

Government Property NSW **The Sandstone Precinct** Traffic Impact Assessment

Issue | 19 November 2014

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number

Arup
Arup Pty Ltd ABN 18 000 966 165



Arup
Level 10 201 Kent Street
PO Box 76 Millers Point
Sydney 2000
Australia
www.arup.com

ARUP

Contents

	Page
1 Introduction	1
1.1 Background	1
1.2 Site Description	1
1.3 Study Objectives	2
2 Existing Transport Conditions	3
2.1 Existing Travel Patterns	3
2.2 Vehicular Access	4
2.3 Traffic Volumes	4
2.4 Parking	5
2.5 Public Transport Access	6
2.6 Pedestrian Access	7
2.7 Pedestrian Volumes	7
2.8 Cycling Network	8
3 Transport Assessment	10
3.1 Vehicular Site Access	10
3.2 Patron and Visitor Activity	10
3.3 Car Parking	10
3.4 Traffic Generation	11
3.5 Road Network Impacts	12
3.6 Public Transport	13
3.7 Walking	14
3.8 Cycling	15
3.9 Travel Plan	15
4 Summary	16

Tables

Table 1 Traffic Modelling Results

Figures

Figure 1 Site Overview

Figure 2 Existing Journey to Work Data for the Sandstone Precinct

Figure 3 Existing Vehicle Access

Figure 4 Traffic Survey Results

Figure 5 Bus Stops Serving the Sandstone Precinct

Figure 6 Existing Pedestrian Volumes

Figure 7 Strategic Cycleway Network Map

Figure 8 Off-Street Car Parking Opportunities

Figure 9 Circular Quay Light Rail Stop

Figure 10 Future Walking Environment – Circular Quay Precinct

Appendices

Appendix A

Traffic Modelling Outputs

1 Introduction

1.1 Background

This report has been prepared by Arup on behalf of Government Property NSW in support of a Stage 1 Stage Significant Development Application (SSDA) to be submitted to the Department of Planning and Environment (DP&E). The DA relates to the proposal to secure approval for a development concept for the subject site at 23-33 Bridge Street (Lands Building) and 35-39 Bridge Street (Education Building), Sydney (herein referred to as the 'Sandstone Precinct'). Detailed design elements and physical works would be subject to a later separate (Stage 2) development application.

This report supports the proposed application in relation to traffic and transport.

1.2 Site Description

The development site comprises two buildings (Lands Building and Education Building) with frontages to Bridge Street in the northern CBD area, with a combined site area of approximately 6,000m². These buildings currently function as Government departmental offices.

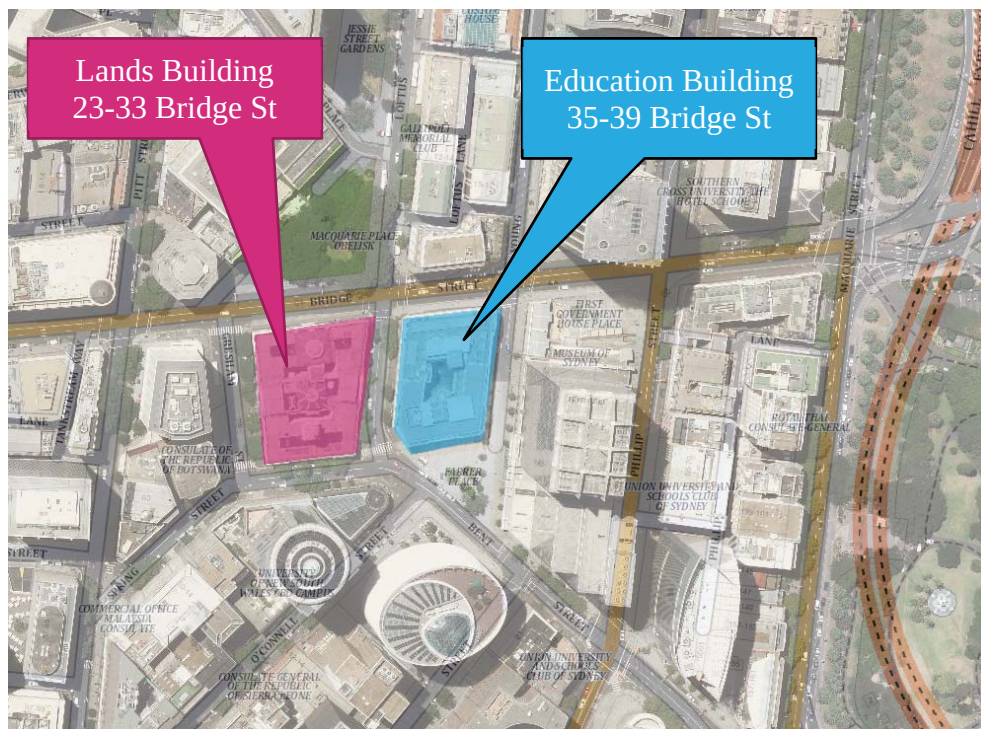


Figure 1 Site Overview

1.3 Study Objectives

This transport assessment responds to the draft Secretary's Environmental Assessment Requirements (SEARs), as outlined below:

Preparation of a Traffic Impact Assessment (TIA) that evaluates:

- Existing transport networks;
- Daily and peak traffic movements generated by the project;
- Safety and performance of the surrounding road network;
- Demonstration of the provision of sufficient car parking;
- Connections to existing and planned public transport;
- Pedestrian and cycle access within and to the site;
- Any proposed temporary or permanent changes to the transport and access on surrounding streets;
- Opportunities to provide safe and efficient loading and servicing for the development; and
- Mitigation measures for the impacts identified in the TIA

2 Existing Transport Conditions

2.1 Existing Travel Patterns

An assessment of existing travel patterns has been conducted using 2011 Journey to Work (JTW) data for the relevant travel zones¹ surrounding the Sandstone Precinct. In this zone more than 1,000 employees were recorded travelling to work on the day of the 2011 Census, with their travel modes summarised in Figure 2.

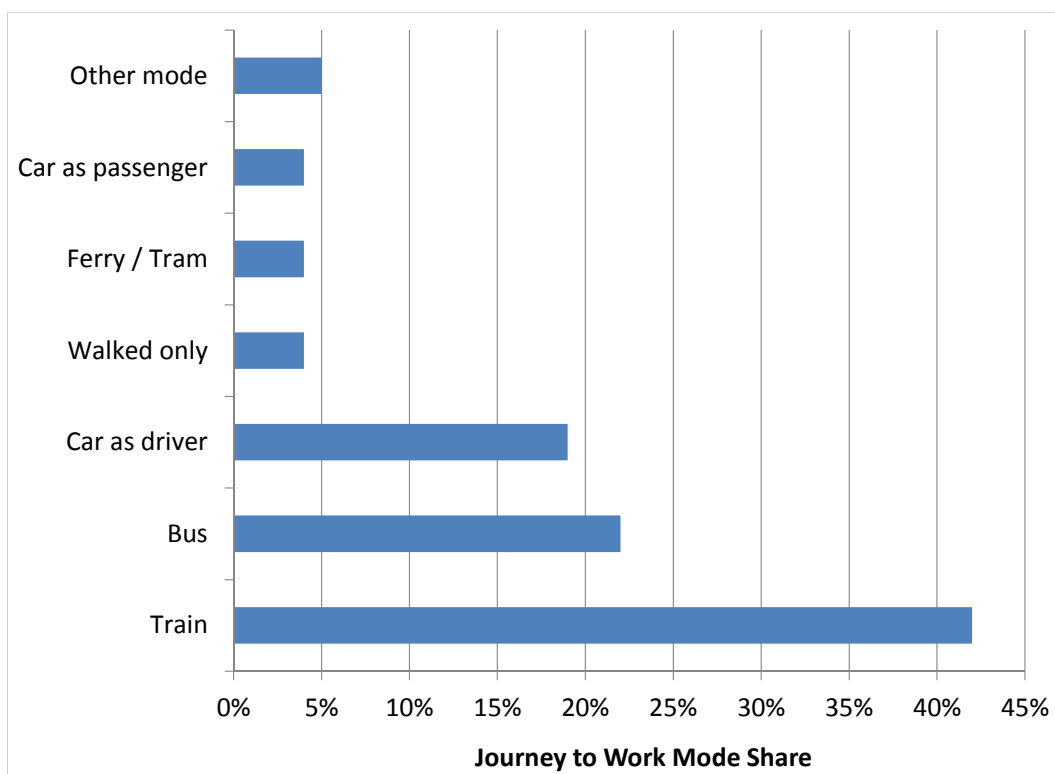


Figure 2 Existing Journey to Work Data for the Sandstone Precinct

The data indicates the significant majority of people working in Sandstone Precinct arrive via non-car modes of transport, mostly bus and train. The proportion of private vehicle trips is less than 20% - reflecting the good public transport availability in the precinct.

The origin location of those arriving to the precinct by private vehicle was assessed to determine the key approach and departure routes utilised. This directional split can be summarised as follows:

- Arriving from the north: 42%
- Arriving from the south: 15%
- Arriving from the east: 22%
- Arriving from the west: 20%

¹ Travel zones 0042 and 0043 utilised for the analysis

2.2 Vehicular Access

The Education Building has a vehicle entry off Loftus Street which acts as both a loading area and on-site parking for up to 12 cars. The Lands Building has access to a small loading dock on Gresham Street at the corner with Bent Street.

The current vehicular access points into the two buildings, as well as the indicative footprint of the parking and loading areas, are illustrated in Figure 3.

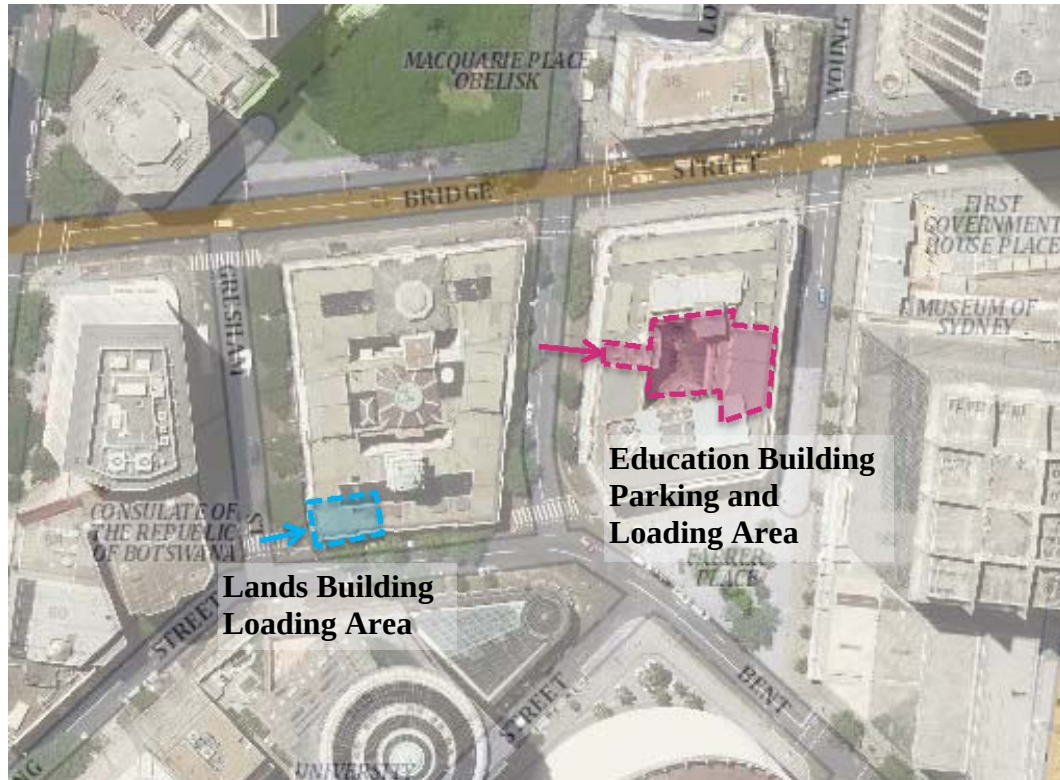


Figure 3 Existing Vehicle Access

2.3 Traffic Volumes

Traffic counts were undertaken at intersections adjacent to the Sandstone Precinct on Wednesday 6 November 2013 (typical weekday outside of school holidays). Counts were undertaken during the following time periods:

- AM Peak: 7am – 9am
- PM Peak: 4pm – 6pm

The AM/PM peak hour was identified to be between 8am – 9am and 5pm – 6pm respectively. The following intersections were surveyed:

- Bridge Street / Pitt Street;
- Bridge Street / Gresham Street;
- Bridge Street / Loftus Street; and
- Bridge Street / Young Street

A summary of traffic volumes in the peak hours is provided in Figure 4.

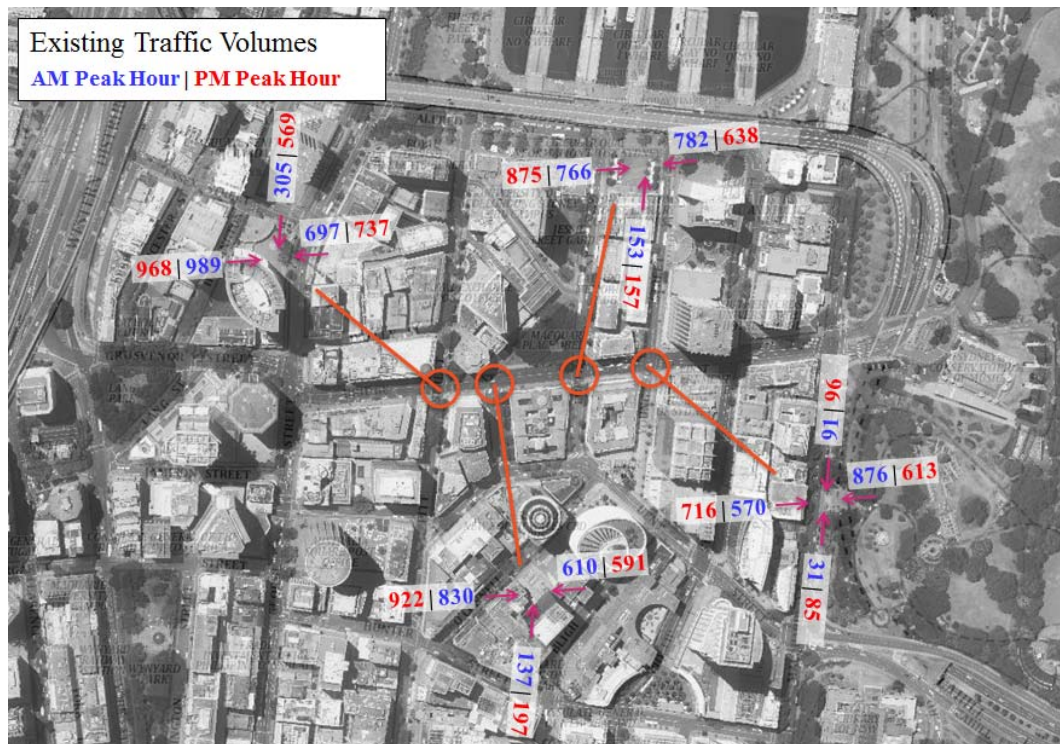


Figure 4 Traffic Survey Results

The results demonstrate Bridge Street carries the majority of traffic in the precinct, with over 900 vehicles travelling eastbound out of the city in the PM peak hour. Eastbound traffic volumes gradually reduce along Bridge Street towards Macquarie Street, with less than 800 eastbound vehicles recorded at the Bridge Street / Young Street intersection. By comparison, Loftus Street and Gresham Street are utilised by a minor number of vehicles, with less than 200 two-way vehicle movements recorded in both peak hours.

2.4 Parking

12 on-site parking bays are currently provided in the Education Building. The Lands Building No on-site parking is provided in the Lands Building.

2.5 Public Transport Access

The Sandstone Precinct is served by the high quality Circular Quay public transport interchange – which provides an environment where passengers may easily transfer between bus, rail and ferry modes. Over 550,000 passenger journeys are made through the interchange every week².

It has previously been identified that public transport accounts for approximately 70% of all work related trips to the area. A summary of the key public transport modes serving the Sandstone Precinct is described below.

2.5.1 Train

Circular Quay Railway Station is located approximately 250m away from the precinct, equating to a walk of less than 5 minutes from the centre of the platform. The station is on the Bankstown, Airport/East Hills, Inner West and South lines, with services running every few minutes in each direction during the morning and afternoon peak hours.

Other heavy rail stations within a 10 minute walk of the precinct include Martin Place and Wynyard Station, which provide access to the Eastern Suburbs and North Shore railway lines respectively.

2.5.2 Bus

The Sandstone Precinct is currently served by approximately 50 bus routes covering the Eastern Suburbs, Western Suburbs and Southern Region services. Western and Southern region inbound bus services use George Street via Town Hall and Wynyard to access Circular Quay, while Eastern region buses travel via Elizabeth Street. The existing bus arrangements provide bus stops on Bridge Street, Gresham Street and Loftus Street directly adjacent to the two buildings.

As part of the Sydney City Centre Bus Infrastructure works, the existing bus stop on the northern side of Bridge Street (adjacent to Loftus Street) is proposed to be removed. Remaining bus stops in the precinct are to remain unchanged resulting from the proposed works, as illustrated in Figure 5.

² Transport for NSW Press Release – May 2011

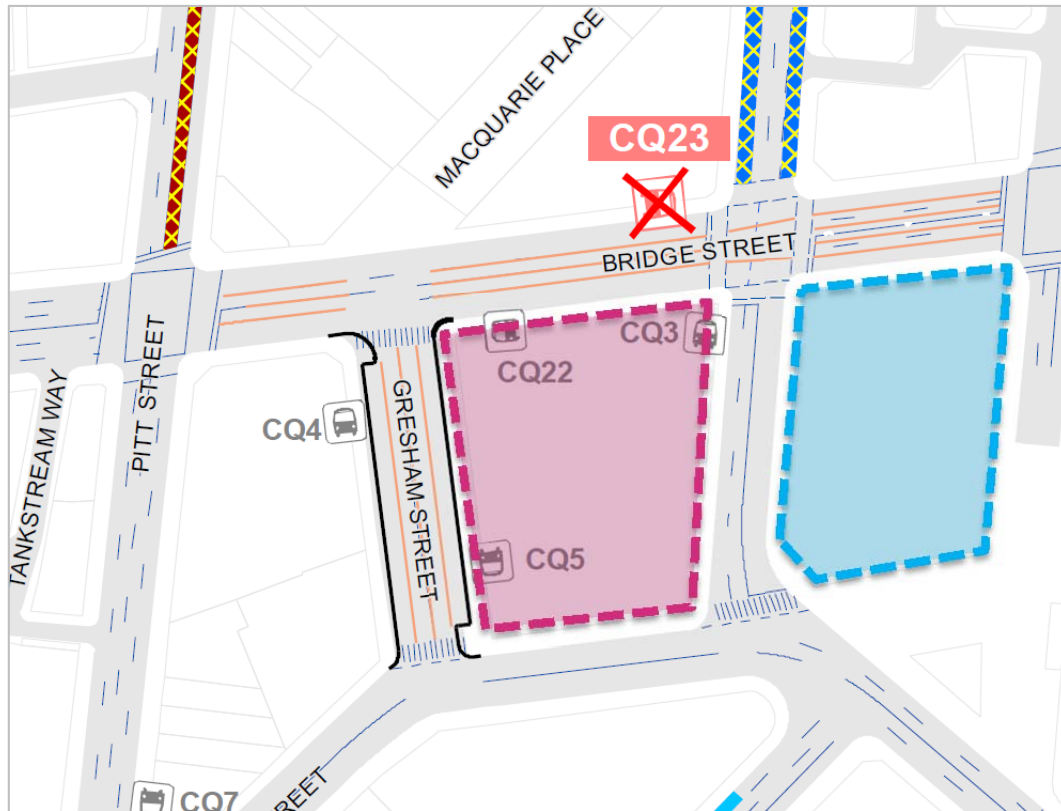


Figure 5 Bus Stops Serving the Sandstone Precinct

Image Source: Sydney City Centre Bus Infrastructure Submissions Report

2.5.3 Ferry

Located within a 5 minute walk of the Sandstone Precinct, Circular Quay provides over eight regular ferry routes serving the Eastern Suburbs, lower North Shore (Manly, Taronga Zoo, Mosman and Neutral Bay) and wharves along the Parramatta River area.

2.6 Pedestrian Access

The Sandstone Precinct is well connected via a network of good quality, wide pedestrian footpaths with signalised crossings of main roads. Zebra crossings are provided on Bent Street at both Loftus Street and Gresham Street, as well as on Gresham Street at Bridge Street. This provides for efficient pedestrian movements in the precinct. Adjacent to the end of the Education Building, the southern end of Young Street is a pedestrianised environment conducive to walking trips.

2.7 Pedestrian Volumes

Pedestrian volumes were collected in the precinct on Wednesday 6 November 2014 in the AM and PM peak hours. The data indicates pedestrian volumes in the precinct are significant, approaching 1,000 pedestrian movements per hour across certain intersection legs - reflective of the high employment population of the area. A summary of existing pedestrian flows is illustrated in Figure 6.

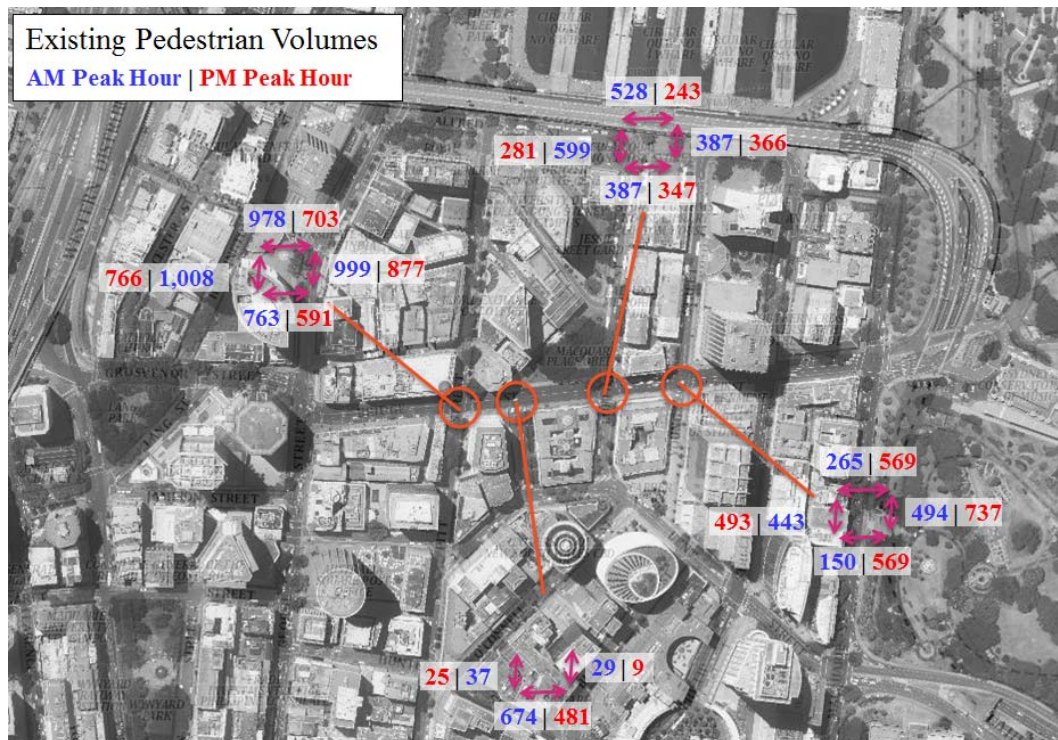


Figure 6 Existing Pedestrian Volumes

2.8 Cycling Network

There are a number of key cross-city cycle routes which form part of City of Sydney Council's new cycling network which provide linkages to the Sandstone Precinct. These routes are as follows:

- Kent Street (separated, bi-directional cycleway)
- King Street (separated, bi-directional cycleway)
- Pyrmont Bridge (shared cycle path)
- Macquarie Street (mixed street environment)
- Alfred Street north (shared cycle path)
- College Street (separated, bi-directional cycleway)

The Sydney City Centre Access Strategy was released by the NSW Government in December 2013. The strategy outlines the future city centre cycleway network to encourage growth in cycling and reduce pressure on the public transport system. The future city centre cycle network is shown in Figure 7, and includes:

- Extending the Kent Street cycleway south to Liverpool Street
- Construction of a bi-directional cycleway on Liverpool Street
- Construction of a bi-directional cycleway on Castlereagh Street and Pitt Street, providing a new north-south connection through the CBD
- Extending the existing King Street cycleway to Castlereagh Street
- Extending the east- west cycleway along Park Street to Castlereagh Street

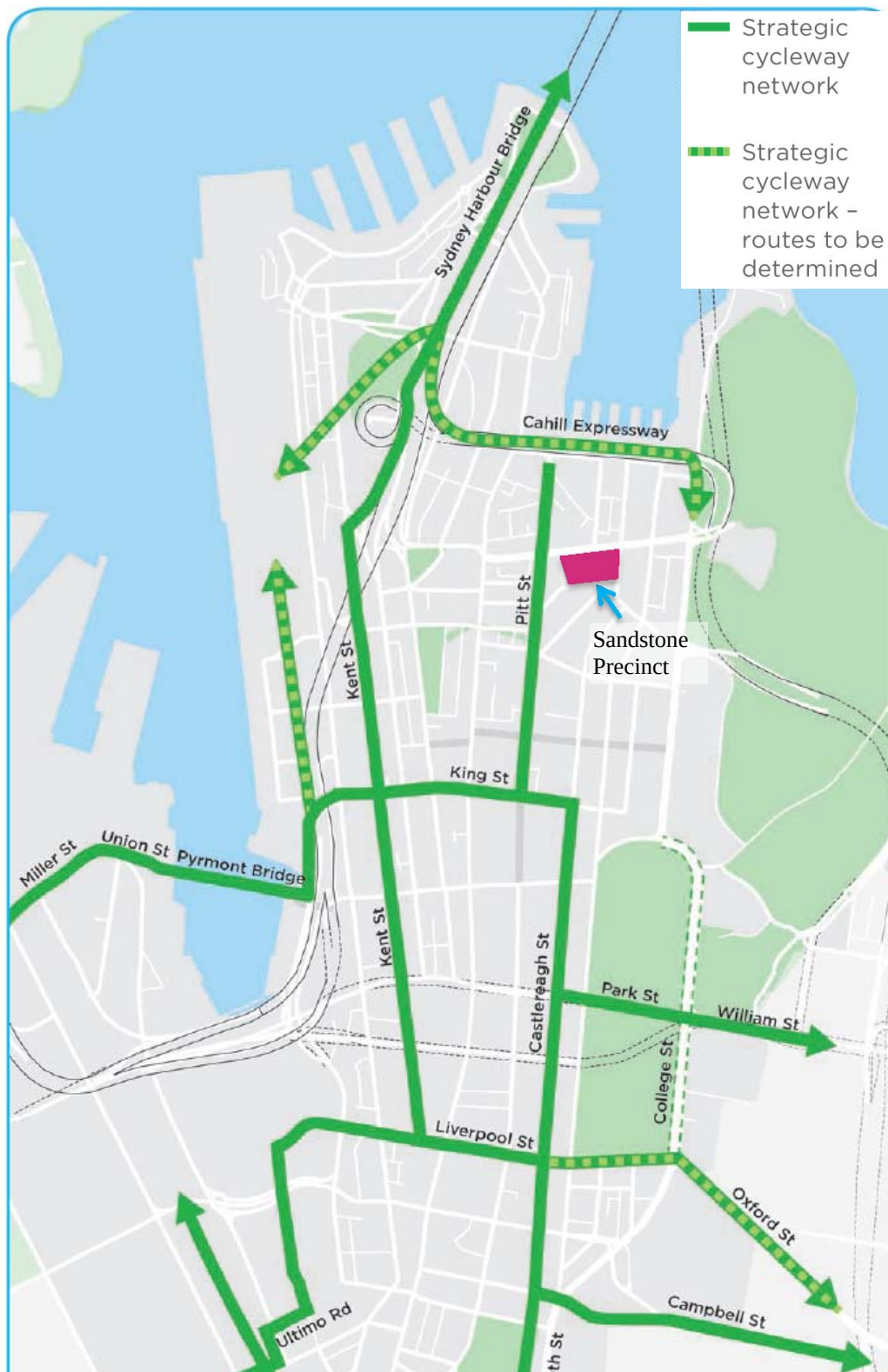


Figure 7 Strategic Cycleway Network Map

Source: Sydney City Centre Access Strategy (NSW Government, 2013)

3 Transport Assessment

3.1 Vehicular Site Access

No amendments to the current vehicular site access points are proposed as part of this Stage 1 application. Any amendments to the current access arrangements would be detailed in a later separate (Stage 2) development application.

3.2 Patron and Visitor Activity

Currently functioning as Government departmental offices, it is proposed that the two buildings within the Sandstone Precinct will primarily be used for tourist and visitor accommodation. Based on preliminary planning for the site, approximately 271 hotel rooms could be provided across the two buildings. The final number of hotel rooms is dependent on the configuration and extent of support and function spaces, and would be detailed in the Stage 2 development application.

At full occupancy, it could be expected that the 271 hotel rooms may accommodate approximately 540 guests and up to 30 members of staff.

3.3 Car Parking

The Sydney Local Environment Plan 2012 designates a **maximum** number of car parking spaces for a building used for the purposes of serviced apartments or hotel or motel accommodation as:

- (a) 1 space for every 4 bedrooms up to 100 bedrooms, and
- (b) 1 space for every 5 bedrooms more than 100 bedrooms.

The final number of on-site parking bays to be provided as part of the Sandstone Precinct would be detailed in the Stage 2 development application. However, during periods when car parking demand may exceed supply, visitors of the hotel will be directed by hotel staff to find parking in the surrounding off-street publicly accessible commercial car parks. As demonstrated in Figure 8, there are numerous existing off-street publicly accessible commercial car parks located in close proximity to the site. After dropping off baggage and guests, the car driver will be directed to the most appropriate off-site car park for overnight parking.

Shared parking arrangements could also be established with nearby commercial buildings as an appropriate and efficient means of managing parking requirements. For example, a number of basement car parks primarily used by commercial workers during the day will likely to be available for hotel users on weekday evenings and weekends when demand generated by commercial uses is low.

It could be expected that the hotel operator would enter into an agreement with a nearby commercial car park to provide a guest parking arrangement. For example, The Metro Hotel on Pitt Street in the CBD has a parking deal with World Square Car Park which is only one block south of the site.

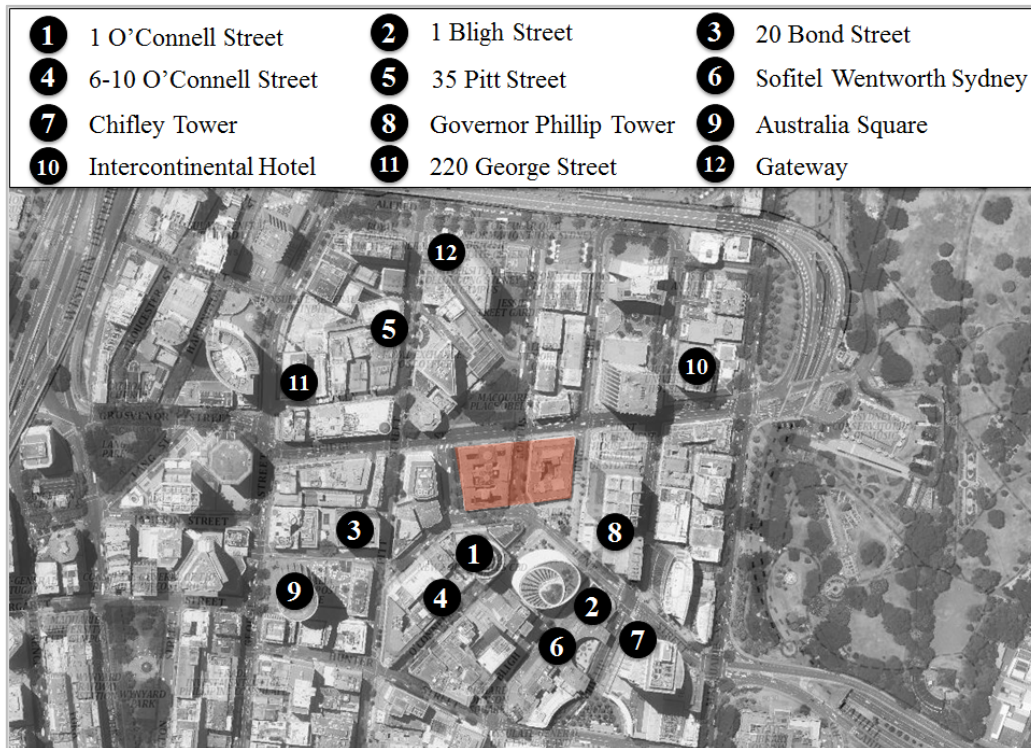


Figure 8 Off-Street Car Parking Opportunities

Typically visitors to Sydney CBD hotels utilise taxi and public transport to transfer from the airport or wider Sydney region. Many guests will be business travellers who will stay for a number of consecutive nights.

A very low car mode of approximately 10% could be expected which equates to 27 cars needing to be parked overnight. The existing site provides for up to 12 car parking bays. The nearby car parks are easily able to accommodate this level of residual demand.

3.4 Traffic Generation

The hotel will generate a small number of private vehicle movements associated with either on-site parking provision or drop off of passengers and luggage prior to parking in a nearby public parking station.

It has been identified that the Sandstone Precinct may generate demand for 27 vehicles to be parked overnight. As a worst case scenario, it has been assumed that 100% of these vehicles depart the site in the AM peak hour (8am-9am) and arrive to the site in the PM peak hour (5pm-6pm). More realistically, vehicle arrivals and departures will be dispersed over the course of the day, reducing the impact on the local road network.

In the northern part of the Sydney CBD, taxis currently circulate on the road network and therefore guest arrivals and departures via taxi will not increase the level of traffic on roads in the precinct.

3.5 Road Network Impacts

3.5.1 Methodology

Traffic modelling has been undertaken to determine the impact on the local road network arising from the proposed development.

The future road network performance has been assessed using the RMS approved SIDRA software. The performance of intersections has been assessed in terms of the Level of Service (LOS), which is based on the average delay per vehicle. LOS ranges from A = very good to F = unsatisfactory.

Another common measure of intersection performance is the degree of saturation (DOS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DOS of 1.0 indicates that an intersection is operating at capacity.

The modelling has considered the critical AM (8am – 9am) and PM (5pm – 6pm) peak hours as identified in the traffic surveys.

3.5.2 Results

The results of the traffic modelling are summarised in Table 1 below. The detailed traffic modelling outputs are provided in Appendix A.

Table 1 Traffic Modelling Results

Intersection	Peak Hour	DOS	Av Delay (s)	LOS
Bridge Street / Pitt Street	AM Existing	0.91	22	C
	AM Future	0.91	22	C
	PM Existing	0.84	20	B
	PM Future	0.85	20	B
Bridge Street / Gresham Street	AM Existing	1.00	7	N/A
	AM Future	1.00	7	N/A
	PM Existing	1.00	7	N/A
	PM Future	1.00	7	N/A
Bridge Street / Loftus Street	AM Existing	0.92	20	B
	AM Future	0.93	21	B
	PM Existing	0.66	15	B
	PM Future	0.66	15	B
Bridge Street / Young Street	AM Existing	0.70	17	B
	AM Future	0.71	17	B
	PM Existing	0.77	18	B
	PM Future	0.79	18	B

DOS – Degree of Saturation, Av Delay – Average Vehicle Delay, LOS – Level of Service

3.5.3 Analysis

The modelling demonstrates the small increase in traffic has a negligible impact on the operation of nearby intersections. No upgrades or improvements are required at these locations to facilitate the development of the Sandstone Precinct.

3.6 Public Transport

3.6.1 Light Rail

The Environmental Impact Statement (EIS) for the CBD and South East Light Rail Project was approved by the DP&E in June 2014. The EIS outlines the proposed construction for a new light rail service in Sydney, connecting Circular Quay and the CBD with Surry Hills, Kingsford and Randwick.

The project includes construction of a new light rail stop Circular Quay on Alfred Street between Pitt Street and Loftus Street as shown in Figure 9.



Figure 9 Circular Quay Light Rail Stop

Source: CSELR EIS Technical Paper 10 - Visual and Landscape Assessment

This new light rail stop at Circular Quay will improve accessibility to the Sandstone Precinct by providing an excellent public transport connection. Associated benefits of the light rail proposal for the Sandstone Precinct include:

- Closure of Loftus Street to vehicular traffic north of Reiby Place towards Circular Quay to provide an improved pedestrian environment;
- Introduction of integrated customer information and wayfinding;
- Connections to adjacent public transport modes including ferry, bus and heavy rail; and
- Integration of light rail platforms into the Circular Quay precinct.

3.6.2 Heavy Rail

It could be expected that a high number of hotel guests at the Sandstone Precinct will be arriving directly from Sydney Airport. Circular Quay Station is located on the Airport rail line and less than a 5 minute walk from the Sandstone Precinct - with no transfer required from either the International or Domestic Terminal stations. A train journey between the International Airport and Circular Quay station is 22 minutes – making this a viable mode of transport for many guests.

3.7 Walking

The introduction of light rail through the CBD will provide opportunities for an improved pedestrian environment in the Sandstone Precinct. With the removal of the bus layover areas on Loftus Street, the section of road between Reiby Place and Alfred Street is to become a pedestrianised precinct, free of moving traffic. This will improve accessibility for hotel patrons travelling between the Sandstone Precinct and Circular Quay transport interchange.

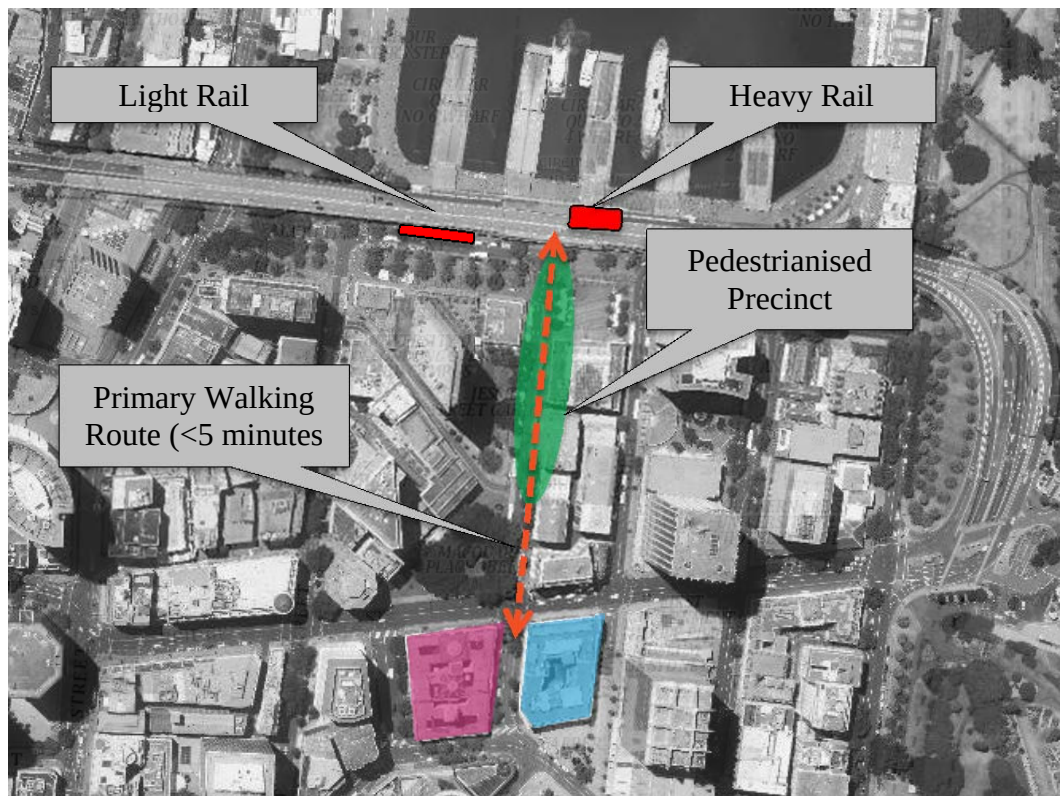


Figure 10 Future Walking Environment – Circular Quay Precinct

The Lands and Education Building that form the Sandstone Precinct currently accommodate a significant number of commercial workers. The number of pedestrian movements generated by the future hotel use of the buildings during the critical commuter peak hours is not expected to exceed current levels of activity.

3.8 Cycling

The proposed bi-directional cycleway on Pitt Street as part of the Sydney City Centre Access Strategy will form the main north-south spine through the CBD for cyclists into the area. Following the closure of Alfred Street to general traffic and the removal of buses on Loftus Street, there will be an opportunity to create a good quality shared environment for pedestrians and cyclists.

3.9 Travel Plan

The implementation of a Travel Plan would contribute to reducing traffic demands and encourage other forms of transport to the Sandstone Precinct. The Premier's Council for Active Living (PCAL) describes the three key objectives for a travel plan as follows:

- To reduce the need to travel
- To improve non-car travel methods
- To ensure the most efficient use of car parking spaces

Framework objectives and measures for the preparation of a travel plan for the Sandstone Precinct include the following:

- Easily accessible transport information for hotel guests prior to their arrival and during their stay;
- Increase of travel choices for employees, with an emphasis on improving access by sustainable modes of transport;
- Encouragement of high mode share to sustainable modes from private vehicle usage;
- Raising awareness of sustainable transport amongst staff and guests with travel guides.

4 Summary

Arup has prepared this Traffic Impact Assessment on behalf of Government Property NSW in support of a Stage 1 Stage Significant Development Application (SSDA) to secure approval for a development concept for the subject site at 23-33 Bridge Street and 35-39 Bridge Street, Sydney ('Sandstone Precinct').

The precinct has good public transport availability, served by the high quality Circular Quay public transport interchange – which provides an environment where passengers may easily transfer between bus, rail and ferry modes. The future introduction of a light rail station at Circular Quay will further improve public transport accessibility to the precinct.

A series of pedestrian footpaths and dedicated crossing facilities provide good connectivity between the building entries and these public transport stops.

The proposal involves a minor increase in peak hour traffic of 27 vehicles, which is considered negligible in the context of existing traffic volumes in the northern CBD. Traffic modelling confirms the operation of key intersections serving the precinct remains unchanged as a result of the proposal.

The final number of on-site parking bays to be provided as part of the Sandstone Precinct would be detailed in the Stage 2 development application. However, a number of publically available off-street car parks are located in close proximity to the site. It could be expected that the hotel operator would enter into an agreement with a nearby commercial car park to provide a guest parking arrangement.

It is concluded that the transport impacts arising from the proposed development application are acceptable and can be appropriately managed.

Appendix A

Traffic Modelling Outputs

MOVEMENT SUMMARY



Site: AM Base

VV0243_6H

Signals - Actuated Cycle Time = 65 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Bridge St E											
4	L2	211	29.0	0.862	31.9	LOS C	9.8	80.5	0.97	0.85	24.5
5	T1	523	3.2	0.862	27.0	LOS C	13.1	94.5	0.97	0.85	25.0
Approach		734	10.6	0.862	28.4	LOS C	13.1	94.5	0.97	0.85	24.8
North: Pitt St N											
7	L2	99	6.4	0.267	24.9	LOS C	2.5	18.5	0.79	0.73	26.6
8	T1	164	21.8	0.169	19.5	LOS B	2.0	16.3	0.76	0.60	27.9
9	R2	58	14.5	0.169	24.2	LOS C	1.5	11.5	0.76	0.69	26.9
Approach		321	15.7	0.267	22.0	LOS C	2.5	18.5	0.77	0.66	27.3
West: Bridge St W											
11	T1	773	18.8	0.723	9.3	LOS A	12.6	102.5	0.59	0.53	32.8
12	R2	341	7.7	0.914	36.0	LOS D	9.9	73.8	1.00	1.07	23.2
Approach		1114	15.4	0.914	17.5	LOS B	12.6	102.5	0.72	0.70	29.1
All Vehicles		2168	13.8	0.914	21.9	LOS C	13.1	102.5	0.81	0.74	27.3

Level of Service (LOS) Method: Delay (HCM 2000).

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	
P1	South Full Crossing	803	27.7	LOS C	1.4	1.4	0.94	0.94	
P2	East Full Crossing	1052	28.0	LOS C	1.8	1.8	0.95	0.95	
P3	North Full Crossing	1165	28.1	LOS C	2.1	2.1	0.95	0.95	
P4	West Full Crossing	1061	28.0	LOS C	1.9	1.9	0.95	0.95	
All Pedestrians		4081	28.0	LOS C			0.95	0.95	

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: AM Future

VV0243_6H

Signals - Actuated Cycle Time = 65 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Bridge St E											
4	L2	211	29.0	0.862	31.9	LOS C	9.8	80.5	0.97	0.85	24.5
5	T1	523	3.2	0.862	27.0	LOS C	13.1	94.5	0.97	0.85	25.0
Approach		734	10.6	0.862	28.4	LOS C	13.1	94.5	0.97	0.85	24.8
North: Pitt St N											
7	L2	99	6.4	0.267	24.9	LOS C	2.5	18.5	0.79	0.73	26.6
8	T1	164	21.8	0.169	19.5	LOS B	2.0	16.3	0.76	0.60	27.9
9	R2	58	14.5	0.169	24.2	LOS C	1.5	11.5	0.76	0.69	26.9
Approach		321	15.7	0.267	22.0	LOS C	2.5	18.5	0.77	0.66	27.3
West: Bridge St W											
11	T1	783	18.5	0.732	9.4	LOS A	12.9	105.0	0.60	0.54	32.8
12	R2	341	7.7	0.914	36.0	LOS D	9.9	73.8	1.00	1.07	23.2
Approach		1124	15.3	0.914	17.4	LOS B	12.9	105.0	0.72	0.70	29.1
All Vehicles		2179	13.8	0.914	21.8	LOS C	13.1	105.0	0.81	0.74	27.3

Level of Service (LOS) Method: Delay (HCM 2000).

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	
P1	South Full Crossing	803	27.7	LOS C	1.4	1.4	0.94	0.94	
P2	East Full Crossing	1052	28.0	LOS C	1.8	1.8	0.95	0.95	
P3	North Full Crossing	1165	28.1	LOS C	2.1	2.1	0.95	0.95	
P4	West Full Crossing	1061	28.0	LOS C	1.9	1.9	0.95	0.95	
All Pedestrians		4081	28.0	LOS C			0.95	0.95	

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: PM Base

VV0243_6H

Signals - Actuated Cycle Time = 58 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Bridge St E											
4	L2	96	41.8	0.843	28.5	LOS C	9.9	76.6	0.96	0.83	25.9
5	T1	680	1.2	0.843	23.9	LOS C	11.3	80.2	0.96	0.83	26.0
Approach		776	6.2	0.843	24.5	LOS C	11.3	80.2	0.96	0.83	26.0
North: Pitt St N											
7	L2	163	0.6	0.377	21.9	LOS C	3.7	26.0	0.79	0.76	27.8
8	T1	268	10.6	0.233	16.2	LOS B	2.8	21.6	0.75	0.60	29.3
9	R2	167	1.3	0.389	21.9	LOS C	3.8	27.0	0.79	0.76	27.7
Approach		599	5.3	0.389	19.4	LOS B	3.8	27.0	0.77	0.69	28.4
West: Bridge St W											
11	T1	803	10.2	0.802	11.7	LOS B	14.6	111.2	0.74	0.65	31.4
12	R2	216	6.3	0.809	31.7	LOS C	5.7	41.8	0.98	0.95	24.4
Approach		1019	9.4	0.809	15.9	LOS B	14.6	111.2	0.79	0.71	29.6
All Vehicles		2394	7.3	0.843	19.6	LOS B	14.6	111.2	0.84	0.74	28.1

Level of Service (LOS) Method: Delay (HCM 2000).

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	622	23.9	LOS C	0.9	0.9	0.92	0.92	
P2	East Full Crossing	923	24.2	LOS C	1.4	1.4	0.93	0.93	
P3	North Full Crossing	740	24.1	LOS C	1.1	1.1	0.93	0.93	
P4	West Full Crossing	806	24.1	LOS C	1.2	1.2	0.93	0.93	
All Pedestrians		3092	24.1	LOS C			0.93	0.93	

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: PM Future

VV0243_6H

Signals - Actuated Cycle Time = 58 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Bridge St E											
4	L2	96	41.8	0.853	28.7	LOS C	10.2	78.4	0.97	0.84	25.8
5	T1	691	1.2	0.853	24.1	LOS C	11.6	81.9	0.97	0.84	26.0
Approach		786	6.2	0.853	24.7	LOS C	11.6	81.9	0.97	0.84	25.9
North: Pitt St N											
7	L2	163	0.6	0.377	21.9	LOS C	3.7	26.0	0.79	0.76	27.8
8	T1	268	10.6	0.233	16.2	LOS B	2.8	21.6	0.75	0.60	29.3
9	R2	167	1.3	0.389	21.9	LOS C	3.8	27.0	0.79	0.76	27.7
Approach		599	5.3	0.389	19.4	LOS B	3.8	27.0	0.77	0.69	28.4
West: Bridge St W											
11	T1	803	10.2	0.802	11.7	LOS B	14.6	111.2	0.74	0.65	31.4
12	R2	216	6.3	0.811	31.8	LOS C	5.7	41.8	0.98	0.95	24.4
Approach		1019	9.4	0.811	15.9	LOS B	14.6	111.2	0.79	0.71	29.6
All Vehicles		2404	7.3	0.853	19.7	LOS B	14.6	111.2	0.84	0.75	28.0

Level of Service (LOS) Method: Delay (HCM 2000).

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	
P1	South Full Crossing	622	23.9	LOS C	0.9	0.9	0.92	0.92	
P2	East Full Crossing	923	24.2	LOS C	1.4	1.4	0.93	0.93	
P3	North Full Crossing	740	24.1	LOS C	1.1	1.1	0.93	0.93	
P4	West Full Crossing	806	24.1	LOS C	1.2	1.2	0.93	0.93	
All Pedestrians		3092	24.1	LOS C			0.93	0.93	

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: AM Base

Gresham Priority
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: Gresham St											
1	L2	133	7.9	0.285	14.9	LOS B	1.2	8.7	0.66	1.00	31.4
3	R2	12	63.6	1.000	503.8	LOS F	2.8	30.3	1.00	1.21	3.6
Approach		144	12.4	1.000	54.2	LOS F	2.8	30.3	0.69	1.02	19.4
East: Bridge St E											
4	L2	28	11.1	0.173	4.7	LOS A	0.0	0.0	0.00	0.00	39.7
5	T1	614	10.8	0.173	0.0	LOS A	0.0	0.0	0.00	0.00	39.8
Approach		642	10.8	0.173	0.2	NA	0.0	0.0	0.00	0.00	39.8
West: Bridge St W											
11	T1	796	17.9	0.306	2.6	LOS A	3.4	26.7	0.22	0.08	37.5
12	R2	78	9.5	0.306	13.4	LOS B	3.4	26.7	0.83	0.28	32.1
Approach		874	17.1	0.306	3.6	NA	3.4	26.7	0.28	0.09	36.9
All Vehicles		1660	14.3	1.000	6.7	NA	3.4	30.3	0.21	0.14	35.1

Level of Service (LOS) Method: Delay (HCM 2000).

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.

MOVEMENT SUMMARY



Site: AM Future

Gresham Priority
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: Gresham St											
1	L2	133	7.9	0.290	15.1	LOS C	1.2	8.9	0.67	1.00	31.3
3	R2	12	63.6	1.000	502.7	LOS F	2.8	30.2	1.00	1.21	3.6
Approach		144	12.4	1.000	54.3	LOS F	2.8	30.2	0.69	1.02	19.4
East: Bridge St E											
4	L2	28	11.1	0.175	4.7	LOS A	0.0	0.0	0.00	0.00	39.7
5	T1	624	10.6	0.175	0.0	LOS A	0.0	0.0	0.00	0.00	39.8
Approach		653	10.6	0.175	0.2	NA	0.0	0.0	0.00	0.00	39.8
West: Bridge St W											
11	T1	796	17.9	0.307	2.7	LOS A	3.4	26.8	0.22	0.08	37.5
12	R2	78	9.5	0.307	13.7	LOS B	3.4	26.8	0.83	0.29	32.0
Approach		874	17.1	0.307	3.6	NA	3.4	26.8	0.28	0.10	36.9
All Vehicles		1671	14.2	1.000	6.7	NA	3.4	30.2	0.20	0.14	35.1

Level of Service (LOS) Method: Delay (HCM 2000).

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.

MOVEMENT SUMMARY



Site: PM Base

Gresham Priority
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: Gresham St											
1	L2	202	7.8	0.405	15.5	LOS C	2.0	14.9	0.67	1.06	31.2
3	R2	5	20.0	1.000	1144.0	LOS F	2.8	22.6	1.00	1.10	1.7
Approach		207	8.1	1.000	44.1	LOS E	2.8	22.6	0.68	1.07	21.5
East: Bridge St E											
4	L2	18	11.8	0.162	5.2	LOS A	0.0	0.0	0.00	0.00	39.8
5	T1	604	5.6	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	39.9
Approach		622	5.8	0.162	0.2	NA	0.0	0.0	0.00	0.00	39.9
West: Bridge St W											
11	T1	914	9.1	0.290	2.8	LOS A	3.9	28.9	0.30	0.06	37.3
12	R2	57	1.9	0.290	11.5	LOS B	3.9	28.9	0.81	0.15	33.3
Approach		971	8.7	0.290	3.3	NA	3.9	28.9	0.33	0.06	37.0
All Vehicles		1800	7.6	1.000	6.9	NA	3.9	28.9	0.25	0.16	35.0

Level of Service (LOS) Method: Delay (HCM 2000).

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.

MOVEMENT SUMMARY



Site: PM Future

Gresham Priority
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: Gresham St											
1	L2	202	7.8	0.405	15.5	LOS C	2.0	14.9	0.67	1.06	31.2
3	R2	5	20.0	1.000	1137.7	LOS F	2.7	22.5	1.00	1.10	1.7
Approach		207	8.1	1.000	43.9	LOS E	2.7	22.5	0.68	1.07	21.6
East: Bridge St E											
4	L2	18	11.8	0.162	5.2	LOS A	0.0	0.0	0.00	0.00	39.8
5	T1	604	5.6	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	39.9
Approach		622	5.8	0.162	0.2	NA	0.0	0.0	0.00	0.00	39.9
West: Bridge St W											
11	T1	932	8.9	0.295	2.9	LOS A	4.0	29.9	0.30	0.05	37.2
12	R2	57	1.9	0.295	11.6	LOS B	4.0	29.9	0.82	0.15	33.3
Approach		988	8.5	0.295	3.4	NA	4.0	29.9	0.33	0.06	37.0
All Vehicles		1818	7.5	1.000	6.9	NA	4.0	29.9	0.26	0.15	35.0

Level of Service (LOS) Method: Delay (HCM 2000).

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.

MOVEMENT SUMMARY

 **Site: AM Base**

VV0321_7E

Signals - Actuated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Loftus St S											
1	L2	49	14.9	0.181	22.4	LOS C	1.6	12.5	0.75	0.68	27.9
2	T1	99	6.4	0.181	17.8	LOS B	2.0	15.2	0.76	0.63	28.3
3	R2	13	41.7	0.181	22.2	LOS C	2.0	15.2	0.76	0.61	28.5
Approach		161	11.8	0.181	19.6	LOS B	2.0	15.2	0.75	0.64	28.2
East: Bridge St E											
4	L2	72	4.4	0.650	14.2	LOS B	11.0	83.2	0.62	0.58	32.4
5	T1	584	10.1	0.650	9.9	LOS A	11.0	83.2	0.63	0.59	32.3
6	R2	167	8.2	0.650	19.1	LOS B	3.3	25.1	0.92	0.78	29.0
Approach		823	9.2	0.650	12.1	LOS B	11.0	83.2	0.69	0.63	31.6
West: Bridge St W											
10	L2	168	55.6	0.919	31.6	LOS C	11.2	99.2	0.99	0.93	24.7
11	T1	587	9.5	0.919	26.8	LOS C	14.0	105.5	0.99	0.93	25.0
12	R2	51	2.1	0.919	31.1	LOS C	14.0	105.5	1.00	0.94	25.1
Approach		806	18.7	0.919	28.1	LOS C	14.0	105.5	0.99	0.93	24.9
All Vehicles		1791	13.7	0.919	20.0	LOS B	14.0	105.5	0.83	0.77	27.9

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik 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
P1	South Full Crossing	407	24.7	LOS C	0.6	0.6	0.92	0.92
P2	East Full Crossing	407	24.7	LOS C	0.6	0.6	0.92	0.92
P3	North Full Crossing	556	24.9	LOS C	0.9	0.9	0.92	0.92
P4	West Full Crossing	631	25.0	LOS C	1.0	1.0	0.92	0.92
All Pedestrians		2001	24.8	LOS C			0.92	0.92

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: AM Future

VV0321_7E

Signals - Actuated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

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: Loftus St S											
1	L2	49	14.9	0.181	22.4	LOS C	1.6	12.5	0.75	0.68	27.9
2	T1	99	6.4	0.181	17.8	LOS B	2.0	15.2	0.76	0.63	28.3
3	R2	13	41.7	0.181	22.2	LOS C	2.0	15.2	0.76	0.61	28.5
Approach		161	11.8	0.181	19.6	LOS B	2.0	15.2	0.75	0.64	28.2
East: Bridge St E											
4	L2	89	3.5	0.665	14.3	LOS B	11.4	86.3	0.63	0.60	32.3
5	T1	584	10.1	0.665	10.0	LOS B	11.4	86.3	0.65	0.61	32.1
6	R2	167	8.2	0.665	19.2	LOS B	3.5	26.0	0.93	0.78	29.0
Approach		841	9.0	0.665	12.3	LOS B	11.4	86.3	0.70	0.64	31.5
West: Bridge St W											
10	L2	168	55.6	0.931	32.5	LOS C	11.7	103.4	1.00	0.96	24.4
11	T1	587	9.5	0.931	27.7	LOS C	14.5	109.0	1.00	0.96	24.7
12	R2	61	1.7	0.931	32.0	LOS C	14.5	109.0	1.00	0.96	24.8
Approach		817	18.4	0.931	29.0	LOS C	14.5	109.0	1.00	0.96	24.6
All Vehicles		1819	13.5	0.931	20.5	LOS C	14.5	109.0	0.84	0.78	27.7

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik 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	407	24.7	LOS C	0.6	0.6	0.92	0.92	
P2	East Full Crossing	407	24.7	LOS C	0.6	0.6	0.92	0.92	
P3	North Full Crossing	556	24.9	LOS C	0.9	0.9	0.92	0.92	
P4	West Full Crossing	631	25.0	LOS C	1.0	1.0	0.92	0.92	
All Pedestrians		2001	24.8	LOS C			0.92	0.92	

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: PM Base

VV0321_7E

Signals - Actuated Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Loftus St S											
1	L2	82	3.8	0.233	28.2	LOS C	2.3	16.6	0.81	0.73	25.5
2	T1	77	2.7	0.183	23.1	LOS C	2.3	16.5	0.79	0.63	26.5
3	R2	6	33.3	0.183	27.7	LOS C	2.3	16.5	0.79	0.63	26.5
Approach		165	4.5	0.233	25.8	LOS C	2.3	16.6	0.80	0.68	26.0
East: Bridge St E											
4	L2	69	1.5	0.423	10.5	LOS B	5.8	42.2	0.37	0.38	34.7
5	T1	540	6.0	0.423	7.1	LOS A	5.8	42.2	0.44	0.44	34.0
6	R2	62	11.9	0.423	14.8	LOS B	3.0	22.2	0.66	0.60	31.7
Approach		672	6.1	0.423	8.2	LOS A	5.8	42.2	0.45	0.45	33.8
West: Bridge St W											
10	L2	145	52.9	0.656	21.9	LOS C	11.2	90.6	0.75	0.69	28.5
11	T1	754	0.8	0.656	17.4	LOS B	11.7	82.9	0.75	0.68	28.6
12	R2	22	4.8	0.656	22.7	LOS C	11.7	82.9	0.75	0.67	28.7
Approach		921	9.1	0.656	18.3	LOS B	11.7	90.6	0.75	0.68	28.6
All Vehicles		1758	7.5	0.656	15.1	LOS B	11.7	90.6	0.64	0.59	30.1

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik 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	
P1	South Full Crossing	365	29.7	LOS C	0.7	0.7	0.93	0.93	
P2	East Full Crossing	385	29.7	LOS C	0.7	0.7	0.93	0.93	
P3	North Full Crossing	256	29.6	LOS C	0.5	0.5	0.92	0.92	
P4	West Full Crossing	296	29.6	LOS C	0.5	0.5	0.93	0.93	
All Pedestrians		1302	29.7	LOS C			0.93	0.93	

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: PM Future

VV0321_7E

Signals - Actuated Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Loftus St S											
1	L2	93	3.4	0.262	28.4	LOS C	2.6	18.8	0.81	0.74	25.4
2	T1	77	2.7	0.237	23.5	LOS C	2.8	20.3	0.81	0.67	26.2
3	R2	24	8.7	0.237	28.0	LOS C	2.8	20.3	0.81	0.67	26.2
Approach		194	3.8	0.262	26.4	LOS C	2.8	20.3	0.81	0.70	25.8
East: Bridge St E											
4	L2	69	1.5	0.423	10.5	LOS B	5.8	42.2	0.37	0.38	34.7
5	T1	540	6.0	0.423	7.1	LOS A	5.8	42.2	0.44	0.44	34.0
6	R2	62	11.9	0.423	14.8	LOS B	3.0	22.2	0.66	0.60	31.7
Approach		672	6.1	0.423	8.2	LOS A	5.8	42.2	0.45	0.45	33.8
West: Bridge St W											
10	L2	145	52.9	0.656	21.9	LOS C	11.2	90.6	0.75	0.69	28.5
11	T1	754	0.8	0.656	17.4	LOS B	11.7	82.9	0.75	0.68	28.6
12	R2	22	4.8	0.656	22.7	LOS C	11.7	82.9	0.75	0.67	28.7
Approach		921	9.1	0.656	18.3	LOS B	11.7	90.6	0.75	0.68	28.6
All Vehicles		1786	7.4	0.656	15.3	LOS B	11.7	90.6	0.64	0.59	30.0

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik 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	365	29.7	LOS C	0.7	0.7	0.93	0.93	
P2	East Full Crossing	385	29.7	LOS C	0.7	0.7	0.93	0.93	
P3	North Full Crossing	256	29.6	LOS C	0.5	0.5	0.92	0.92	
P4	West Full Crossing	296	29.6	LOS C	0.5	0.5	0.93	0.93	
All Pedestrians		1302	29.7	LOS C			0.93	0.93	

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: AM Base**

VV0227_13H

Signals - Actuated Cycle Time = 56 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Young St S											
1	L2	17	12.5	0.043	19.4	LOS B	0.3	2.5	0.69	0.64	28.8
2	T1	3	33.3	0.044	15.7	LOS B	0.3	2.6	0.71	0.62	28.6
3	R2	13	16.7	0.044	20.2	LOS C	0.3	2.6	0.71	0.62	28.6
Approach		33	16.1	0.044	19.3	LOS B	0.3	2.6	0.70	0.63	28.7
East: Bridge St E											
4	L2	49	4.3	0.697	15.6	LOS B	12.0	89.3	0.71	0.64	31.6
5	T1	774	8.0	0.697	11.7	LOS B	12.0	89.3	0.74	0.67	31.2
6	R2	99	43.6	0.697	18.0	LOS B	5.2	42.8	0.86	0.75	30.0
Approach		922	11.6	0.697	12.6	LOS B	12.0	89.3	0.75	0.67	31.1
North: Young St N											
7	L2	48	43.5	0.333	21.7	LOS C	2.1	19.7	0.78	0.70	28.0
8	T1	6	16.7	0.333	17.2	LOS B	2.1	19.7	0.78	0.70	28.0
9	R2	41	33.3	0.333	21.2	LOS C	2.1	19.7	0.78	0.70	28.0
Approach		96	37.4	0.333	21.2	LOS C	2.1	19.7	0.78	0.70	28.0
West: Bridge St W											
10	L2	39	10.8	0.685	26.7	LOS C	7.9	59.9	0.89	0.76	26.7
11	T1	542	10.3	0.685	22.3	LOS C	7.9	59.9	0.89	0.76	26.7
12	R2	19	5.6	0.685	26.7	LOS C	7.0	53.2	0.89	0.76	26.7
Approach		600	10.2	0.685	22.7	LOS C	7.9	59.9	0.89	0.76	26.7
All Vehicles		1651	12.7	0.697	16.9	LOS B	12.0	89.3	0.80	0.70	29.1

Level of Service (LOS) Method: Delay (HCM 2000).

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	
P1	South Full Crossing	288	22.6	LOS C	0.4	0.4	0.90	0.90	
P2	East Full Crossing	665	23.0	LOS C	1.0	1.0	0.92	0.92	
P3	North Full Crossing	340	22.6	LOS C	0.5	0.5	0.91	0.91	
P4	West Full Crossing	466	22.8	LOS C	0.7	0.7	0.91	0.91	
All Pedestrians		1760	22.8	LOS C			0.91	0.91	

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: AM Future

VV0227_13H

Signals - Actuated Cycle Time = 56 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Young St S											
1	L2	17	12.5	0.043	19.4	LOS B	0.3	2.5	0.69	0.64	28.8
2	T1	3	33.3	0.044	15.7	LOS B	0.3	2.6	0.71	0.62	28.6
3	R2	13	16.7	0.044	20.2	LOS C	0.3	2.6	0.71	0.62	28.6
Approach		33	16.1	0.044	19.3	LOS B	0.3	2.6	0.70	0.63	28.7
East: Bridge St E											
4	L2	49	4.3	0.707	15.6	LOS B	12.3	91.5	0.71	0.65	31.6
5	T1	792	7.8	0.707	11.9	LOS B	12.3	91.5	0.75	0.67	31.2
6	R2	99	43.6	0.707	18.3	LOS B	5.4	44.0	0.86	0.76	29.8
Approach		940	11.4	0.707	12.7	LOS B	12.3	91.5	0.76	0.68	31.0
North: Young St N											
7	L2	48	43.5	0.333	21.7	LOS C	2.1	19.7	0.78	0.70	28.0
8	T1	6	16.7	0.333	17.2	LOS B	2.1	19.7	0.78	0.70	28.0
9	R2	41	33.3	0.333	21.2	LOS C	2.1	19.7	0.78	0.70	28.0
Approach		96	37.4	0.333	21.2	LOS C	2.1	19.7	0.78	0.70	28.0
West: Bridge St W											
10	L2	39	10.8	0.685	26.7	LOS C	7.9	59.9	0.89	0.76	26.7
11	T1	542	10.3	0.685	22.3	LOS C	7.9	59.9	0.89	0.76	26.7
12	R2	19	5.6	0.685	26.7	LOS C	7.0	53.1	0.89	0.76	26.7
Approach		600	10.2	0.685	22.7	LOS C	7.9	59.9	0.89	0.76	26.7
All Vehicles		1668	12.6	0.707	16.9	LOS B	12.3	91.5	0.81	0.71	29.1

Level of Service (LOS) Method: Delay (HCM 2000).

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	
P1	South Full Crossing	288	22.6	LOS C	0.4	0.4	0.90	0.90	
P2	East Full Crossing	665	23.0	LOS C	1.0	1.0	0.92	0.92	
P3	North Full Crossing	340	22.6	LOS C	0.5	0.5	0.91	0.91	
P4	West Full Crossing	466	22.8	LOS C	0.7	0.7	0.91	0.91	
All Pedestrians		1760	22.8	LOS C			0.91	0.91	

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: PM Base

VV0227_13H

Signals - Actuated Cycle Time = 56 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Young St S											
1	L2	60	0.0	0.141	20.0	LOS C	1.2	8.4	0.72	0.71	28.5
2	T1	3	0.0	0.077	16.0	LOS B	0.6	4.2	0.72	0.67	28.5
3	R2	26	0.0	0.077	20.4	LOS C	0.6	4.2	0.72	0.67	28.5
Approach		89	0.0	0.141	20.0	LOS C	1.2	8.4	0.72	0.69	28.5
East: Bridge St E											
4	L2	15	0.0	0.469	14.0	LOS B	6.7	48.1	0.56	0.50	32.7
5	T1	575	3.5	0.469	10.3	LOS B	6.7	48.1	0.62	0.54	32.2
6	R2	56	69.8	0.469	17.0	LOS B	3.4	28.0	0.79	0.67	30.6
Approach		645	9.1	0.469	11.0	LOS B	6.7	48.1	0.63	0.55	32.0
North: Young St N											
7	L2	60	50.9	0.400	22.3	LOS C	2.3	23.6	0.80	0.71	27.7
8	T1	1	0.0	0.400	17.8	LOS B	2.3	23.6	0.80	0.71	27.7
9	R2	41	51.3	0.400	21.8	LOS C	2.3	23.6	0.80	0.71	27.7
Approach		102	50.5	0.400	22.0	LOS C	2.3	23.6	0.80	0.71	27.7
West: Bridge St W											
10	L2	16	13.3	0.774	27.2	LOS C	10.1	71.4	0.93	0.79	26.5
11	T1	732	0.7	0.774	22.8	LOS C	10.1	71.4	0.93	0.79	26.5
12	R2	6	0.0	0.774	27.2	LOS C	9.2	64.9	0.93	0.79	26.5
Approach		754	1.0	0.774	22.9	LOS C	10.1	71.4	0.93	0.79	26.5
All Vehicles		1591	7.4	0.774	17.9	LOS B	10.1	71.4	0.79	0.68	28.7

Level of Service (LOS) Method: Delay (HCM 2000).

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	158	22.5	LOS C	0.2	0.2	0.90	0.90	
P2	East Full Crossing	520	22.8	LOS C	0.8	0.8	0.91	0.91	
P3	North Full Crossing	279	22.6	LOS C	0.4	0.4	0.90	0.90	
P4	West Full Crossing	519	22.8	LOS C	0.8	0.8	0.91	0.91	
All Pedestrians		1476	22.7	LOS C			0.91	0.91	

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: PM Future

VV0227_13H

Signals - Actuated Cycle Time = 56 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Young St S											
1	L2	60	0.0	0.141	20.0	LOS C	1.2	8.4	0.72	0.71	28.5
2	T1	3	0.0	0.077	16.0	LOS B	0.6	4.2	0.72	0.67	28.5
3	R2	26	0.0	0.077	20.4	LOS C	0.6	4.2	0.72	0.67	28.5
Approach		89	0.0	0.141	20.0	LOS C	1.2	8.4	0.72	0.69	28.5
East: Bridge St E											
4	L2	15	0.0	0.469	14.0	LOS B	6.7	48.1	0.56	0.50	32.7
5	T1	575	3.5	0.469	10.3	LOS B	6.7	48.1	0.62	0.54	32.2
6	R2	56	69.8	0.469	17.0	LOS B	3.3	27.9	0.79	0.67	30.6
Approach		645	9.1	0.469	11.0	LOS B	6.7	48.1	0.63	0.55	32.0
North: Young St N											
7	L2	60	50.9	0.400	22.3	LOS C	2.3	23.6	0.80	0.71	27.7
8	T1	1	0.0	0.400	17.8	LOS B	2.3	23.6	0.80	0.71	27.7
9	R2	41	51.3	0.400	21.8	LOS C	2.3	23.6	0.80	0.71	27.7
Approach		102	50.5	0.400	22.0	LOS C	2.3	23.6	0.80	0.71	27.7
West: Bridge St W											
10	L2	16	13.3	0.792	27.4	LOS C	10.4	73.7	0.94	0.80	26.5
11	T1	749	0.7	0.792	22.9	LOS C	10.4	73.7	0.94	0.80	26.4
12	R2	6	0.0	0.792	27.3	LOS C	9.5	67.0	0.94	0.80	26.4
Approach		772	1.0	0.792	23.0	LOS C	10.4	73.7	0.94	0.80	26.4
All Vehicles		1608	7.3	0.792	18.0	LOS B	10.4	73.7	0.79	0.69	28.7

Level of Service (LOS) Method: Delay (HCM 2000).

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	
P1	South Full Crossing	158	22.5	LOS C	0.2	0.2	0.90	0.90	
P2	East Full Crossing	520	22.8	LOS C	0.8	0.8	0.91	0.91	
P3	North Full Crossing	279	22.6	LOS C	0.4	0.4	0.90	0.90	
P4	West Full Crossing	519	22.8	LOS C	0.8	0.8	0.91	0.91	
All Pedestrians		1476	22.7	LOS C			0.91	0.91	

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.