JMT CONSULTING

34 Queen Street, Campbelltown

Transport Impact Assessment

18 April 2023

PROJECT INFORMATION

Project Name:	34 Queen Street, Campbelltown
Project Number:	2259
Prepared By:	JMT Consulting

DOCUMENT HISTORY

Document Title	Revision	Date issued	Author
34 Queen Street TIA	Draft	14.03.23	JM
34 Queen Street TIA	Issue	18.04.23	JM

Table of Contents

1 Introduction 1

1.1 Background 1

1.2 Site location 1

1.3 Report purpose 2

2 Existing Transport Conditions 3

2.1 Existing site conditions 3

2.2 Travel behaviours 4

2.3 Road network 5

2.4 Public transport 6

2.5 Traffic volumes 7

2.6 Crash history 8

3 Transport Assessment 9

3.1 Proposed access arrangements 9

3.2 Forecast traffic generation 10

3.3 Potential traffic generation – current planning controls 11

3.4 Background traffic growth 12

3.5 Traffic distribution 12

3.6 Road network impacts 12

3.7 Car parking 15

3.8 Service vehicles 15

3.9 Bicycle parking 15

3.10 Green travel plan 16

4 Summary 19

Appendix A: Traffic Modelling Outputs 20

Figures

Figure 1 Site location 1
Figure 2 Existing site context 3
Figure 3 Existing site access point 3
Figure 4 Road network serving the site 5
Figure 5 Existing bus routes 6
Figure 6 Campbelltown transport interchange 7
Figure 7 Crash data 8
Figure 8 Proposed access arrangements 9
Figure 9 Forecast traffic generation – current controls vs Planning Proposal 11
Figure 10 Proposed upgrade at Campbelltown Road / Queen Street intersection 14

Tables

Table 1 Existing travel patterns 4
Table 2 Forecast traffic generation 10
Table 3 Level of service grades / description 12
Table 4 Road network performance – AM Peak Hour 13
Table 5 List of potential GTP measures 17

1 Introduction

1.1 Background

JMT Consulting was engaged to prepare a transport impact assessment report to support a Planning Proposal for the site at 34 Queen Street, Campbelltown (the site). The proposal would facilitate a mix of retail and residential floor space in close proximity to transport services, particularly Campbelltown transport interchange.

1.2 Site location

The site is located on the edge of the Campbelltown CBD fronting Queen Street as shown in Figure 1 below. Vehicle access is obtained via a single driveway from Queen Street, with the adjoining site at 22-32 Queen Street afforded access via a signalised intersection. Campbelltown transport interchange is approximately 800m (10 minute walk) away from the site.

Figure 1 Site location

1.3 Report purpose

This report has been prepared to summarise the traffic and transport implications of the Planning Proposal. Specifically the assessment considers the following items:

- Existing transport conditions.
- Surrounding road network.
- Vehicle site access.
- Public transport provision.
- Potential vehicle access arrangements to be provided, subject to further detail provided at the Development Application (DA) phase of the project.
- Proposed parking rates to be adopted as part of a future development application for the site, including indicative parking numbers based on the reference scheme.
- Additional traffic movements resulting from the Planning Proposal and impacts to the adjacent road network.

2 Existing Transport Conditions

2.1 Existing site conditions

The site at 34 Queen Street currently comprises of three low-scale buildings used primarily for retail purposes, accommodating Officeworks, MCAS Superstore and a medical centre. Between them these three uses occupy some 5,100m^2 of gross leasable floorspace. Vehicle access is obtained via a single driveway access on Queen Street which permits both left and right turn movements, with this driveway shown in Figure 3.

Figure 2 Existing site context

Figure 3 Existing site access point

2.2 Travel behaviours

Travel behaviours for residents and employees within the area surrounding the site[1] been analysed using 2016 Journey to Work Census data and is presented in Table 1 below.

Table 1 Existing travel patterns

Mode of travel	Proportion of trips	
	Residents travelling to work from Campbelltown	*Employees travelling into Campbelltown for work*
Car driver	58%	80%
Car passenger	3%	8%
Train	24%	5%
Bus	3%	2%
Walk	8%	2%
Other	4%	3%
Total	**100.00%**	**100.00%**

Analysis of the journey to work data indicates that the destination trip distribution is as follows:

- Travel north on Campbelltown Road towards Hume Motorway = 60%
- Travel south towards Campbelltown Road onto Hume Motorway = 20%
- Travel west via Queen Street= 10%
- Travel East & West via Campbelltown Road = 10%

[1] SA1, code 12302143709

2.3 Road network

To manage the extensive network of roads for which councils are responsible under the Roads Act 1993, Transport for NSW (TfNSW) in partnership with local government established an administrative framework of *State, Regional,* and *Local Road* categories. State Roads are managed and financed by TfNSW and Regional and Local Roads are managed and financed by councils. Regional Roads perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads.

Campbelltown itself is well serviced by the arterial road network with a number of high capacity connections feeding the city centre, notably the Hume Motorway and Narellan Road.

Key State and Regional roads which provide access to the site are illustrated in Figure 4, with Campbelltown Road acting as the key State Road in the vicinity of the site. Queen Street fronting the site is an unclassified regional road (No. 7193) which places no restrictions with respect to vehicle site access. Other regional roads in the vicinity of the site that act as key access routes include Broughton Street and Hurley Street.

Figure 4 Road network serving the site

2.4 Public transport

The subject site has access to existing bus routes 870, 871, 872, 877 and 878 provided by Sydney Buses which operates along Queen Street, with the nearest bus stop located in front of the site. Route numbers 870,871,872, provide access from Campbelltown to Liverpool via Glenfield/Macquarie fields respectively whilst the 877 & 878 services operates between Campbelltown and Kearns via Eschol Park. The routes start/end at Campbelltown Train Station which provides a convenient bus / rail interchange. The bus routes are presented in Figure 5.

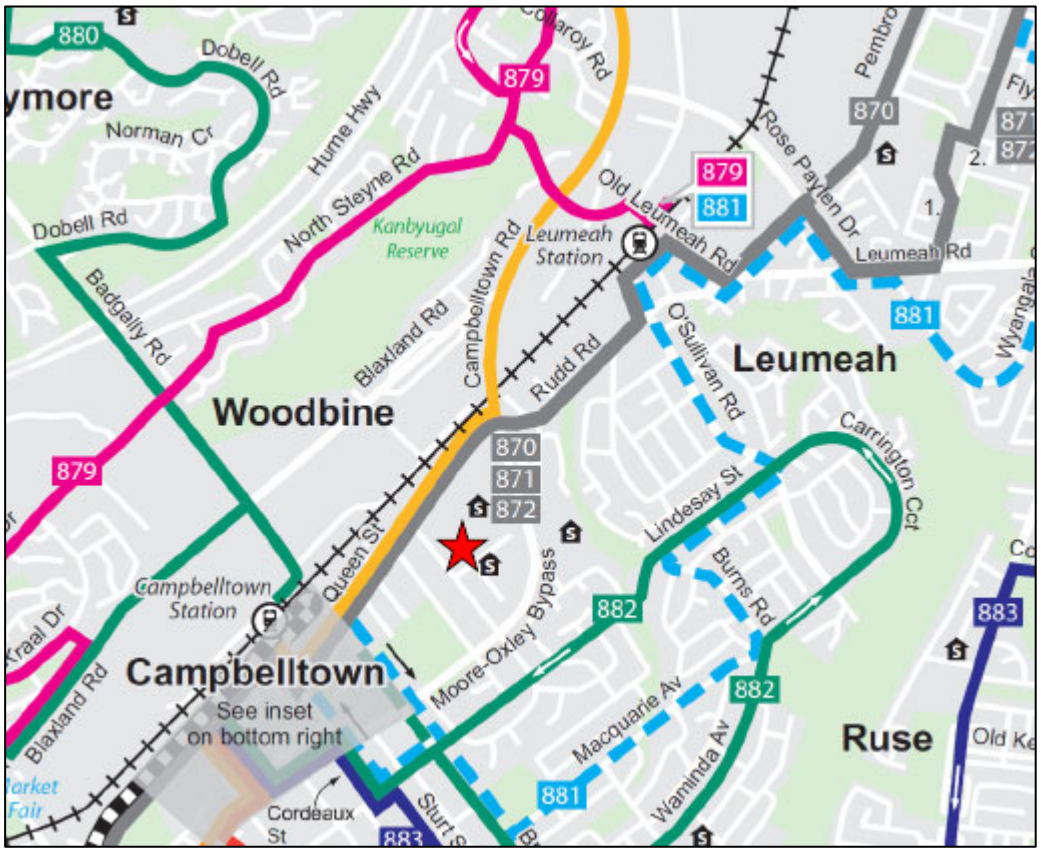

Figure 5 Existing bus routes

In addition to bus services, the site is location within comfortable walking distance of Campbelltown transport interchange. The Campbelltown train and bus interchange provides for a strong level of public transport connectivity to the centre. The station is located on the Sydney Trains T8 Airport and South line, with four to five train services running in each direction during busy hours of the day. This provides for a high level of capacity into the city centre. Complementing the heavy rail network is over 20 local and regional bus services that connect Campbelltown with nearby centres not serviced by heavy rail. Transport for NSW are currently planning for an enhancement to the public transport offering in Campbelltown through the North-South rail line project which would provide a connection between either Campbelltown or Macarthur through to St Marys via the new Western Sydney Airport. TfNSW is also undertaking a Final Business Case for a Rapid Bus from Campbelltown to Western Sydney Airport, with services expected to start prior to airport opening.

Figure 6 Campbelltown transport interchange

2.5 Traffic volumes

Traffic counts were undertaken in September 2022 (outside of school holiday periods) to understand the existing level of traffic generated by the site through it's access point on Queen Street. The surveys demonstrated the following levels of traffic generation during the critical peak hours of the day:

- Weekday AM peak hour (8am – 9am): 122 vehicle movements
- Weekday PM peak hour (5pm – 6pm): 170 vehicle movements
- Saturday peak hour (11am – 12pm): 214 vehicle movements

2.6 Crash history

A review of crash data published by Transport for NSW for the most recent five year period has been review and is shown in Figure 7. This indicates only one crash at the site access intersection in the past five years, with this crash being a non-causality (towaway) as opposed to resulting in injuries to any road users.

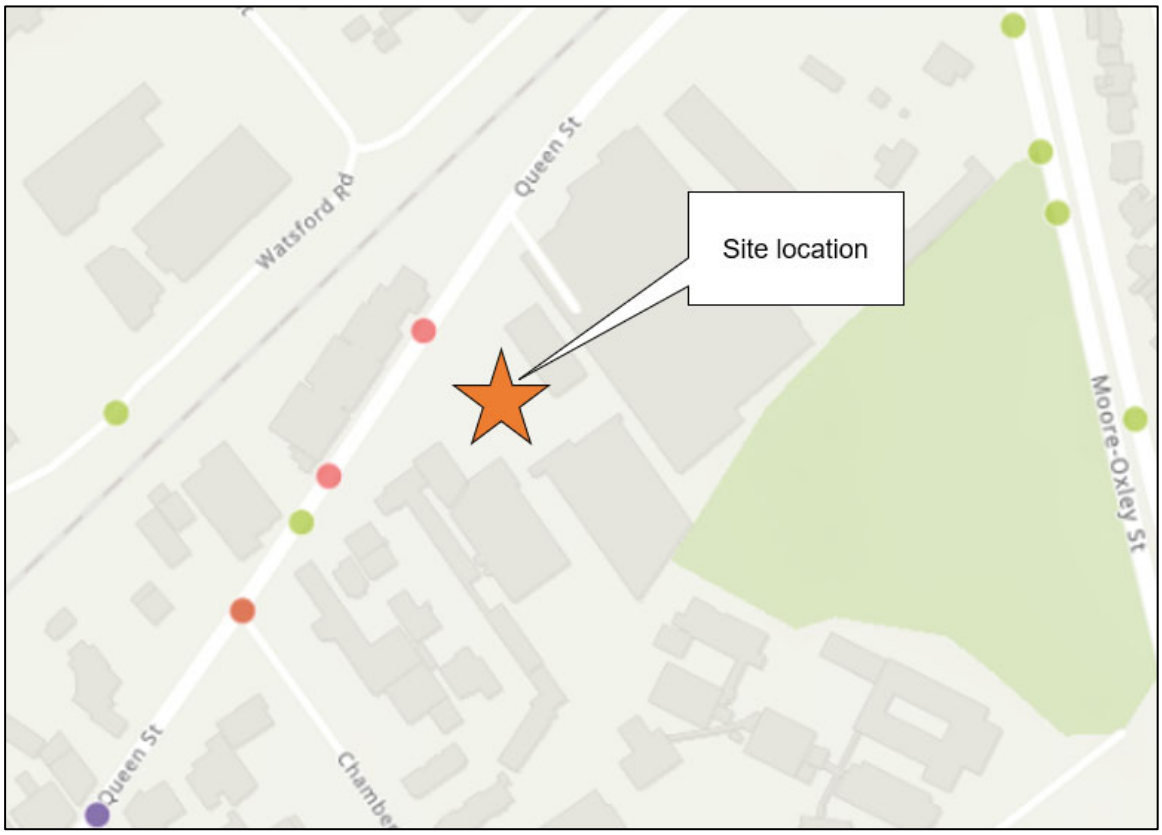

Figure 7 Crash data

Source: NSW Centre for Road Safety

3 Transport Assessment

3.1 Proposed access arrangements

The reference scheme prepared for the Planning Proposal envisages vehicle ingress and egress via a single driveway access point on Queen Street – consistent with current conditions. The proposal includes a single point of access from Queen Street, consistent with current site conditions. As demonstrated in later sections of this report, the level of traffic generation resulting from the Planning Proposal will be similar to current site conditions, confirming the suitability of this single point of access.

The reference scheme has identified the preferred access point at the western boundary of the site on Queen Street, noting the suitability of this location will be subject to further investigations during the Development Application (DA) phase of the project. Should this access point not be deemed suitable due to impacts to existing trees and the adjoining site, an alternate access point has been identified in the centre of the site which aligns with the existing driveway crossover.

The proposal also includes allowance for a potential connection through to the adjoining site at 22-32 Queen Street. This connection would be subject to discussions with the relevant landowner and investigated further at the DA stage.

Figure 8 Proposed access arrangements

3.2 Forecast traffic generation

The forecast level of traffic movements generated by the uses contemplated under the Planning Proposal is summarised in Table 2 which has considered:

(i) The existing traffic movements generated by the significant amount of retail floor space on the site with associated at-grade car parking, as previously detailed in Section 2.5 of this document;

(ii) The reduced extent of retail floor space to be provided as part of a future site redevelopment, utilising traffic generation rates consistent with those currently experienced for the site; and

(iii) The future residential uses on the site. A traffic generation rate of 0.29 vehicles per apartment has been adopted which is consistent with the rate identified in the *Guide to Traffic Generating Developments* document for sub-regional centres. The adopted traffic generation rate for the residential uses is slightly above that surveyed by TfNSW for 'car based high density residential buildings'[2] of 0.26 and 0.28 vehicles per unit during the AM and PM peak hours respectively. Therefore the adopted rate for residential uses is considered robust and suitable for use.

Table 2 Forecast traffic generation

Scenario	Use	Quantum	Units	Traffic Generation Rate (per apartment or 100m² GFA)			Traffic movements		
				AM peak hour	*PM peak hour*	*Sat peak hour*	*AM peak hour*	*PM peak hour*	*Sat peak hour*
Existing Site	Retail	5,100	m² GLA	n/a - based on survey data			122	170	214
Future Site	Retail	1,616[3]	m² GLA	2.39	3.33	4.20	39	54	68
	Residential	395	units	0.29	0.29	0.29	115	115	115
Net traffic generation (change from current conditions)							***+32***	***-1***	***-31***

The analysis demonstrates that the Planning Proposal, due to the reduction in retail floor space on the site, will result in reductions in traffic movements during the weekday afternoon and Saturday peak hours of the day. A minor increase in traffic during the weekday morning peak hour of 32 vehicles, equivalent to one vehicle every two minutes, is forecast.

[2] Trip Generation Surveys High Density Residential Car Based Data Report (Bitzios Consulting for Roads and Maritime Services)
[3] Assuming an 80% efficiency from GFA to GLA, noting the potential 2,020m² of retail GFA to be delivered on the site under the reference scheme

3.3 Potential traffic generation – current planning controls

It is important to recognise that the site is currently zoned B4 (mixed use) with the potential for uplift under current planning controls. A compliant scheme could potentially approximately 4,940m^2 of retail GFA and 19,455m^2 of residential GFA (220 apartments).

Based on the same traffic generation rates adopted for the Planning Proposal and as described in the previous section of this document, development permissible under current controls for the site would generate significantly greater levels of traffic compared to the reference scheme.

As shown in Figure 9 the volume of traffic generated by development permissible under current development controls is greater in the AM, PM and Saturday peak hours when compared to the reference scheme under the Planning Proposal. This reflects the mix of uses provided on the site, particularly the reduced quantum of retail floor space. This results in a significant improvement in the operation of the surrounding road network in comparison to a 'business as usual' scenario.

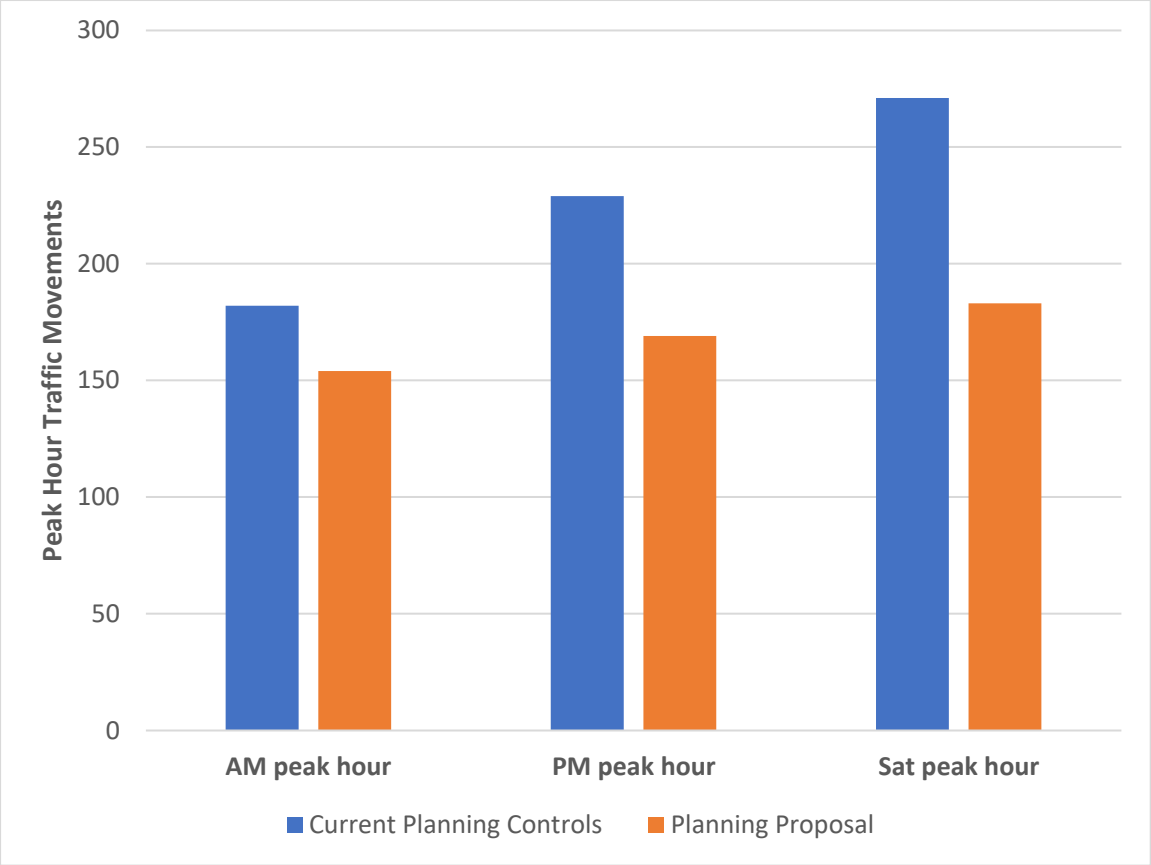

Figure 9 Forecast traffic generation – current controls vs Planning Proposal

3.4 Background traffic growth

To assess the cumulative traffic impacts of the proposal with consideration of traffic growth from development in the surrounding area, reference is made to the traffic modelling undertaken for the adjoining site at 22-32 Queen Street, Campbelltown. This analysis considered a 1% per annum background traffic growth rate following advice from Council and Transport for NSW. In addition to this background traffic growth the potential traffic movements arising from the development of the neighbouring site at 22-32 Queen Street has also been considered in the modelling.

3.5 Traffic distribution

The distribution of traffic onto the external road network has been generally based on Journey to Work Data and other relevant studies undertaken within Campbelltown. The expected distribution of traffic is summarised below:

- 35% to/from the Queen Street / Chamberlain Street intersection
- 65% to/from the Queen Street / Campbelltown Road intersection

3.6 Road network impacts

The traffic modelling metric used to analyse the performance of the road network is Level of Service (LOS). Level of Service is a measure that uses the average delay experienced by vehicles to categorically assign each approach and movement with a qualitative ordinal grade (A through F, with A being the best and F being the worst). RMS Traffic Modelling Guidelines indicate the average delay relating to each grade, this is outlined in Table 3.

Table 3 Level of service grades / description

Level of service grade	Average delay (seconds)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

The forecast impact of the Planning Proposal on the surrounding road network is summarised in Table 4 for the AM peak hour, with detailed outputs provided as Appendix A. As previously documented in Section 3.2 traffic is forecast to reduce compared to current conditions in the PM and Saturday peak hours due to the reduction in retail floor space on the site, and therefore only the impacts during the AM peak hour need to be considered.

Table 4 Road network performance – AM Peak Hour

Intersection	Intersection performance – 2033 'future base'		Intersection performance – 2033 'future base + proposal'	
	Delay (s)	Level of Service	Delay (s)	Level of Service
Queen Street / Chamberlain Street	20	**B**	20	**B**
Queen Street / Campbelltown Road	108	**F**	109	**F**

The traffic modelling indicates that the surrounding road network during the morning peak hour, with the additional 32 vehicle trips as forecast under the Planning Proposal, will not materially impact the operation of surrounding intersections. The Queen Street / Chamberlain Street intersections retains a strong Level of Service B with no change in average delay for vehicles. Although the Queen Street / Campbelltown Road intersection is forecast to operate at Level of Service F during the morning peak hour, this performance is due to existing and future levels of traffic movements external to the subject site. The Planning Proposal results in a negligible increase in average vehicle delays of just one second through the intersection.

It is noted that the proposal for 22-32 Queen Street includes an upgrade at the Queen Street / Campbelltown Road intersection as indicated in Figure 10. Traffic modelling undertaken indicates that this upgrade would significantly improve the intersection performance compared to a 'business as usual' scenario. It is also important to recognise that the adjacent site at 22-32 Queen Street is forecast to generate up to 616 vehicle movements per hour – approximately 15 times greater than the 32 vehicles (net increase) forecast for the subject Planning Proposal.

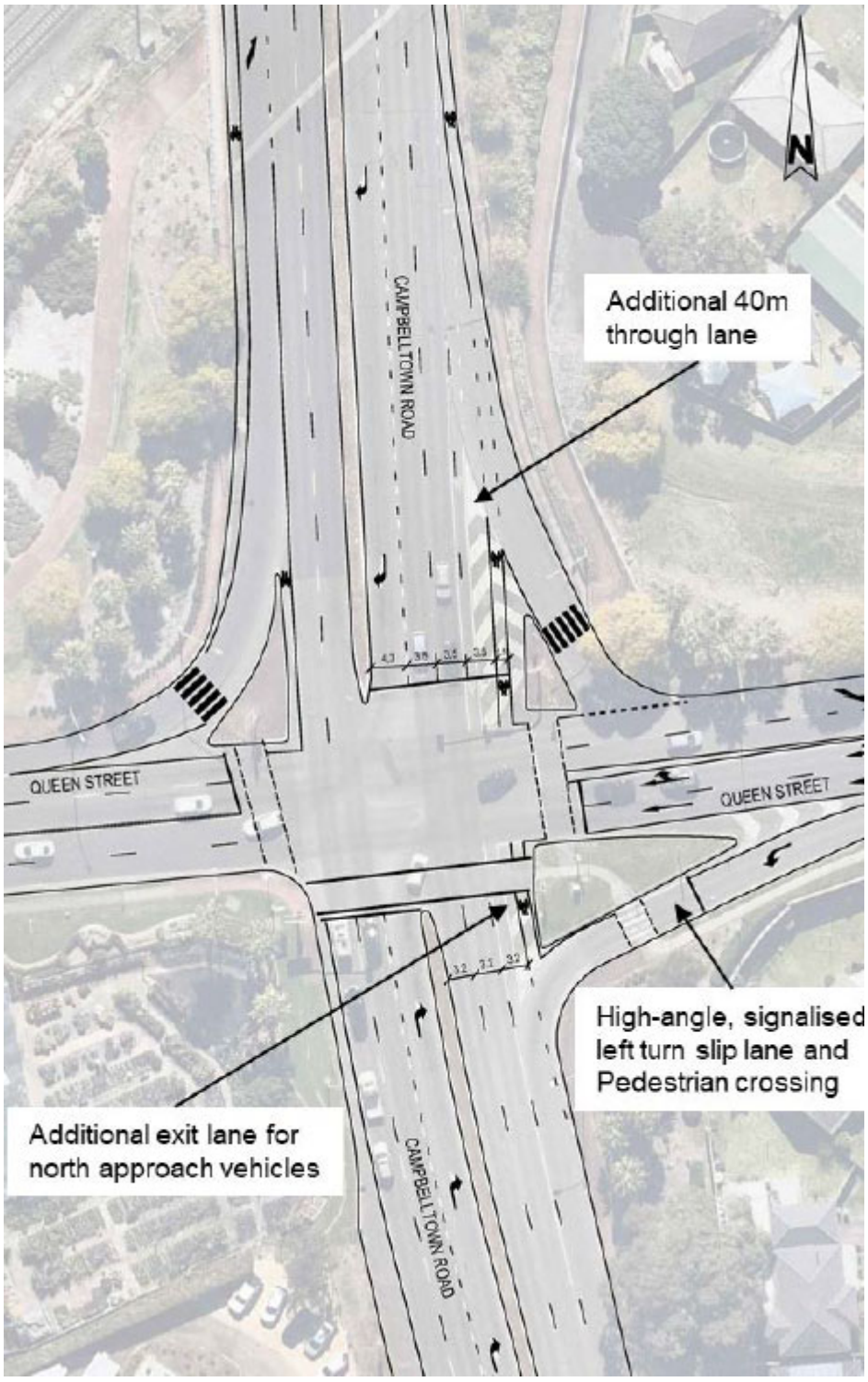

Figure 10 Proposed upgrade at Campbelltown Road / Queen Street intersection

Source: Bitzios

3.7 Car parking

The following sections of this document outline the car parking provision for the various uses within the site, based on the reference scheme prepared for the Planning Proposal. It should be noted that the reference scheme is conceptual in nature and further investigations will need to be undertaken at subsequent stages to confirm the final parking number and layout. The final car parking requirements and provision for the site will be confirmed at the Development Application (DA) stage of the project.

3.7.1 Retail car parking

The Campbelltown (Sustainable City) Council 2015 DCP notes that car parking for retail uses within mixed use developments should be provided at the rate of 1 space per 25m^2 leasable area. The reference scheme contains approximately 1,616m^2 of leasable retail space and therefore approximately 65 parking spaces may be provided for the retail component.

3.7.2 Residential car parking

The Campbelltown (Sustainable City) Council 2015 DCP notes that car parking for residential uses within mixed use developments should be provided at the rate of 1.25 spaces per dwelling with an additional one space for every 10 dwellings allocated to visitors. Based on the 395 apartments contemplated under the reference scheme for the Planning Proposal approximately 494 residential car parking spaces and 40 visitor car parking spaces would be required.

3.8 Service vehicles

Future development of the site would provide for appropriate provisions for service vehicles (including waste collection vehicles) to enter and exit the site in a forwards direction. All servicing will be conducted on-site with no reliance on street car parking outside of the site boundary. Further details around site servicing, including vehicle swept path analysis, will be provided at the Development Application (DA) stage of the project.

3.9 Bicycle parking

Bicycle parking will be provided as part of any future site development in line with Council's controls, with Council's DCP requiring bicycle storage to be provided at the rate of 1 space for every 5 dwellings. Based on the reference scheme prepared for the Planning Proposal a minimum of 80 bicycle parking spaces would be required. The provision for bicycle parking will be confirmed at the Development Application (DA) stage of the project.

3.10 Green travel plan

3.10.1 Background

A Green Travel Plan (GTP) is a package of measures put in place by the development occupants to try and encourage more sustainable travel. It is a means for a development to demonstrate a commitment and take a pro-active step towards improving the environmental sustainability of its activities.

More generally, the principles of a GTP are applied to all people travelling to and from a site. Government authorities are placing increasing emphasis on the need to reduce the number and lengths of motorised journeys and in doing so encourage greater use of alternative means of travel with less negative environmental impacts than the car.

3.10.2 Objectives

The main objectives of the GTP are to reduce the need to travel and promotion of sustainable means of transport. The more specific objectives include:

- High mode share for public transport, cycling and walking to work journeys;
- Ensuring adequate facilities are provided at the site to enable the tenants and visitors of the development to commute by sustainable transport modes;
- Reduce the number of car journeys associated with business travel;
- Facilitate the sustainable and safe travel of occupants; and
- Raise awareness of sustainable transport amongst tenants of the development.

3.10.3 Potential measures

A suite of potential measures is described below to be implemented as part of the GTP, which can be developed further as the development progresses.

Table 5 List of potential GTP measures

Action	Responsibility
Cycling	
Provide sufficient cycle parking to meet needs, which is easily accessible and secure	Developer
Provide adequate cycle parking facilities for visitors	Developer
Ensure cycle parking is clearly visible or provide signage to direct people to cycle bays	Building manager
Produce a map showing cycle routes and bike stands in the area	Building manager
Supply a communal toolkit for staff consisting of puncture repair equipment, a bike pump, a spare lock and lights.	Building manager
Promote the participation in annual events such as 'Ride to Work Day'	Tenants
Walking	
Identify tenants living near work that may be interested in walking to work	Building manager
Identify through the travel survey what incentives might need to be put in place for non-walkers to consider a mode shift	Building manager
Public Transport	
Develop a map showing public transport routes in the area	Building manager
Put up a noticeboard with leaflets and maps showing the main public transport routes to and from the site	Building manager
Carshare / Carpooling	
Establish a car pooling program to help people find someone to share in their daily commute.	Building manager and tenants
Develop a map showing car-share spots in the area to encourage staff and visitors to use a shared car (e.g. GoGet) if they are required to drive	Building manager and tenants
General actions	
Promotion including: • Allow staff the flexibility to commute outside peak periods to reduce overall congestion and travel time. • Identify a tenant/champion to complete travel coordinator duties • Provide a welcome pack upon initial occupation of each tenant which includes details around sustainable travel options	Tenants

3.10.4 Monitoring and review

In order for the GTP to be effective, it must be reviewed on a regular basis. It is important to ensure that the GTP is meeting its objectives and having the intended impact on car use and transport choices. The GTP should be reviewed on a yearly basis by undertaking travel surveys. It is recommended that the mode shares are first reviewed at least 18 months after occupation, to allow activity levels to settle at the site.

4 Summary

This transport impact assessment report has been prepared by JMT Consulting to support a Planning Proposal for the site at 34 Queen Street, Campbelltown. The proposal would facilitate a mix of retail and residential floor space in close proximity to transport services, particularly Campbelltown transport interchange. Key findings of the assessment are as follows:

- The site benefits from being located within comfortable walking distance of Campbelltown transport interchange as well as nearby bus stops, therefore achieving a high level of public transport accessibility.
- The reference scheme includes a vehicle site access point on Queen Street – consistent with current site conditions.
- The reference scheme makes allowance for all loading and servicing to be accommodated on site, in accordance with Council's DCP and facilitating vehicle entry and exit in a forwards direction.
- Analysis indicates that the potential increase in traffic as a result of the Planning Proposal compared to current conditions is a minor 32 vehicles during the AM peak hour. In the afternoon and Saturday peak periods there is forecast to be a reduction in traffic compared to current conditions as a result of the reduced retail floor space on the site.
- Traffic modelling undertaken on the surrounding road network demonstrates the proposal will have a negligible impact on the surrounding road network, with average vehicle delays expected to increase by no more than one second compared to a scenario without the Planning Proposal.
- The reference scheme contemplates approximately 600 off-street parking bays which is consistent with the current Campbelltown DCP parking rates, with the final number of parking spaces to be confirmed as part of a subsequent Development Application.
- Secure bicycle parking would be provided as a component of any future proposed development, in line with rates specified in the Council's DCP.

In the above context, the traffic and transport impacts arising from the proposal are considered acceptable.

Appendix A: Traffic Modelling Outputs

MOVEMENT SUMMARY

Site: 101 [Queen / Campbelltown (Site Folder: AM Future Base + PP)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Campbelltown Road (S)														
1	L2	24	1.0	24	1.0	1.043	178.5	LOS F	60.6	435.6	1.00	1.74	2.13	15.4
2	T1	933	3.3	933	3.3	* 1.043	173.4	LOS F	60.6	435.6	1.00	1.73	2.14	15.5
3	R2	321	3.0	321	3.0	0.534	43.5	LOS D	16.5	118.4	0.87	0.82	0.87	34.7
Approach		1278	3.2	1278	3.2	1.043	140.9	LOS F	60.6	435.6	0.97	1.51	1.82	18.0
East: Queen Street (E)														
4	L2	386	2.5	386	2.5	0.212	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
5	T1	381	2.0	381	2.0	* 1.047	183.8	LOS F	37.8	269.4	1.00	1.63	2.31	14.8
6	R2	121	1.8	121	1.8	1.047	192.3	LOS F	25.0	177.7	1.00	1.57	2.40	14.4
Approach		888	2.2	888	2.2	1.047	107.5	LOS F	37.8	269.4	0.57	1.14	1.32	21.6
North: Campbelltown Road (N)														
7	L2	105	3.1	105	3.1	0.946	85.3	LOS F	45.5	324.9	1.00	1.23	1.40	25.7
8	T1	1081	2.1	1081	2.1	0.946	75.4	LOS F	52.5	374.3	1.00	1.20	1.37	26.8
9	R2	766	1.7	766	1.7	* 1.064	183.9	LOS F	87.7	623.1	1.00	1.44	2.24	13.5
Approach		1952	2.0	1952	2.0	1.064	118.5	LOS F	87.7	623.1	1.00	1.29	1.71	19.3
West: Queen Street (W)														
10	L2	410	3.3	410	3.3	0.226	6.9	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
11	T1	261	3.0	261	3.0	0.386	51.4	LOS D	7.4	53.0	0.93	0.75	0.93	32.7
Approach		671	3.2	671	3.2	0.386	24.2	LOS B	7.4	53.0	0.36	0.61	0.36	43.4
All Vehicles		4789	2.5	4789	2.5	1.064	109.2	LOS F	87.7	623.1	0.82	1.23	1.48	21.0

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Campbelltown Road (S)												
P1	Full	6	6	59.2	LOS E	0.0	0.0	0.95	0.95	231.3	223.8	0.97
East: Queen Street (E)												
P2	Full	2	2	59.1	LOS E	0.0	0.0	0.95	0.95	226.2	217.2	0.96

MOVEMENT SUMMARY

Site: 101 [Queen / Chamberlain (Site Folder: AM Future Base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Chamberlain Street														
21	L2	107	2.0	113	2.0	* 0.246	37.1	LOS C	4.4	31.5	0.84	0.76	0.84	32.9
23	R2	130	2.0	137	2.0	0.588	50.4	LOS D	6.5	46.6	0.99	0.80	0.99	23.9
Approach		237	2.0	249	2.0	0.588	44.4	LOS D	6.5	46.6	0.92	0.78	0.92	28.3
NorthEast: Queen Street														
24	L2	118	2.0	124	2.0	0.651	23.8	LOS B	22.5	160.1	0.79	0.73	0.79	34.7
25	T1	1090	2.0	1147	2.0	* 0.651	19.2	LOS B	22.7	161.6	0.79	0.72	0.79	35.4
Approach		1208	2.0	1272	2.0	0.651	19.7	LOS B	22.7	161.6	0.79	0.72	0.79	35.3
SouthWest: RoadName														
31	T1	391	2.0	412	2.0	0.285	4.2	LOS A	6.3	44.5	0.34	0.30	0.34	45.9
32	R2	173	2.0	182	2.0	0.402	29.1	LOS C	7.5	53.5	0.89	0.86	0.89	35.5
Approach		564	2.0	594	2.0	0.402	11.8	LOS A	7.5	53.5	0.51	0.47	0.51	41.0
All Vehicles		2009	2.0	2115	2.0	0.651	20.4	LOS B	22.7	161.6	0.73	0.66	0.73	35.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Chamberlain Street												
P5	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
SouthWest: RoadName												
P8	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	211.4	217.2	1.03
All Pedestrians		100	105	44.3	LOS E	0.1	0.1	0.94	0.94	209.3	214.6	1.03

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 [Queen / Campbelltown (Site Folder: AM Future Base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Campbelltown Road (S)														
1	L2	22	1.0	22	1.0	1.040	175.4	LOS F	59.8	430.4	1.00	1.72	2.11	15.6
2	T1	933	3.3	933	3.3	* 1.040	170.3	LOS F	59.8	430.4	1.00	1.72	2.12	15.7
3	R2	321	3.0	321	3.0	0.534	43.5	LOS D	16.5	118.4	0.87	0.82	0.87	34.7
Approach		1276	3.2	1276	3.2	1.040	138.5	LOS F	59.8	430.4	0.97	1.49	1.80	18.2
East: Queen Street (E)														
4	L2	386	2.5	386	2.5	0.212	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
5	T1	380	2.0	380	2.0	* 1.041	175.5	LOS F	36.6	260.7	1.00	1.60	2.26	15.3
6	R2	121	1.8	121	1.8	1.041	183.9	LOS F	24.4	173.5	1.00	1.54	2.35	14.9
Approach		887	2.2	887	2.2	1.041	102.8	LOS F	36.6	260.7	0.56	1.13	1.29	22.3
North: Campbelltown Road (N)														
7	L2	105	3.1	105	3.1	0.946	85.3	LOS F	45.5	325.0	1.00	1.23	1.40	25.7
8	T1	1081	2.1	1081	2.1	0.946	75.4	LOS F	52.5	374.4	1.00	1.20	1.37	26.8
9	R2	765	1.7	765	1.7	* 1.063	181.8	LOS F	87.0	617.9	1.00	1.43	2.22	13.6
Approach		1951	2.0	1951	2.0	1.063	117.7	LOS F	87.0	617.9	1.00	1.29	1.70	19.4
West: Queen Street (W)														
10	L2	395	3.3	395	3.3	0.218	6.9	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
11	T1	256	3.0	256	3.0	0.378	51.3	LOS D	7.2	51.9	0.93	0.75	0.93	32.7
Approach		651	3.2	651	3.2	0.378	24.3	LOS B	7.2	51.9	0.37	0.61	0.37	43.3
All Vehicles		4765	2.5	4765	2.5	1.063	107.7	LOS F	87.0	617.9	0.82	1.22	1.47	21.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Campbelltown Road (S)												
P1	Full	6	6	59.2	LOS E	0.0	0.0	0.95	0.95	231.3	223.8	0.97
East: Queen Street (E)												
P2	Full	2	2	59.1	LOS E	0.0	0.0	0.95	0.95	226.2	217.2	0.96

MOVEMENT SUMMARY

Site: 101 [Queen / Chamberlain (Site Folder: AM Future Base + PP)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Chamberlain Street														
21	L2	107	2.0	113	2.0	* 0.246	37.1	LOS C	4.4	31.5	0.84	0.76	0.84	32.9
23	R2	130	2.0	137	2.0	0.588	50.4	LOS D	6.5	46.6	0.99	0.80	0.99	23.9
Approach		237	2.0	249	2.0	0.588	44.4	LOS D	6.5	46.6	0.92	0.78	0.92	28.3
NorthEast: Queen Street														
24	L2	123	2.0	129	2.0	0.657	23.9	LOS B	22.8	162.5	0.79	0.74	0.79	34.7
25	T1	1097	2.0	1155	2.0	* 0.657	19.3	LOS B	23.0	164.1	0.79	0.73	0.79	35.3
Approach		1220	2.0	1284	2.0	0.657	19.8	LOS B	23.0	164.1	0.79	0.73	0.79	35.2
SouthWest: RoadName														
31	T1	391	2.0	412	2.0	0.285	4.2	LOS A	6.3	44.5	0.34	0.30	0.34	45.9
32	R2	173	2.0	182	2.0	0.404	29.3	LOS C	7.5	53.5	0.89	0.87	0.89	35.4
Approach		564	2.0	594	2.0	0.404	11.9	LOS A	7.5	53.5	0.51	0.48	0.51	41.0
All Vehicles		2021	2.0	2127	2.0	0.657	20.5	LOS B	23.0	164.1	0.73	0.66	0.73	35.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
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