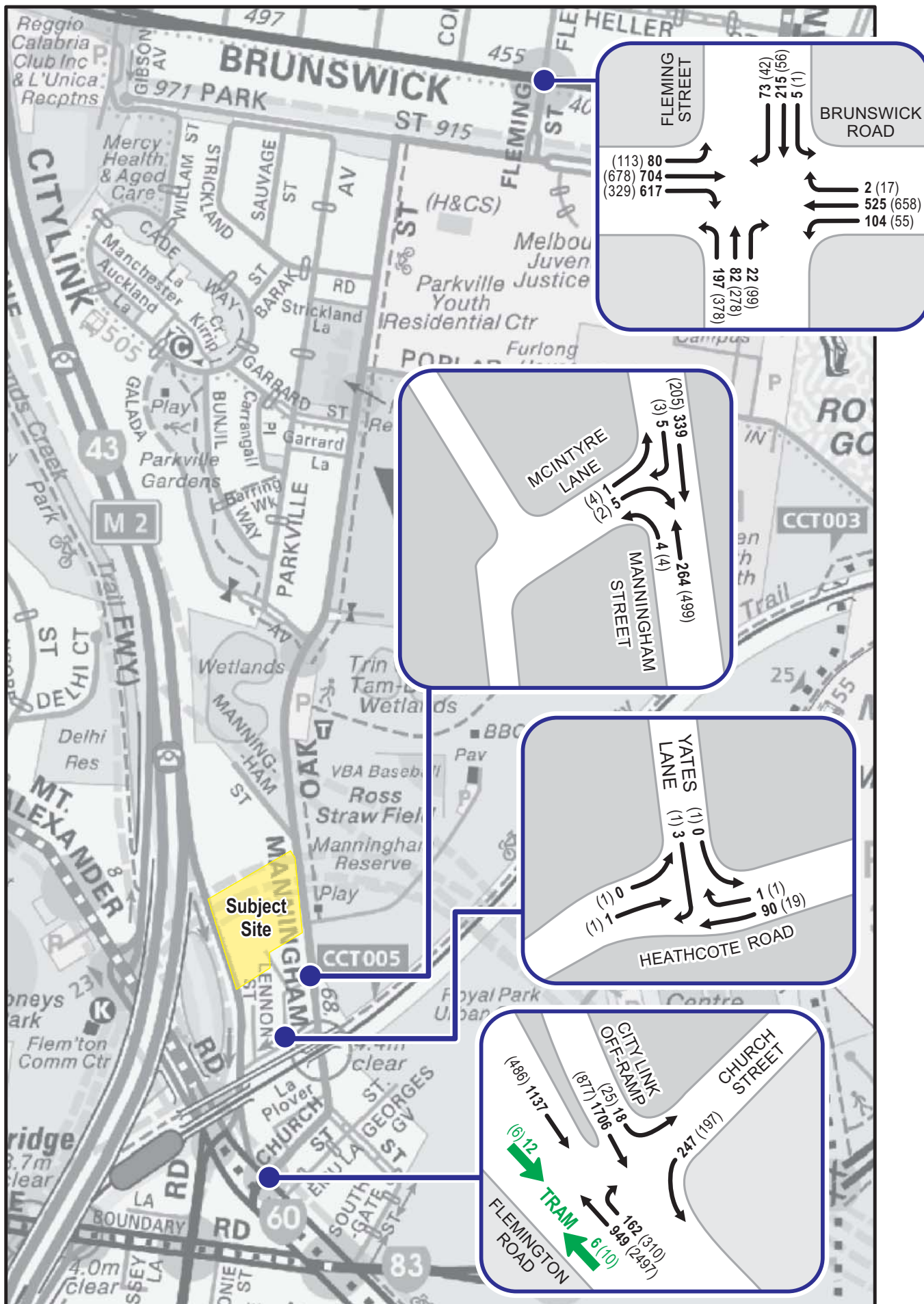
It is proposed to rezone the subject site to Residential Growth Zone. We have been instructed to assess the traffic impacts of up to 400 dwellings being constructed on the site as part of the rezoning.

An internal road is proposed to service the development with primary vehicle access provided to Manningham Street, with a secondary access to McIntyre Lane.

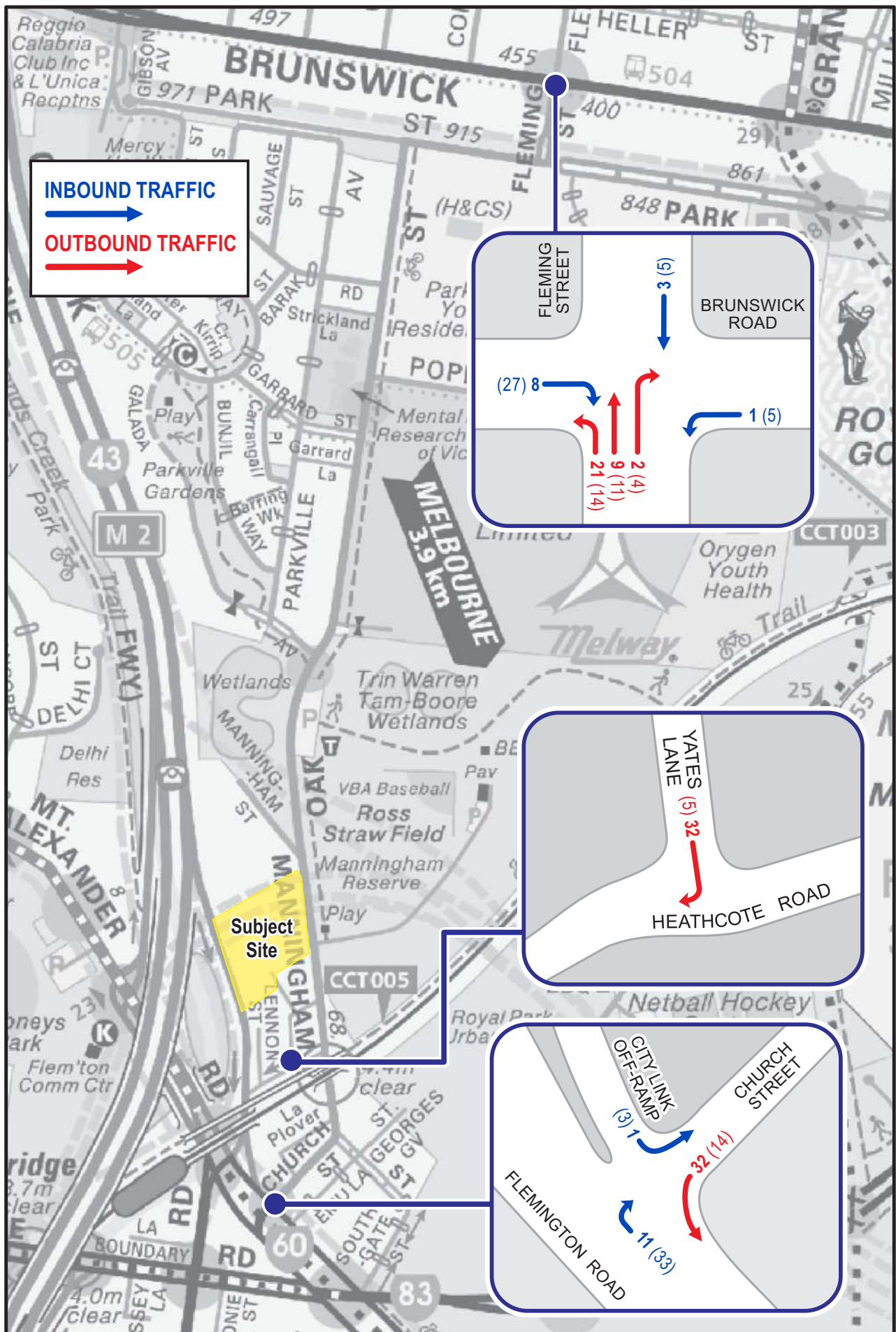
Based on the assessment undertaken above, it is concluded as follows:

- It is recommended that reduced on-site parking provision rates be considered for development applications within the site. Indicative rates are provided as follows:
  - Residents
    - 0.7 spaces to each one-bedroom dwelling;
    - 0.9 spaces to each two-bedroom dwelling; and
    - 1.5 spaces to each three-bedroom dwelling.
  - Residential Visitors
    - 0.1 spaces to each dwelling.
- It is recommended that bicycle parking be provided in accordance with the statutory requirements as a minimum, with consideration given to providing bicycle parking in excess of the statutory requirements for residents.
- Suitable locations exist at the Manningham Street frontage for crossovers to be located to provide vehicular access. A number of factors should be considered in choosing appropriate locations for the crossovers at the planning permit application stage including proximity to the intersection to the north of the site, power poles, services and tree protection zones.
- SIDRA analysis suggests either one or two access points would provide adequate access without any mitigating works being required to Manningham Street.
- The traffic anticipated to be generated by the proposal can be accommodated by the existing road network, without any mitigating works required.

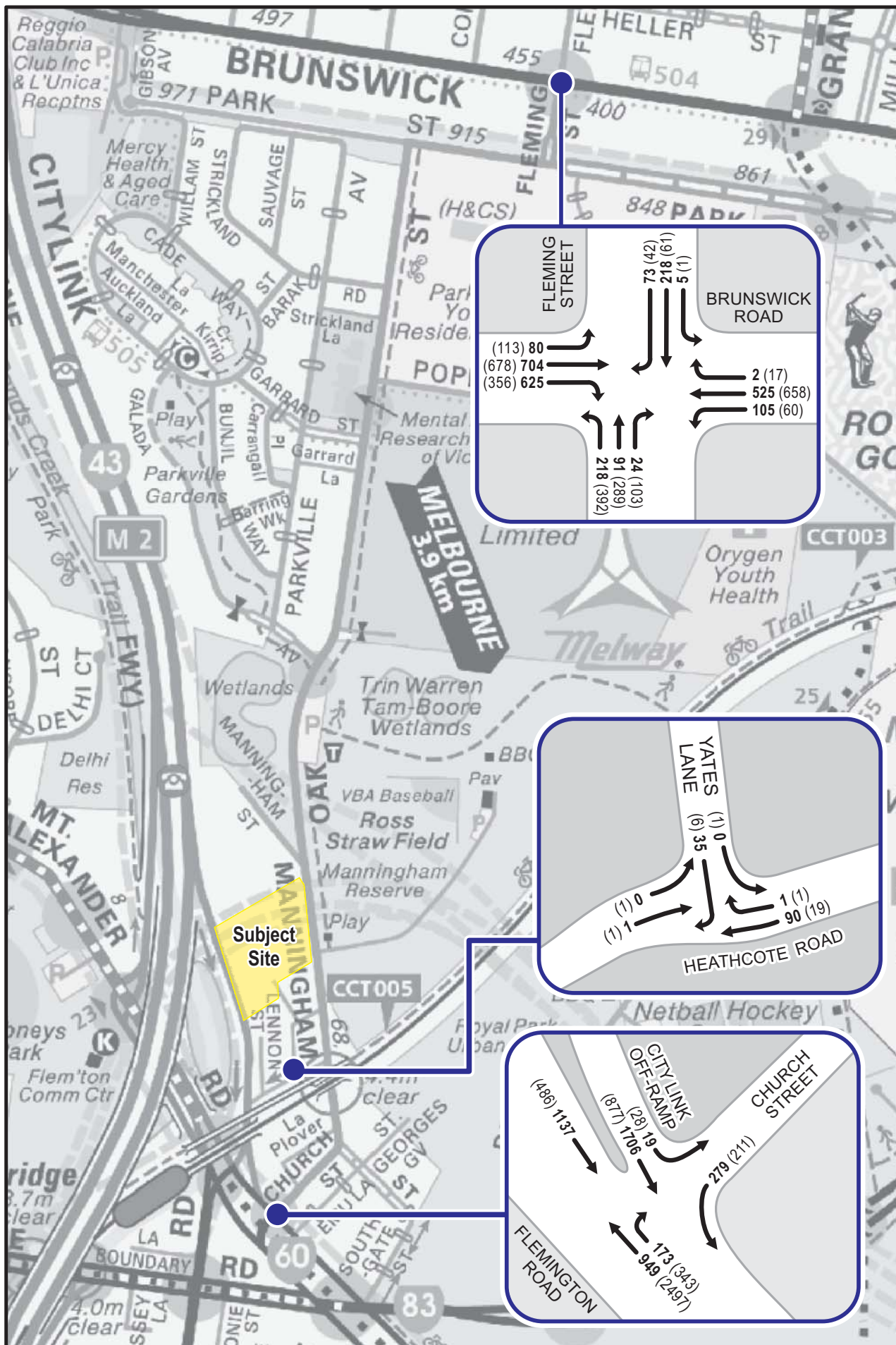
## Appendix A Traffic Volume Diagrams



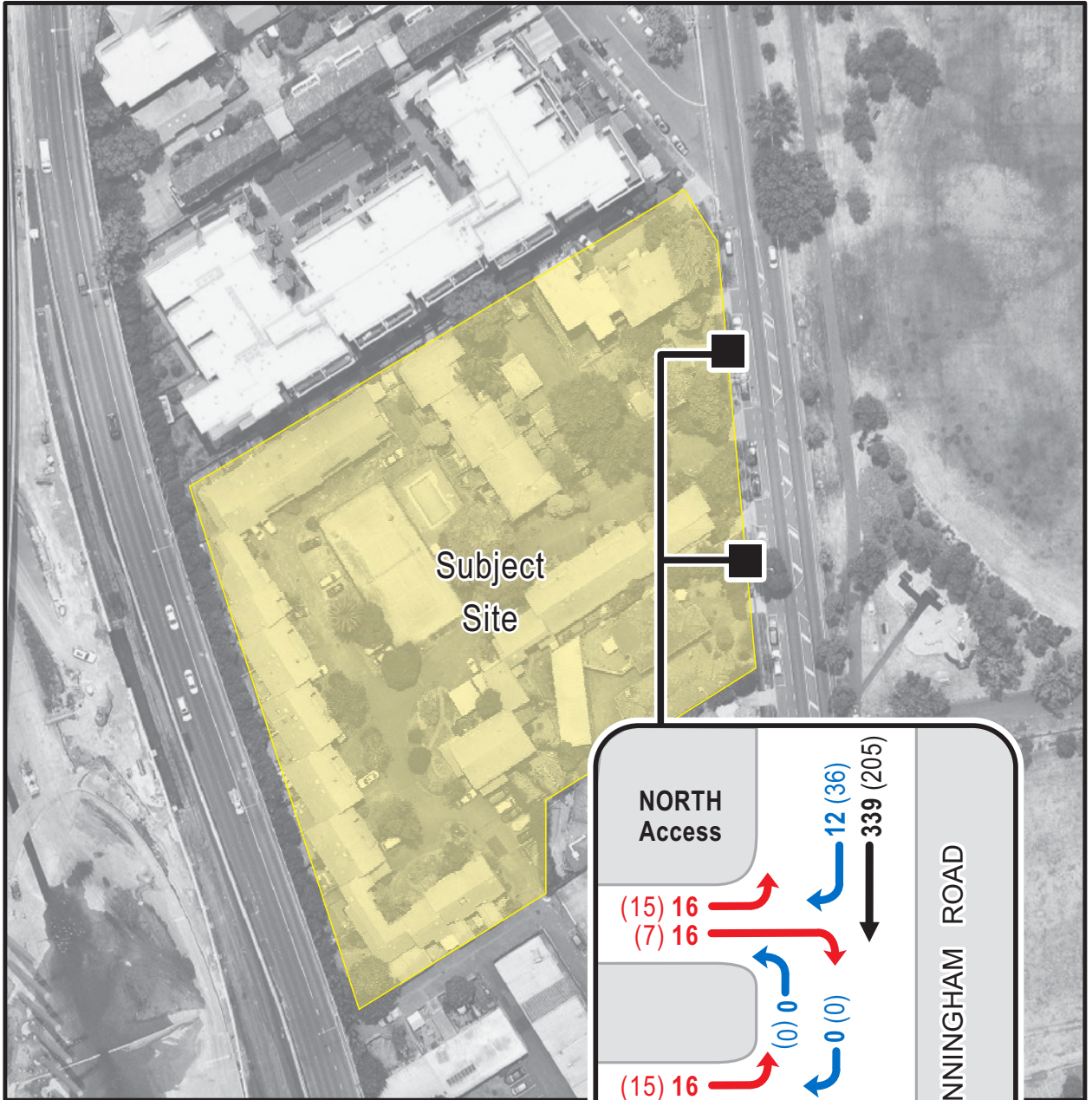
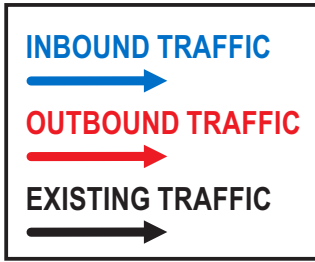
XX - AM PEAK: 7:30am - 8:30am (XX) - PM PEAK: 5:15pm - 6:15pm



XX - AM PEAK: 7:30am - 8:30am (XX) - PM PEAK: 5:15pm - 6:15pm



XX - AM PEAK: 7:30am - 8:30am (XX) - PM PEAK: 5:15pm - 6:15pm



**XX - AM PEAK: 7:30am - 8:30am**  
**(XX) - PM PEAK: 5:15pm - 6:15pm**

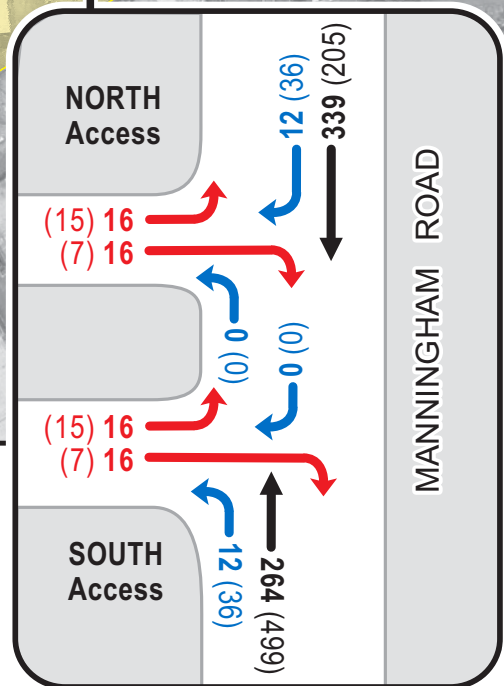


FIGURE 6  
**ANTICIPATED TRAFFIC GENERATION**  
**NORTH and SOUTH Access**

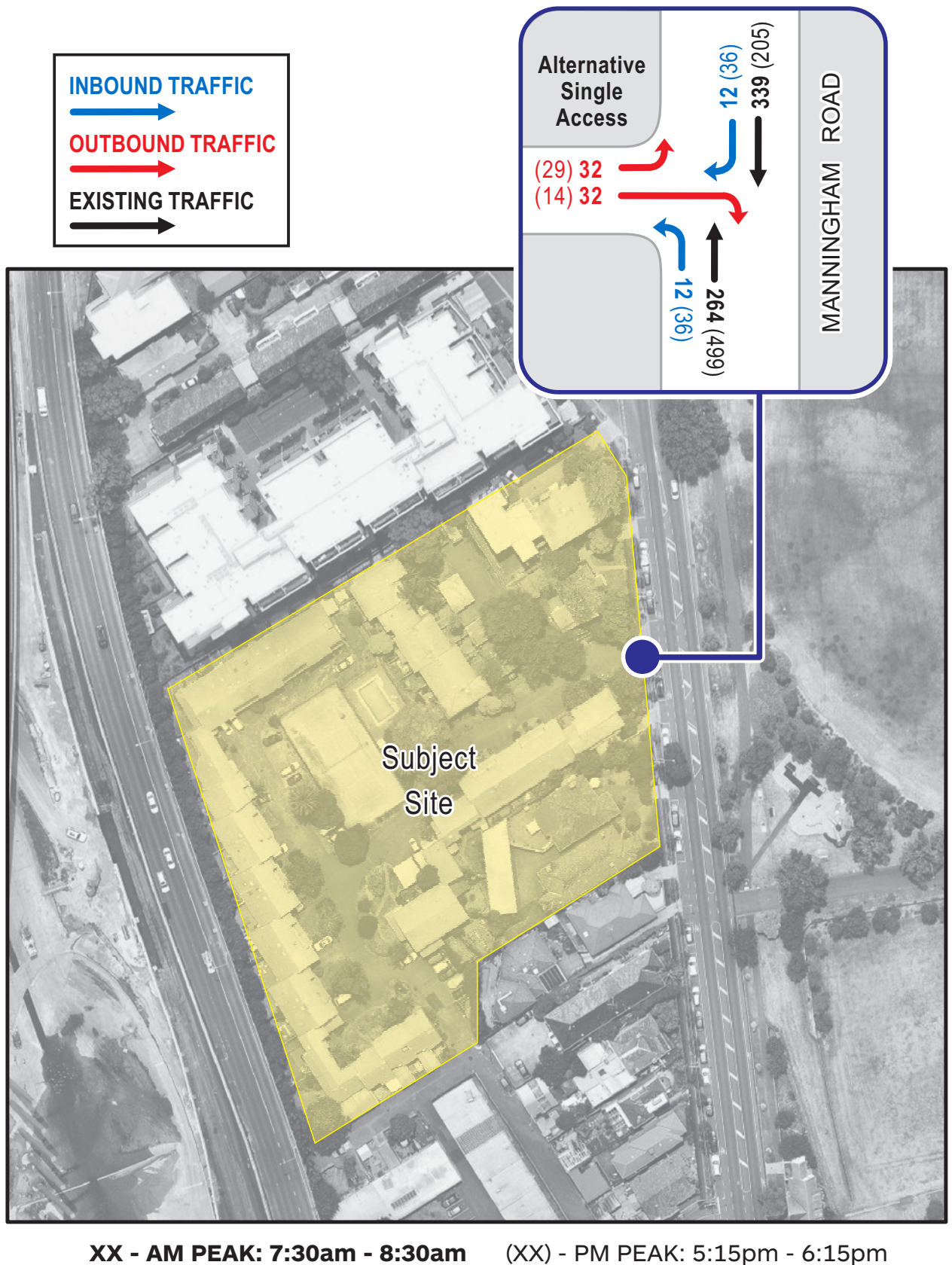


FIGURE 6  
**ANTICIPATED TRAFFIC GENERATION**  
**Alternative Single Access**

## Appendix B SIDRA Results

# MOVEMENT SUMMARY

 **Site: 101 [ManMc\_ExAM]**

Manningham Street / McIntyre Lane  
Existing AM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manningham Street											
1	L2	4	0.0	0.002	4.6	LOS A	0.0	0.0	0.00	0.53	46.6
2	T1	278	0.0	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		282	0.0	0.143	0.1	NA	0.0	0.0	0.00	0.01	49.9
North: Manningham Street											
8	T1	357	0.0	0.191	0.0	LOS A	0.0	0.0	0.00	0.01	49.9
9	R2	5	0.0	0.191	4.6	LOS A	0.0	0.0	0.00	0.01	49.1
Approach		362	0.0	0.191	0.1	NA	0.0	0.0	0.00	0.01	49.9
West: McIntyre Lane											
10	L2	5	0.0	0.007	7.8	LOS A	0.0	0.2	0.39	0.83	37.0
12	R2	1	0.0	0.007	12.2	LOS B	0.0	0.2	0.39	0.83	36.9
Approach		6	0.0	0.007	8.5	LOS A	0.0	0.2	0.39	0.83	37.0
All Vehicles		651	0.0	0.191	0.2	NA	0.0	0.2	0.00	0.02	49.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 **Site: 101 [HeaYat\_ExAM]**

Heathcote Road / Yates Lane  
Existing AM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Heathcote Road											
5	T1	95	0.0	0.050	0.0	LOS A	0.0	0.0	0.00	0.01	40.0
6	R2	1	0.0	0.050	3.6	LOS A	0.0	0.0	0.00	0.01	39.8
Approach		96	0.0	0.050	0.0	NA	0.0	0.0	0.00	0.01	40.0
North: Yates Lane											
7	L2	1	0.0	0.004	6.7	LOS A	0.0	0.1	0.01	0.99	37.4
9	R2	3	0.0	0.004	6.6	LOS A	0.0	0.1	0.01	0.99	37.1
Approach		4	0.0	0.004	6.7	LOS A	0.0	0.1	0.01	0.99	37.2
West: Heathcote Road											
10	L2	1	0.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.23	39.4
11	T1	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.23	39.3
Approach		2	0.0	0.001	1.7	NA	0.0	0.0	0.00	0.23	39.3
All Vehicles		102	0.0	0.050	0.4	NA	0.0	0.1	0.00	0.05	39.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY



**Site: 101 [BrunFle\_ExAM]**

Brunswick Road / Fleming Street

Existing AM Peak

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fleming Street											
1	L2	207	0.0	0.181	12.7	LOS B	3.9	27.4	0.46	0.67	44.9
2	T1	86	0.0	0.306	38.3	LOS D	3.5	24.5	0.94	0.73	32.8
3	R2	23	0.0	0.233	52.7	LOS D	1.1	7.4	1.00	0.70	30.1
Approach		317	0.0	0.306	22.6	LOS C	3.9	27.4	0.63	0.69	39.5
East: Brunswick Road											
4	L2	109	0.0	0.773	44.1	LOS D	14.4	100.7	0.99	0.92	33.9
5	T1	553	0.0	0.773	38.4	LOS D	15.0	105.1	0.99	0.92	36.6
6	R2	2	0.0	0.011	34.7	LOS C	0.1	0.5	0.79	0.63	35.7
Approach		664	0.0	0.773	39.3	LOS D	15.0	105.1	0.99	0.92	36.1
North: Fleming Street											
7	L2	5	0.0	0.729	47.4	LOS D	9.4	65.6	1.00	0.89	32.7
8	T1	226	0.0	0.729	43.4	LOS D	9.4	65.6	1.00	0.89	31.3
9	R2	77	0.0	0.729	52.9	LOS D	4.8	33.4	1.00	0.88	30.3
Approach		308	0.0	0.729	45.8	LOS D	9.4	65.6	1.00	0.89	31.1
West: Brunswick Road											
10	L2	84	0.0	0.302	10.2	LOS B	6.2	43.4	0.38	0.41	49.8
11	T1	741	0.0	0.302	4.7	LOS A	6.5	45.3	0.38	0.37	55.3
12	R2	649	0.0	0.744	21.9	LOS C	18.4	128.7	0.87	0.90	41.0
Approach		1475	0.0	0.744	12.6	LOS B	18.4	128.7	0.60	0.60	47.7
All Vehicles		2764	0.0	0.773	23.9	LOS C	18.4	128.7	0.74	0.72	41.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	36.5	LOS D	0.1	0.1	0.90	0.90
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	6.4	LOS A	0.1	0.1	0.38	0.38
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		211	30.4	LOS D			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY



**Site: 101 [FleChur\_ExAM]**

Flemington Road / Church Street

Existing AM Peak

Signals - Fixed Time Isolated    Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Flemington Road											
2	T1	1005	0.6	0.128	0.0	LOS A	0.1	2.7	0.00	0.00	60.0
3	R2	171	0.0	0.456	43.5	LOS D	7.4	51.9	0.92	0.80	35.0
Approach		1176	0.5	0.456	6.4	LOS A	7.4	51.9	0.14	0.12	54.3
North: Church Street											
4	L2	260	0.0	0.337	42.3	LOS D	5.5	38.4	0.89	0.78	34.9
Approach		260	0.0	0.337	42.3	LOS D	5.5	38.4	0.89	0.78	34.9
West: Flemington Road											
7	L2	19	0.0	0.458	13.9	LOS B	13.7	95.7	0.51	0.47	51.4
8	T1	2986	0.4	0.458	8.3	LOS A	13.7	95.8	0.51	0.46	52.8
Approach		3005	0.4	0.458	8.3	LOS A	13.7	95.8	0.51	0.46	52.8
All Vehicles		4441	0.4	0.458	9.8	LOS A	13.7	95.8	0.44	0.39	51.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	North Full Crossing	53	8.8	LOS A	0.1	0.1	0.42	0.42	
All Pedestrians		53	8.8	LOS A			0.42	0.42	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

 **Site: 101 [ManMc\_ExPM]**

Manningham Street / McIntyre Lane  
Existing PM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manningham Street											
1	L2	4	0.0	0.002	4.6	LOS A	0.0	0.0	0.00	0.53	46.6
2	T1	525	0.0	0.269	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		529	0.0	0.269	0.1	NA	0.0	0.0	0.00	0.00	49.9
North: Manningham Street											
8	T1	216	0.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.01	49.9
9	R2	3	0.0	0.116	4.6	LOS A	0.0	0.0	0.00	0.01	49.1
Approach		219	0.0	0.116	0.1	NA	0.0	0.0	0.00	0.01	49.9
West: McIntyre Lane											
10	L2	4	0.0	0.011	9.3	LOS A	0.0	0.3	0.56	0.86	36.3
12	R2	2	0.0	0.011	14.3	LOS B	0.0	0.3	0.56	0.86	36.1
Approach		6	0.0	0.011	10.9	LOS B	0.0	0.3	0.56	0.86	36.2
All Vehicles		755	0.0	0.269	0.2	NA	0.0	0.3	0.00	0.01	49.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 **Site: 101 [HeaYat\_ExPM]**

Heathcote Road / Yates Lane  
Existing PM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Heathcote Road											
5	T1	20	0.0	0.011	0.0	LOS A	0.0	0.0	0.00	0.03	39.9
6	R2	1	0.0	0.011	3.6	LOS A	0.0	0.0	0.00	0.03	39.7
Approach		21	0.0	0.011	0.2	NA	0.0	0.0	0.00	0.03	39.9
North: Yates Lane											
7	L2	1	0.0	0.002	6.7	LOS A	0.0	0.0	0.01	0.99	37.5
9	R2	1	0.0	0.002	6.4	LOS A	0.0	0.0	0.01	0.99	37.2
Approach		2	0.0	0.002	6.5	LOS A	0.0	0.0	0.01	0.99	37.3
West: Heathcote Road											
10	L2	1	0.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.23	39.4
11	T1	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.23	39.3
Approach		2	0.0	0.001	1.7	NA	0.0	0.0	0.00	0.23	39.3
All Vehicles		25	0.0	0.011	0.8	NA	0.0	0.0	0.00	0.12	39.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY



Site: 101 [BrunFle\_ExPM]

Brunswick Road / Fleming Street

Existing PM Peak

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fleming Street											
1	L2	398	0.0	0.424	19.9	LOS B	11.0	77.2	0.68	0.76	41.2
2	T1	293	0.0	0.750	39.5	LOS D	12.9	90.5	1.00	0.91	32.5
3	R2	104	0.0	0.381	41.0	LOS D	4.2	29.3	0.93	0.78	33.3
Approach		795	0.0	0.750	29.8	LOS C	12.9	90.5	0.83	0.82	36.5
East: Brunswick Road											
4	L2	58	0.0	0.595	32.0	LOS C	13.8	96.8	0.88	0.77	38.6
5	T1	693	0.0	0.595	26.2	LOS C	13.8	96.8	0.88	0.76	41.8
6	R2	18	0.0	0.069	27.5	LOS C	0.5	3.8	0.70	0.70	38.4
Approach		768	0.0	0.595	26.7	LOS C	13.8	96.8	0.87	0.76	41.5
North: Fleming Street											
7	L2	1	0.0	0.151	36.9	LOS D	2.2	15.4	0.86	0.66	36.1
8	T1	59	0.0	0.151	32.4	LOS C	2.2	15.4	0.86	0.66	34.7
9	R2	44	0.0	0.468	53.9	LOS D	2.1	14.5	1.00	0.73	29.8
Approach		104	0.0	0.468	41.6	LOS D	2.2	15.4	0.92	0.69	32.4
West: Brunswick Road											
10	L2	119	0.0	0.332	12.4	LOS B	7.5	52.7	0.46	0.50	48.1
11	T1	714	0.0	0.332	6.8	LOS A	7.9	55.3	0.46	0.44	53.5
12	R2	346	0.0	0.543	16.8	LOS B	6.4	44.8	0.82	0.81	43.5
Approach		1179	0.0	0.543	10.3	LOS B	7.9	55.3	0.57	0.56	49.6
All Vehicles		2846	0.0	0.750	21.3	LOS C	13.8	96.8	0.73	0.69	42.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	28.1	LOS C	0.1	0.1	0.79	0.79	
P2	East Full Crossing	53	36.5	LOS D	0.1	0.1	0.90	0.90	
P3	North Full Crossing	53	8.5	LOS A	0.1	0.1	0.43	0.43	
P4	West Full Crossing	53	37.4	LOS D	0.1	0.1	0.91	0.91	
All Pedestrians		211	27.6	LOS C			0.76	0.76	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY



**Site: 101 [FleChur\_ExPM]**

Flemington Road / Church Street

Existing PM Peak

Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Flemington Road											
2	T1	2635	0.2	0.337	0.1	LOS A	0.2	5.0	0.00	0.00	59.9
3	R2	326	0.0	0.382	23.3	LOS C	10.1	70.5	0.68	0.76	43.3
Approach		2961	0.2	0.382	2.6	LOS A	10.1	70.5	0.08	0.08	57.5
North: Church Street											
4	L2	207	0.0	0.118	20.7	LOS C	2.7	19.2	0.58	0.71	43.9
Approach		207	0.0	0.118	20.7	LOS C	2.7	19.2	0.58	0.71	43.9
West: Flemington Road											
7	L2	26	0.0	0.382	28.3	LOS C	10.2	71.4	0.75	0.66	42.6
8	T1	1474	0.9	0.382	22.7	LOS C	10.2	71.7	0.75	0.65	43.7
Approach		1500	0.8	0.382	22.8	LOS C	10.2	71.7	0.75	0.65	43.6
All Vehicles		4668	0.4	0.382	9.9	LOS A	10.2	71.7	0.32	0.29	51.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	North Full Crossing	53	23.9	LOS C	0.1	0.1	0.69	0.69	
All Pedestrians		53	23.9	LOS C			0.69	0.69	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Organisation: RATIO CONSULTANTS PTY LTD | Processed: Friday, 25 August 2017 10:06:19 AM

Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID\_14547T\_Existing.sip7

# MOVEMENT SUMMARY

 **Site: 101 [HeaYat\_ProAM]**

Heathcote Road / Yates Lane  
Proposed AM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Heathcote Road											
5	T1	95	0.0	0.050	0.0	LOS A	0.0	0.0	0.00	0.01	40.0
6	R2	1	0.0	0.050	3.6	LOS A	0.0	0.0	0.00	0.01	39.8
Approach		96	0.0	0.050	0.0	NA	0.0	0.0	0.00	0.01	40.0
North: Yates Lane											
7	L2	1	0.0	0.035	6.7	LOS A	0.1	0.8	0.06	0.97	37.4
9	R2	37	0.0	0.035	6.7	LOS A	0.1	0.8	0.06	0.97	37.1
Approach		38	0.0	0.035	6.7	LOS A	0.1	0.8	0.06	0.97	37.1
West: Heathcote Road											
10	L2	1	0.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.23	39.4
11	T1	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.23	39.3
Approach		2	0.0	0.001	1.7	NA	0.0	0.0	0.00	0.23	39.3
All Vehicles		136	0.0	0.050	1.9	NA	0.1	0.8	0.02	0.28	39.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: RATIO CONSULTANTS PTY LTD | Processed: Monday, 21 August 2017 10:01:43 AM

Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID\_14547T\_Proposed.sip7

# MOVEMENT SUMMARY



Site: 101 [BrunFile\_ProAM]

Brunswick Road / Fleming Street

Proposed AM Peak

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fleming Street											
1	L2	229	0.0	0.200	12.8	LOS B	4.4	30.8	0.47	0.68	44.8
2	T1	96	0.0	0.340	38.5	LOS D	3.9	27.4	0.94	0.74	32.8
3	R2	25	0.0	0.263	53.0	LOS D	1.2	8.1	1.00	0.70	30.0
Approach		351	0.0	0.340	22.7	LOS C	4.4	30.8	0.64	0.70	39.4
East: Brunswick Road											
4	L2	111	0.0	0.775	44.2	LOS D	14.4	101.0	0.99	0.92	33.8
5	T1	553	0.0	0.775	38.4	LOS D	15.1	105.5	0.99	0.92	36.6
6	R2	2	0.0	0.011	34.7	LOS C	0.1	0.5	0.79	0.63	35.7
Approach		665	0.0	0.775	39.4	LOS D	15.1	105.5	0.99	0.92	36.1
North: Fleming Street											
7	L2	5	0.0	0.749	47.9	LOS D	9.7	68.2	1.00	0.90	32.6
8	T1	229	0.0	0.749	43.9	LOS D	9.7	68.2	1.00	0.90	31.2
9	R2	77	0.0	0.749	53.7	LOS D	4.7	32.9	1.00	0.90	30.1
Approach		312	0.0	0.749	46.4	LOS D	9.7	68.2	1.00	0.90	30.9
West: Brunswick Road											
10	L2	84	0.0	0.302	10.2	LOS B	6.2	43.4	0.38	0.41	49.8
11	T1	741	0.0	0.302	4.7	LOS A	6.5	45.3	0.38	0.37	55.3
12	R2	658	0.0	0.754	22.5	LOS C	19.1	133.6	0.87	0.90	40.7
Approach		1483	0.0	0.754	12.9	LOS B	19.1	133.6	0.60	0.61	47.5
All Vehicles		2811	0.0	0.775	24.1	LOS C	19.1	133.6	0.74	0.73	40.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	36.5	LOS D	0.1	0.1	0.90	0.90
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	6.4	LOS A	0.1	0.1	0.38	0.38
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		211	30.4	LOS D			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY



**Site: 101 [FleChur\_ProAM]**

Flemington Road / Church Street

Proposed AM Peak

Signals - Fixed Time Isolated    Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Flemington Road											
2	T1	1005	0.6	0.128	0.1	LOS A	0.1	2.8	0.00	0.00	60.0
3	R2	182	0.0	0.465	42.8	LOS D	7.9	55.1	0.92	0.80	35.3
Approach		1187	0.5	0.465	6.6	LOS A	7.9	55.1	0.14	0.12	54.1
North: Church Street											
4	L2	294	0.0	0.363	41.7	LOS D	6.2	43.2	0.89	0.79	35.1
Approach		294	0.0	0.363	41.7	LOS D	6.2	43.2	0.89	0.79	35.1
West: Flemington Road											
7	L2	20	0.0	0.465	14.4	LOS B	14.1	98.7	0.53	0.49	51.0
8	T1	2986	0.4	0.465	8.8	LOS A	14.1	98.8	0.53	0.48	52.4
Approach		3006	0.4	0.465	8.9	LOS A	14.1	98.8	0.53	0.48	52.4
All Vehicles		4487	0.4	0.465	10.4	LOS B	14.1	98.8	0.45	0.40	51.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	North Full Crossing	53	9.3	LOS A	0.1	0.1	0.43	0.43	
All Pedestrians		53	9.3	LOS A			0.43	0.43	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Organisation: RATIO CONSULTANTS PTY LTD | Processed: Friday, 25 August 2017 10:04:01 AM

Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID\_14547T\_Proposed.sip7

# MOVEMENT SUMMARY

 **Site: 101 [ManNAcc\_ProAM]**

Manningham Street / North Access  
Proposed AM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manningham Street											
1	L2	1	0.0	0.147	5.6	LOS A	0.0	0.0	0.00	0.00	58.3
2	T1	278	0.0	0.147	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		279	0.0	0.147	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Manningham Street											
8	T1	357	0.0	0.195	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
9	R2	13	0.0	0.195	5.6	LOS A	0.0	0.0	0.00	0.02	57.4
Approach		369	0.0	0.195	0.2	NA	0.0	0.0	0.00	0.02	59.7
West: North Access											
10	L2	17	0.0	0.045	9.2	LOS A	0.2	1.1	0.42	0.90	50.7
12	R2	17	0.0	0.045	11.4	LOS B	0.2	1.1	0.42	0.90	50.1
Approach		34	0.0	0.045	10.3	LOS B	0.2	1.1	0.42	0.90	50.4
All Vehicles		682	0.0	0.195	0.6	NA	0.2	1.1	0.02	0.06	59.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: RATIO CONSULTANTS PTY LTD | Processed: Monday, 21 August 2017 10:05:14 AM

Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID14547T\_Proposed Access Points.sip7

# MOVEMENT SUMMARY

 **Site: 101 [ManSAcc\_ProAM]**

Manningham Street / South Access  
Proposed AM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manningham Street											
1	L2	13	0.0	0.154	5.6	LOS A	0.0	0.0	0.00	0.03	58.1
2	T1	278	0.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		291	0.0	0.154	0.3	NA	0.0	0.0	0.00	0.03	59.7
North: Manningham Street											
8	T1	1	0.0	0.198	0.0	LOS A	0.0	0.0	0.00	0.62	54.9
9	R2	357	0.0	0.198	5.6	LOS A	0.0	0.0	0.00	0.62	52.9
Approach		358	0.0	0.198	5.6	NA	0.0	0.0	0.00	0.62	52.9
West: North Access											
10	L2	17	0.0	0.045	9.2	LOS A	0.2	1.1	0.42	0.90	50.7
12	R2	17	0.0	0.045	11.3	LOS B	0.2	1.1	0.42	0.90	50.1
Approach		34	0.0	0.045	10.2	LOS B	0.2	1.1	0.42	0.90	50.4
All Vehicles		682	0.0	0.198	3.5	NA	0.2	1.1	0.02	0.38	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID14547T\_Proposed Access Points.sip7

# MOVEMENT SUMMARY

 **Site: 101 [ManSiteAcc\_ProAM]**

Manningham Street / Single Site Access (Alternate Option)  
Proposed AM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manningham Street											
1	L2	13	0.0	0.154	5.6	LOS A	0.0	0.0	0.00	0.03	58.1
2	T1	278	0.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		291	0.0	0.154	0.3	NA	0.0	0.0	0.00	0.03	59.7
North: Manningham Street											
8	T1	357	0.0	0.195	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
9	R2	13	0.0	0.195	5.6	LOS A	0.0	0.0	0.00	0.02	57.4
Approach		369	0.0	0.195	0.2	NA	0.0	0.0	0.00	0.02	59.7
West: Site Access											
10	L2	34	0.0	0.091	9.2	LOS A	0.3	2.2	0.43	0.92	50.6
12	R2	34	0.0	0.091	11.7	LOS B	0.3	2.2	0.43	0.92	50.0
Approach		67	0.0	0.091	10.4	LOS B	0.3	2.2	0.43	0.92	50.3
All Vehicles		727	0.0	0.195	1.2	NA	0.3	2.2	0.04	0.11	58.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: RATIO CONSULTANTS PTY LTD | Processed: Thursday, 24 August 2017 3:34:49 PM

Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID14547T\_Proposed Access Points.sip7

# MOVEMENT SUMMARY

 **Site: 101 [HeaYat\_ProPM]**

Heathcote Road / Yates Lane  
Proposed PM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Heathcote Road											
5	T1	20	0.0	0.011	0.0	LOS A	0.0	0.0	0.00	0.03	39.9
6	R2	1	0.0	0.011	3.6	LOS A	0.0	0.0	0.00	0.03	39.7
Approach		21	0.0	0.011	0.2	NA	0.0	0.0	0.00	0.03	39.9
North: Yates Lane											
7	L2	1	0.0	0.006	6.7	LOS A	0.0	0.1	0.02	0.98	37.5
9	R2	6	0.0	0.006	6.4	LOS A	0.0	0.1	0.02	0.98	37.2
Approach		7	0.0	0.006	6.4	LOS A	0.0	0.1	0.02	0.98	37.3
West: Heathcote Road											
10	L2	1	0.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.23	39.4
11	T1	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.23	39.3
Approach		2	0.0	0.001	1.7	NA	0.0	0.0	0.00	0.23	39.3
All Vehicles		31	0.0	0.011	1.8	NA	0.0	0.1	0.00	0.27	39.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: RATIO CONSULTANTS PTY LTD | Processed: Monday, 21 August 2017 10:01:45 AM

Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID\_14547T\_Proposed.sip7

# MOVEMENT SUMMARY



Site: 101 [BrunFile\_ProPM]

Brunswick Road / Fleming Street

Proposed PM Peak

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fleming Street											
1	L2	413	0.0	0.421	18.6	LOS B	11.0	77.2	0.66	0.76	41.8
2	T1	304	0.0	0.638	33.4	LOS C	12.2	85.3	0.95	0.80	34.4
3	R2	108	0.0	0.329	37.1	LOS D	4.1	28.8	0.88	0.77	34.5
Approach		825	0.0	0.638	26.5	LOS C	12.2	85.3	0.79	0.78	37.7
East: Brunswick Road											
4	L2	63	0.0	0.642	33.9	LOS C	14.5	101.3	0.91	0.80	37.8
5	T1	693	0.0	0.642	28.2	LOS C	14.5	101.3	0.91	0.79	40.9
6	R2	18	0.0	0.073	29.0	LOS C	0.6	3.9	0.72	0.70	37.7
Approach		774	0.0	0.642	28.7	LOS C	14.5	101.3	0.90	0.78	40.5
North: Fleming Street											
7	L2	1	0.0	0.134	33.3	LOS C	2.2	15.7	0.82	0.63	37.5
8	T1	64	0.0	0.134	28.7	LOS C	2.2	15.7	0.82	0.63	35.9
9	R2	44	0.0	0.361	49.4	LOS D	2.0	13.8	0.98	0.74	31.0
Approach		109	0.0	0.361	37.1	LOS D	2.2	15.7	0.88	0.68	33.7
West: Brunswick Road											
10	L2	119	0.0	0.356	14.3	LOS B	8.5	59.8	0.52	0.54	46.9
11	T1	714	0.0	0.356	8.8	LOS A	9.0	62.9	0.52	0.49	52.0
12	R2	375	0.0	0.648	19.1	LOS B	8.1	56.4	0.90	0.84	42.3
Approach		1207	0.0	0.648	12.5	LOS B	9.0	62.9	0.64	0.60	48.1
All Vehicles		2916	0.0	0.648	21.7	LOS C	14.5	101.3	0.76	0.70	42.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.7	LOS C	0.1	0.1	0.81	0.81	
P2	East Full Crossing	53	33.0	LOS D	0.1	0.1	0.86	0.86	
P3	North Full Crossing	53	10.3	LOS B	0.1	0.1	0.48	0.48	
P4	West Full Crossing	53	33.9	LOS D	0.1	0.1	0.87	0.87	
All Pedestrians		211	26.7	LOS C			0.75	0.75	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY



**Site: 101 [FleChur\_ProPM]**

Flemington Road / Church Street

Proposed PM Peak

Signals - Fixed Time Isolated    Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Flemington Road											
2	T1	2635	0.2	0.337	0.1	LOS A	0.2	5.2	0.00	0.00	59.9
3	R2	361	0.0	0.406	22.4	LOS C	11.0	76.8	0.67	0.76	43.8
Approach		2996	0.2	0.406	2.8	LOS A	11.0	76.8	0.08	0.09	57.3
North: Church Street											
4	L2	222	0.0	0.121	19.6	LOS B	2.8	19.9	0.56	0.71	44.4
Approach		222	0.0	0.121	19.6	LOS B	2.8	19.9	0.56	0.71	44.4
West: Flemington Road											
7	L2	29	0.0	0.403	29.9	LOS C	10.6	74.0	0.78	0.68	41.8
8	T1	1474	0.9	0.403	24.3	LOS C	10.6	74.4	0.78	0.67	42.8
Approach		1503	0.8	0.403	24.4	LOS C	10.6	74.4	0.78	0.67	42.8
All Vehicles		4721	0.4	0.406	10.5	LOS B	11.0	76.8	0.33	0.30	51.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	North Full Crossing	53	25.3	LOS C	0.1	0.1	0.71	0.71	
All Pedestrians		53	25.3	LOS C			0.71	0.71	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

 **Site: 101 [ManNAcc\_ProPM]**

Manningham Street / North Access  
Proposed PM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manningham Street											
1	L2	1	0.0	0.278	5.6	LOS A	0.0	0.0	0.00	0.00	58.3
2	T1	525	0.0	0.278	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		526	0.0	0.278	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Manningham Street											
8	T1	216	0.0	0.135	0.0	LOS A	0.0	0.0	0.00	0.10	59.2
9	R2	38	0.0	0.135	5.6	LOS A	0.0	0.0	0.00	0.10	56.8
Approach		254	0.0	0.135	0.8	NA	0.0	0.0	0.00	0.10	58.8
West: North Access											
10	L2	16	0.0	0.036	10.7	LOS B	0.1	0.8	0.53	0.92	50.1
12	R2	7	0.0	0.036	12.9	LOS B	0.1	0.8	0.53	0.92	49.5
Approach		23	0.0	0.036	11.4	LOS B	0.1	0.8	0.53	0.92	49.9
All Vehicles		803	0.0	0.278	0.6	NA	0.1	0.8	0.02	0.06	59.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID14547T\_Proposed Access Points.sip7

# MOVEMENT SUMMARY

 **Site: 101 [ManSAcc\_ProPM]**

Manningham Street / South Access  
Proposed PM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manningham Street											
1	L2	38	0.0	0.298	5.6	LOS A	0.0	0.0	0.00	0.04	58.0
2	T1	525	0.0	0.298	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		563	0.0	0.298	0.4	NA	0.0	0.0	0.00	0.04	59.5
North: Manningham Street											
8	T1	216	0.0	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	1	0.0	0.115	5.6	LOS A	0.0	0.0	0.00	0.00	57.6
Approach		217	0.0	0.115	0.0	NA	0.0	0.0	0.00	0.00	59.9
West: North Access											
10	L2	16	0.0	0.035	10.7	LOS B	0.1	0.8	0.53	0.92	50.1
12	R2	7	0.0	0.035	12.8	LOS B	0.1	0.8	0.53	0.92	49.6
Approach		23	0.0	0.035	11.3	LOS B	0.1	0.8	0.53	0.92	49.9
All Vehicles		803	0.0	0.298	0.6	NA	0.1	0.8	0.02	0.06	59.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID14547T\_Proposed Access Points.sip7

# MOVEMENT SUMMARY

 **Site: 101 [ManSiteAcc\_ProPM]**

Manningham Street / Single Site Access (Alternate Option)  
Proposed PM Peak  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manningham Street											
1	L2	38	0.0	0.298	5.6	LOS A	0.0	0.0	0.00	0.04	58.0
2	T1	525	0.0	0.298	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		563	0.0	0.298	0.4	NA	0.0	0.0	0.00	0.04	59.5
North: Manningham Street											
8	T1	216	0.0	0.135	0.0	LOS A	0.0	0.0	0.00	0.10	59.2
9	R2	38	0.0	0.135	5.6	LOS A	0.0	0.0	0.00	0.10	56.8
Approach		254	0.0	0.135	0.8	NA	0.0	0.0	0.00	0.10	58.8
West: Site Access											
10	L2	31	0.0	0.071	10.8	LOS B	0.2	1.7	0.54	0.95	49.9
12	R2	15	0.0	0.071	13.4	LOS B	0.2	1.7	0.54	0.95	49.4
Approach		45	0.0	0.071	11.6	LOS B	0.2	1.7	0.54	0.95	49.8
All Vehicles		862	0.0	0.298	1.1	NA	0.2	1.7	0.03	0.10	58.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: Y:\14501-15000\14547T - 87-103 Manningham Road, Parkville\Work\SIDRA\SID14547T\_Proposed Access Points.sip7

## Appendix C Feature and Level Survey

DATE PLOTTED: 31 August 2017 2:24 PM BY: RICHARD MITCHELL

XREFs: CAD File: M:2017\0501\_1000\VT10967 Parkville\Survey\Drawings\VT10967 RFL 2D revA.dwg



**IMPORTANT NOTE**  
This plan is of an identification/re-mark survey only and as such is not registered by the Registrar of Titles. Subsequent registered or other surveys in this area may affect the boundary definition shown on the plan. Any differences so caused to the boundary definition shown on this plan are beyond the control of Cardno Victoria Pty Ltd who can accept no responsibility for such differences.

Legend	
	001 PERM SURVEY MARK
	003 TITLE PEG
	004 INSTRUMENT STATION
	102 TOP OF BANK
	103 TOE OF BANK
	104 EXISTING SURFACE SPOT
	201 SINGLE TREE
	403 EDGE OF BITUMEN
	406 LIP OF KERB OR CHANNEL
	407 INVERT OF KERB OR CHANNEL
	408 BACK OF KERB OR CHANNEL
	409 TOP OF KERB OR CHANNEL
	410 PEDESTRIAN PATH
	411 DRIVEWAY
	505 TRAFFIC SIGNAL POLE
	511 JOINT USE POLE
	517 CENTRE MOUNTED SIGN
	601 HOUSE
	603 MAJOR BUILDING
	639 ROOF RIDGE
	711 LIGHT POLE
	712 ELECTRICITY POLE ONLY
	713 ELECTRICITY POLE WITH LIGHT
	731 GAS VALVE
	735 GAS METER
	751 STOP VALVE
	753 FIRE HYDRANT
	754 WATER METER
	807 TRAMWAY POLE
	903 FENCE
	904 GATE

**Notes**  
Levels shown thus are to Australian Height Datum vide Jika Jika PM 280 with a stated value of RL 11.674  
Coordinates are to MGA Zone 55 vide Jika Jika PM s 661 and 724  
Property Information shown thus is not based on Survey and has been obtained from Vicmap Digital.  
Property Information shown thus is not based on Survey and has been obtained from an Aerial Image.  
Contour Interval 0.2 metres  
Subtract 6°52'00" for BP2737Y Title Bearings  
See Certificates of Title and RP18434 for Easement details

Services shown hereon have been located by field survey. Other hidden underground services may exist and prior to any demolition, excavation or construction on the site, the relevant authority or 'Dial before you Dig' should be contacted for possible location of further underground services.

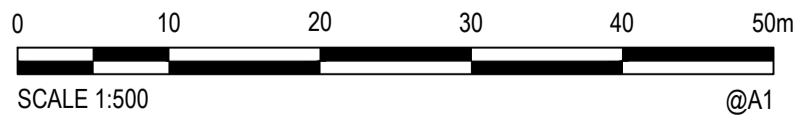
**SURVEYORS CERTIFICATION**  
I, PETER FRANCIS SULLIVAN  
LEVEL 4, 501 SWANSTON STREET, MELBOURNE  
certify that this abstract of field records correctly represents the results of the survey effected under my direction and supervision and marked on the ground in accordance with the Surveying Act that the survey accuracy accords with that required for LEVEL LAND as defined in regulation 7 (2) of the Surveying (Cadastral Surveys) Regulations 2005 and that this abstract of field records correctly represents the adopted boundaries and related features existing on 21/08/2017  
Date: \_\_\_\_\_ Licensed Surveyor  
**TITLE REFERENCE**  
VOL: 11542 FOL: 458 UNIT 1 ON RP18434  
VOL: 8801 FOL: 510 UNIT 1 ON RP1438  
VOL: 11532 FOL: 495 LOT 2 ONLP79484  
VOL: 11532 FOL: 492 LOT 1 ON LP65246  
PART OF CROWN ALLOTMENT 8, 9, & 10  
PARISH OF JIKA JIKA  
COUNTY OF BOURKE  
**TITLE NOTE**  
LAND SHOWN ENCLOSED BY THICK CONTINUOUS LINES HAS BEEN RE-ESTABLISHED

**IMPORTANT NOTE**  
This plan is prepared for DEPARTMENT OF TREASURY AND FINANCE from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose.  
Cardno Victoria Pty Ltd accepts no liability for any loss or damage, howsoever arising, to any person or corporation who may use or rely on this plan for any purpose other than the purpose for which it has been prepared.  
The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. Services shown hereon have been located where possible by field survey. If not able to be so located, known services have been plotted from the records of relevant authorities where available and have been noted accordingly on this plan. Where such records either do not exist or are considered inadequate, a notation has been made hereon. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services. This note is an integral part of this plan.

**IMPORTANT NOTE**  
This plan has been prepared in part from Vicmap Digital data (VDD) dated Jan 2013 (cadastral information) and October 1999 (contours). The VDD generally depicts either titles or land ownership (in the latter case individual titles are often not shown). Title or land ownership data may be incomplete or may be subject to alteration without notice.  
The accuracy of the VDD for both cadastral and contour data is quoted as being generally between 0.3 metres and 0.8 metres. Therefore the information in this plan may not be used for applications that require higher precision. Please refer to title details of any lot for precise dimensions and accurate easement and restriction details.

Datums (unless specified otherwise):  
Co-ordinated - Map Grid of Australia 94 Zone 55  
Contours - Australian Height Datum

Rev.	Date	Description	Des.	Verif.	Appd.
A	31/08/2017	87 Manningham St and NW corner of 91 Manningham St added	RM		PS



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**Cardno**  
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Web: www.cardno.com.au

Drawn R.Mitchell	Date 21/08/2017
Checked RM	Date 21/08/2017
Surveyed RM & NL & HL	Date 01-08/08/2017
Verified	Date
Approved	
P.Sullivan	21/08/2017

Client Department of Treasury and Finance	Project Manningham St Parkville VIC	Title Re-establishment, Feature & Level Survey Sheet 1 of 1
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Status <b>AS SURVEYED</b>	Coord Datum MGA55	Height Datum AHD	Scale 1 : 500	Size A1
Drawing Number V170967 RFL 2D	Revision A			