MUSEUMS DISCOVERY CENTRE EXPANSION
ENVIRONMENTAL IMPACT STATEMENT

APPENDIX I
TRAFFIC IMPACT ASSESSMENT REPORT

JMT

NSW GOVERNMENT

Museums Discovery Centre Expansion

Transport Impact Assessment

Prepared for:

Create Infrastructure

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JMT Consulting

PROJECT INFORMATION

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1 Introduction

1.1 Overview

This report supports a State Significant Development (SSD) Application for the proposed construction and use of a new building to facilitate the expansion of the Museums Discovery Centre (MDC) site at 2 Green Road, Castle Hill.

The primary objective of the SSD Application is to provide expanded facilities to accommodate the Powerhouse collection including spaces for storage, conservation, research and display and spaces to facilitate increased public access to the collection through education, public programs, workshops, talks, exhibitions and events. The expansion of the existing MDC facility within the site at 2 Green Road Castle Hill will integrate with the existing MDC site located at 172 Showground Road, Castle Hill and its operations on a permanent basis.

The proposal is a type of *"Information and Education Facility"* with a Capital Investment Value (CIV) in excess of $30 million and is classified as SSD under Schedule 1 Clause 13 of the State Environmental Planning Policy (State and Regional Development) 2011 (State and Regional Development SEPP).

Create Infrastructure is the proponent of the SSD Application.

1.2 Background

The MDC is owned and operated by the Museum of Applied Arts and Sciences (MAAS) and features exhibitions and displays in collaboration with Australian Museum and Sydney Living Museums, who also maintain collection storage and conservation facilities on the site. The MDC is located at 172 Showground Road, Castle Hill. There are six buildings primarily providing collection storage as well as areas for displays and education and public programs, accessible to visitors (Building E). During 2017-2018 a total of 17,481 persons visited the MDC site.

The MDC Expansion is part of the renewal of the Museum of Applied Arts and Sciences, known as the Powerhouse Program, that includes:

- **Powerhouse Parramatta**: A new benchmark in cultural placemaking for Greater Sydney that will be a symbol of a new approach to creative activity and engagement.
- **Powerhouse Ultimo**: The NSW Government recently announced that the Museum's Ultimo site will be retained, and the Museum will operate over four sites across the Greater Sydney area.

- **Powerhouse Collection Relocation and Digitisation Project**: The relocation of the Powerhouse collection and digitisation of around 338,000 objects, enhancing the collection's accessibility for local, national and international audiences.

The MDC expansion is an integral component of the Powerhouse Program and will provide the opportunity to increase visitation to the site, forming an important and significant cultural institution within The Hills Shire. In addition to the storage component of the proposal, the expansion will increase access to the Powerhouse collection through a range of spaces for visible storage, research and viewing of the collection, as well as flexible spaces for education and public programs, workshops, talks, exhibitions and events.

1.3 Site description

The proposed Building J site is located within the property known as 2 Green Road, Castle Hill which comprises a single lot legally described as Lot 102 DP 1130271. The site is generally square in shape with a splay corner to the intersection of Green Road and Showground Road and a total area of approximately 3.8ha. The site has a primary frontage of approximately 183m to Green Road and a secondary frontage of approximately 186m to Showground Road. Refer to Figure 1. The location of the proposed new MDC building (to be known as "Building J") is located on the western end of the site and is marked on Figure 1 in a dashed yellow line (referred as the Building J Site). The overall site contains large institutional buildings set within a landscaped setting featuring a high tree canopy.

The overall site is a TAFE campus that caters for approximately 400 enrolled students, and provides courses on business and financial services, hospitality, general education, community services, health, nursing, carpentry, building and retail. The site currently includes TAFE buildings, car parking and vegetated open space areas. A dam is situated in the north eastern part of the site.

The MDC site is located immediately west of the existing TAFE site at 172 Showground Road, Castle Hill. A subdivision application (included within this SSD Application) will consolidate the site of the proposed Building J with the existing MDC site. The main public vehicle access to the MDC site is via Windsor Road. There is also a vehicular access point to the MDC on Showground Road. The MDC and TAFE have a longstanding arrangement, that permits vehicle access to the MDC site from Green Road, allowing vehicles to traverse across the TAFE site to access the MDC site.

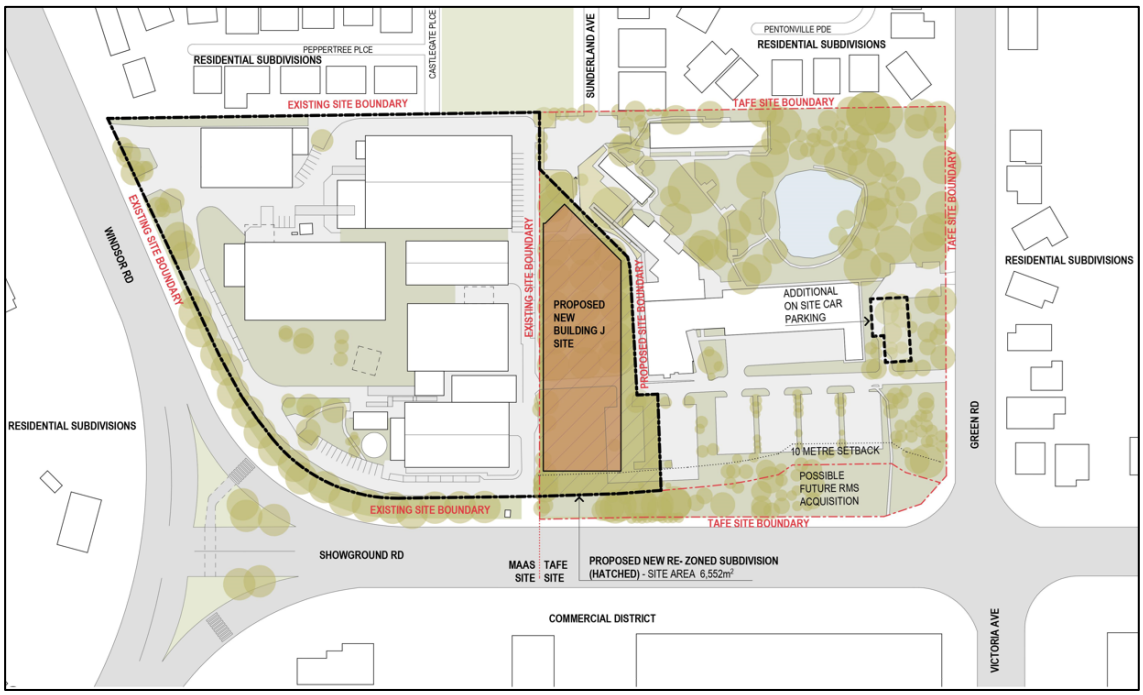

Figure 1 Existing site layout plan and proposed development site

Source: Lahznimmo Architects

1.4 Proposed development

The successful delivery of this SSD project supports a priority cultural infrastructure project and is a NSW Government 2019 election commitment (Powerhouse Precinct at Parramatta). This application will deliver a significant cultural institution for Castle Hill and The Hills Shire.

The proposed Building J will offer many opportunities for public engagement as part of a desire to increase public access to the Powerhouse collection. The renewal of the site offers a range of opportunities to increase public access including visible storage facilities, booked tours, Open Days, public and education programs, workshops, talks and other events. The facilities in Building J will serve the needs of a variety of user groups including staff, volunteers, education groups, researchers, artists, scientists, industry partners and the general public.

Further information on the proposal is provided in Section 3 of this document.

1.5 Secretary's Environmental Assessment Requirements (SEARs)

The Department of Planning, Industry and Environment (DPIE) issued a list of the Secretary's Environmental Assessment Requirements (SEARs) which inform the Environmental Impact Statement (EIS). Table 1 lists the SEARs that are specific to transport and accessibility.

Table 1 Response to SEARs

SEARs – Transport and Accessibility	Section Discussed
The EIS must be accompanied by a Traffic and Accessibility Impact Assessment (TAIA) which details, but is not limited to, the following:	
Estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycles, based on surveys of existing and similar sites	4.1
accurate details of the current daily and peak hour vehicle, existing and future public transport, pedestrian and cycle movements on the adjacent road network	4.1
adequacy of existing or future public transport infrastructure and pedestrian and bicycle networks in the vicinity of the site, and infrastructure to meet likely future demand of the proposal	4.1
proposed hours of operation, staff numbers and forecast visitor numbers by mode over a week day and weekend (including bus and coach forecasts)	2.1, 4.1, 4.2
the impact of trips generated by the development on nearby intersections, including cumulative impacts from approved developments in the vicinity. Provide SIDRA traffic modelling and analysis (current and future years) for the following intersections: Showground Road at Windsor Road Showground Road at Victoria Avenue/ Green Street.	4.3
identify and detail any upgrades to infrastructure required to improve impacts on traffic efficiency and road safety impacts associated with the proposal	4.3
details of travel demand management measures to minimise the impact on general traffic and bus operations, in consultation with Council and TfNSW, including details of a Green Travel Plan (GTP) and specific Workplace travel plan.	5
proposed access arrangements (car and bus pick-up/drop-off facilities) and measures to mitigate associated traffic impacts and impacts on public transport, pedestrian and bicycle networks	4.4, 4.7
site accessibility, including requirements for staff/ visitors, measures to address them and any priority arrangements	4.4, 4.5, 4.6,
wayfinding measures to identify direction and distance from nearby public transport	4.7, 5

SEARs – Transport and Accessibility	Section Discussed
an assessment of the cumulative demand and provision of on-site parking for staff, visitors, buses and any other parking, in accordance with relevant parking codes and Australian Standards	4.5
address any loss of informal car parking on the site and requirements of DA 1674/2007/HA	4.5
arrangements to accommodate overflow parking from weekend events in the TAFE site	4.5
proposed bicycle parking provision, including end of trip facilities	4.9
an assessment of road and pedestrian safety adjacent to the site, required road safety measures and personal safety	4.10
emergency and service vehicle access, delivery and loading arrangements and estimated movements	4.6, 4.7
a preliminary Construction Pedestrian and Traffic Management Plan (CPTMP).	6

1.6 TfNSW Planning Proposal feedback

Transport for NSW (TfNSW) provided feedback in relation to the Planning Proposal lodged for the site (5/2020/PLP) at 2 Green Road, Castle Hill which has been considered as part of this assessment. The TfNSW feedback provided and associated responses are provided in Table 2 below.

Table 2 Response to TfNSW feedback to Planning Proposal

TfNSW comment	Response
TfNSW confirms the need for retention of the road widening reservation along the site's frontage to Showground Road. Future development on the site will need to provide an appropriate setback to the existing road widening reservation. It is noted that a 10m setback will be provided to the road widening boundary for landscaping and fencing. However, TfNSW is not in a position, at present, to provide preliminary concept plans to clarify the extent of the setback required for the future widening of Showground Road and will endeavour to provide further clarification at a later stage. An amendment to Council's DCP may need to be made that outlines the need for and extent of the setback that should occur on Showground Road.	The 10m setback to the road widening boundary has been maintained as part of this application

TfNSW comment	Response
TfNSW has safety concerns regarding the turning path shown for the 19m vehicle entering and exiting the site on Windsor Road. The swept path of the largest vehicle entering and exiting the subject site, as well as manoeuvrability through the site, should be in accordance with AUSTROADS. The swept path diagrams submitted do not show the full configuration of Windsor Road including lane markings. TfNSW will require scaled swept path diagrams showing how the turning vehicles will enter and exit the site from the kerbside lane.	Scaled swept path diagrams are provided in Appendix C of this document. 19m vehicles would enter the site via Showground Road rather than Windsor Road.
More information is required in regards to proposed truck movements including frequency of trips and time of day.	This is detailed in Section 4.6 of this document
It is noted that the traffic report estimates 30% of the total estimated traffic will be entering the site by turning right from Windsor Road onto Showground Road and then changing lanes to enter the site. There is the need to clarify if the existing access on Showground Road is an entry only. Submitted plans show the access to the site on Showground Road is an existing entry only however; Section 3.2 Incoming and Outgoing Traffic Distribution in the traffic report shows the access is for entry and exit.	The Showground Road access point provides for both the entry and exit of vehicles. This is detailed further in Section 2.4 and 4.4 of this document
While it is acknowledged that the MAAS and TAFE sites are two separate developments operating under shared access and parking arrangements, there may be the need in the future to consider the closure of the entry to Showground Road. TfNSW has concerns with the location of the entry to the site in close proximity to the traffic signals at Windsor Road and the merging of traffic into different lanes approaching the Showground Road/Green Road/Victoria Road intersection. It is noted that the swept path plans provided show no trucks will be accessing the site from Showground Road therefore, the removal of this access on Showground Road will not impact the operation of the proposed warehouse.	Access off Showground Road is required to support the movement of large vehicles to the Building J loading dock. As noted in Section 4.1, the number of vehicle movements into the site is low and will not impact the operation of the adjacent road network.

1.7 State Environmental Planning Policy (Infrastructure) 2007

With regards to the State Environmental Planning Policy (Infrastructure) 2007 the following is noted:

- The site has frontages to two classified roads (Showground Road and Windsor Road), therefore triggering the assessment requirements of clause 101 of the SEPP.
- The site adjoins two roads with an annual average daily traffic volume of more than 20,000 vehicles (Showground Road and Windsor Road), therefore triggering the assessment requirements of clause 102 of the SEPP; and
- The proposal is not defined as a traffic generating development nor is it expected to impact the operation of the local road network and is therefore not considered to be 'traffic generating development' as defined under clause 104 of the SEPP (Infrastructure).

2 Existing Conditions

2.1 Operating hours

The MDC is open to the general public on Saturdays and Sundays between 10am and 4pm. Pre-booked group tours are also provided on Wednesdays, Thursdays and Fridays.

2.2 Travel behaviours

2016 Journey to Work Census data was reviewed to understand the current travel behaviours of employees working in the vicinity of the MDC site. The mode choice of employees travelling to work in Castle Hill[1] is summarised in Table 3 below. This indicates a high proportion of people that drive to work on a daily basis, with public transport accounting for less than 10% of all trips. It should be noted however that the opening of the Sydney Metro Northwest line in May 2019, subsequent to the date of the most recent Census, has significantly improved public transport accessibility to the area.

Table 3 Existing journey to work mode share of workers in Castle Hill

Mode of Travel	Mode Share
Car Driver	79%
Car Passenger	8%
Train	1%
Bus	8%
Walk Only	4%
Total	**100%**

[1] Castle Hill North SA2 115011553

2.3 Road network

The MDC site is well serviced by a network of Local, Regional and State roads as shown in Figure 2. Showground Road and Windsor Road are both State classified roads under the control of Transport for NSW and provide connectivity to the broader road network. Windsor Road provides for direct access to the M2 Motorway and serves as the primary access route to the site. Greens Road, Victoria Road and Carrington Road are all regional roads that provide a good level of road accessibility and connect with these higher order State roads.

Figure 2 Existing road network

2.4 Site access

Vehicle site access to the MDC site is currently provided via either:

- A driveway along Showground Road (Figure 3) which allows for left in / left out movements only. This serves as the primary public car park access
- A driveway along Windsor Road where traffic movements are permitted from any direction. This access is typically used by larger services vehicles and buses/coaches.
- An exit and entry driveway on Green Road into the TAFE site which also indirectly provides access to the MDC site (via security gates)

Figure 3 Showground Road vehicle site access

Figure 4 Vehicle site access options

2.5 Car parking

There are currently 54 marked parking spaces on the MDC site, which is more than sufficient to accommodate the demand generated by the maximum of 10-15 staff that are currently on site. These spaces are typically distributed around the perimeter of the existing buildings as illustrated in Figure 5 below.

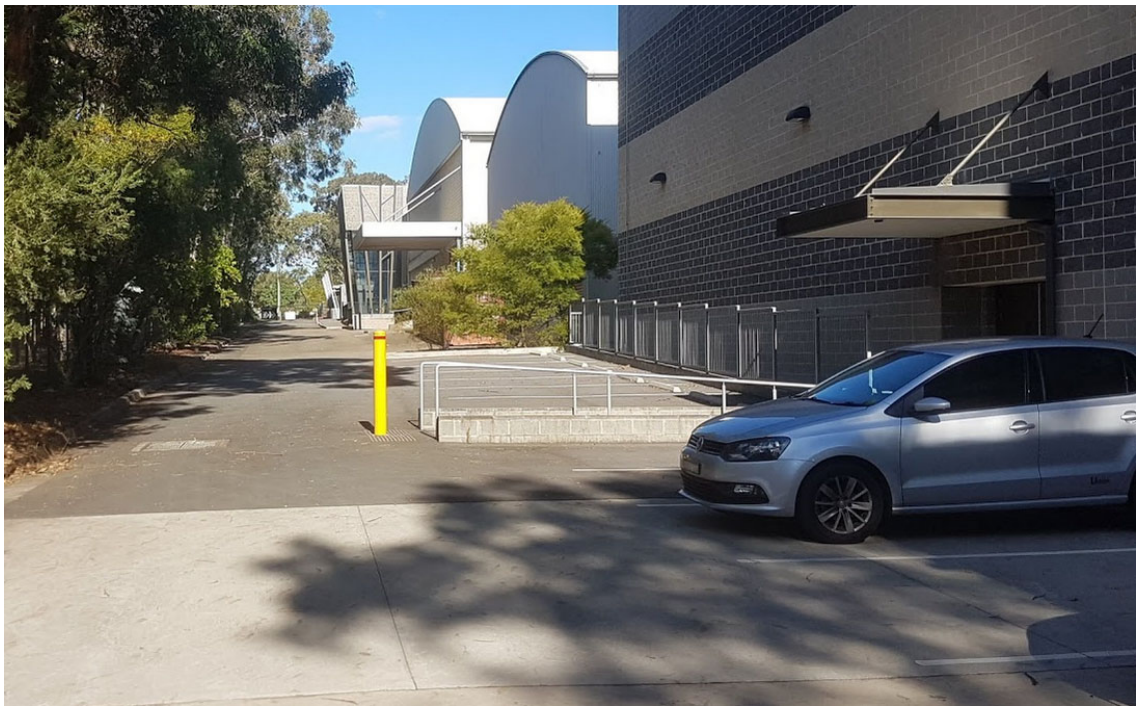

Figure 5 Existing parking areas

2.6 Public transport

Public transport to the MDC site at Castle Hill is limited to nearby bus stops or the Hills Showground metro station which is located approximately 1.6km away from the site as shown in Figure 6. The walk between the metro station and the MDC site is between 20 to 25 minutes and 1.6km in length.

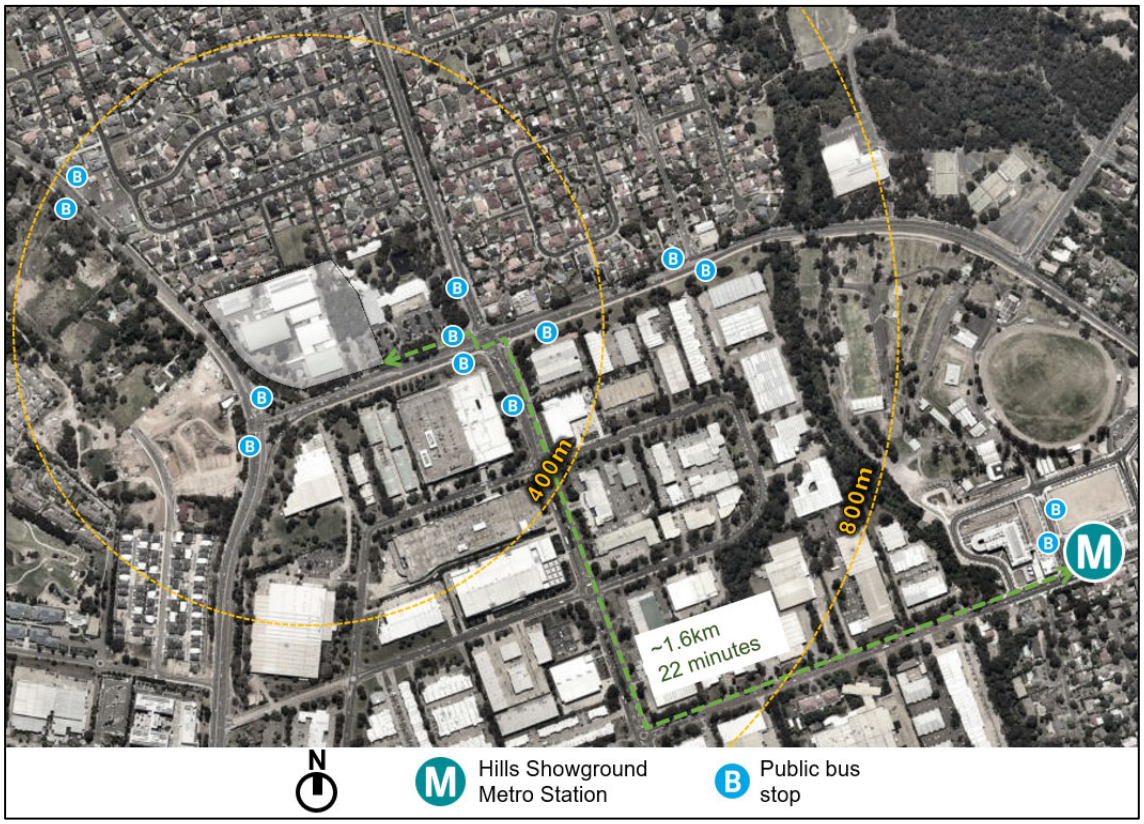

Figure 6 Existing public transport overview – Castle Hill

At Hills Showground metro station there is a bus station immediately adjacent to the entry point as shown in Figure 7. Connecting bus services from these stands through to Greens Road (adjacent to the MDC site) include:

- 601 bus route – runs every 15 minutes during peak periods
- 626 bus route – runs every 30 minutes during peak periods
- 633 bus route – runs every 20-30 minutes during peak periods
- 651 bus route – runs 20-30 minutes during peak periods

The choice of services on offer means that passengers typically would wait between five and 10 minutes for a connecting bus service from Hills Showground to the MDC site. Staff using the metro and then connecting on to a public bus service (using their Opal card) are only required to pay a fee of less than 30 cents, given the $2 Opal transfer discount on offer. Further, the connecting bus service typically takes less than five minutes and requires only a short walk to the MDC site.

Figure 7 Bus stands adjacent to Hills Showground metro station

Figure 8 Connecting bus services between Hills Showground metro and MDC

An additional option for people travelling between the MDC site and Sydney Metro stations is the Norwest On Demand service operated by CDC Hillsbus MetroConnect.

The On Demand service picks up the person travelling from an agreed pick up point to Norwest Station, Bella Vista Station or Hills Showground Station which makes it easier connecting with the Sydney Metro as well as travelling to the MDC site.

The service is available on weekdays (inclusive of public holidays that land on a weekday). The morning service is from 6:00am – 10:00am and the afternoon service is from 4:00pm – 9:00pm making it ideal for employees travelling from the MDC site to a nearby metro station, or alternatively employees living within the catchment zone to directly access the MDC site.

The area for the On Demand service is shaded in blue in Figure 9.

Figure 9 Extent of Norwest on-demand bus service

2.7 Walking and cycling

Generally walking and cycling facilities are adequate around the MDC site, with footpaths provided on most sides of surrounding streets. Pedestrians can cross Showground Road via formal pedestrian crossings at the traffic signals at either Windsor Road or Green Road.

There is a shared walking/cycling path on the southern side of Showground Road as indicated in Figure 10 below. This shared path continues along Showground Road through to the Hills Showground metro station. Other cycling facilities in the area include a shared pathway on the northern side of Carrington Road which provides connectivity with Hills Showground metro station.

Figure 10 Shared pathway – Showground Road

3 Overview of Proposal

The SSD Application seeks consent for the delivery of the MDC expansion as a single stage, comprising:

- Site preparation works, including the termination/relocation and installation of site services and infrastructure, tree removal (337 trees in total), earthworks, and the erection of site protection hoardings and fencing.
- Demolition of existing car park and vehicle accessway along the eastern and north eastern parts of the site. A new at-grade car park is proposed to be constructed on the eastern side of the TAFE site and will accommodate 24 car parking spaces to be removed from the Building J site.
- Construction of the proposed new Building J. The proposed new Building J will cater for the following uses:
    - Storage for the Powerhouse collection and archives (both collected archives and institutional archives).
    - Flexible spaces for education and public programs, workshops, talks, exhibitions and events.
    - Suites of conservation laboratories and collection work spaces.
    - Photography, digitisation and collection documentation facilities.
    - Work space for staff, researchers, industry partners and other collaborators. This will include amenities, meeting and storage rooms, collection research and study areas as well as other ancillary facilities.
    - Components of the image and research library.
    - Object and exhibition preparation, packing, quarantine and holding areas.
- Construction of new vehicle accessways to maintain connectivity to the MDC and TAFE sites.
- Subdivision of the proposed Building J site from the TAFE site including creation of right-of-carriageway easement to facilitate access over the new realigned accessway by TAFE vehicles and consolidation to form a single lot with the existing MDC site.

The proposed site plan is shown in Figure 11 below.

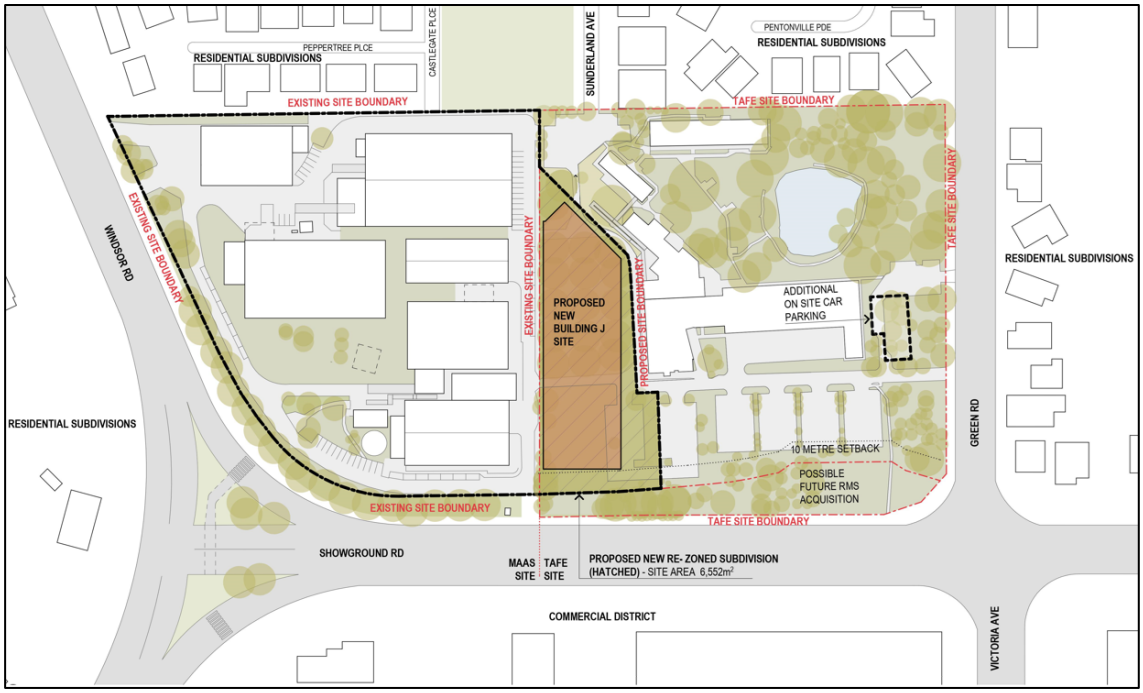

Figure 11 Proposed site plan

4 Transport Assessment

4.1 Travel demand

The MDC expansion project will provide space for up to 50 Powerhouse staff members at any one time, an increase from the current 10-15 people on site. Therefore the proposal may generate an increase of 40 employees over the course of a typical weekday. No changes are proposed to the current hours of operation of the MDC nor is the level of visitation expected to change as a result of the project – therefore weekend travel demand will not be impacted.

Table 4 summarises the forecast number of trips (all modes) made to the future building over the following time periods:

- AM peak period (6.30am – 9.30am)
- AM peak hour (8am – 9am)
- Daily[2]

This future travel demand assessment has regard for the existing travel behaviours of employees of Castle Hill, as well as the recent opening of Sydney Metro Northwest and the proposed Green Travel Plan measures as summarised in Section 5 of this document.

The proposal is anticipated to generate 40 trips over a three hour morning peak period, with approximately 50% taking place during the morning peak hour (8am-9am). In the order of 130 additional trips are forecast over the entire day.

Table 4 Total trips generated by proposal

Transport mode	Mode split	Additional trip generation		
		AM peak period (6.30am – 9.30am)	AM peak hour (8am – 9am)	Daily
Car driver	74%	30	15	99
Car passenger	7%	3	1	9
Bus	9%	4	2	12
Train / Metro	6%	2	1	8
Walk	4%	2	1	5
Total	**100%**	**40**	**20**	**133**

[2] The estimated future daily trips are based on surveys undertaken by Transport for NSW which indicates that trips generated during the AM peak hour account for approximately 15% of the daily number of person trips.

4.2 Traffic movements

As previously indicated in Table 4, the proposal may generate an additional 15 traffic movements on the adjacent road network during the critical AM peak hour period. This volume of traffic is considered negligible in the context of existing traffic flows along Windsor Road and Showground Road, which number well over 2,000 vehicles per hour. Therefore the proposal will not result in any impacts on the adjacent road network nor necessitate the requirement for any road network enhancements.

4.3 Road network impacts

In line with the requirements of the SEARs, SIDRA traffic modelling and analysis for the following intersections has been undertaken:

- Showground Road at Windsor Road
- Showground Road at Victoria Avenue/ Green Road

The following scenarios have been assessed in the SIDRA modelling:

- Current conditions – based on SCATS traffic data obtained via Transport for NSW for Thursday 4 April 2019[3]
- Future conditions – based on the travel demand estimates as previously described in Section 4.1 of this document. The distribution of traffic on the broader road network and associated increase in vehicle movements is illustrated in Figure 12 below.

Figure 12 Forecast traffic distribution

[3] Given the reduction in traffic volumes associated with the COVID-19 pandemic, it was not possible to obtain traffic volumes in 2020

Traffic modelling has been undertaken using the TfNSW approved SIDRA modelling software package. The modelling parameters used to analyse the performance of the intersections are as follows:

Level of Service (LoS) - 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 5.

Table 5 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

Degree of Saturation (DoS) - Another common measure of intersection performance is the degree of saturation, which provides an overall measure of the capability of the intersection to accommodate additional traffic.

The results of the traffic modelling are summarised in Table 6 below. Full analysis is provided as Appendix A of this document.

Table 6 Traffic modelling results

Peak Hour	Intersection	Existing Performance			Future Performance with Building J		
		AVD (sec)	DOS	LOS	AVD (sec)	DOS	LOS
AM peak hour	Showground Road / Windsor Road	24	0.81	C	25	0.81	C
	Showground Road / Victoria Avenue / Green Road	60	0.91	E	60	0.93	E
PM peak hour	Showground Road / Windsor Road	28	0.68	C	28	0.68	C
	Showground Road / Victoria Avenue / Green Road	62	0.95	E	63	0.96	E

AVD – Average vehicle delay DOS – Degree of Saturation LOS – Level of Service

The traffic modelling demonstrates that the minor increase of 30 traffic movements associated with the introduction of Building J on the site will not impact the operation of the surrounding road network. Both intersections retain their current level of service during both the AM and PM peak hours, with no additional measures required to accommodate future traffic demands.

4.4 Site access and circulation

No changes are proposed with respect to vehicle access to the MDC site, which is to remain via Showground Road (left in / left out) or Windsor Road.

Within the site vehicle circulation remains largely unchanged, with the exception of a new access gate at the northern end of the site to facilitate a connection with the adjacent TAFE site. This replaces the existing access gate which will need to be removed to facilitate the construction of Building J – thereby maintaining a vehicle connection between the two sites.

The proposed vehicle access and circulation arrangements are illustrated in Figure 13 below.

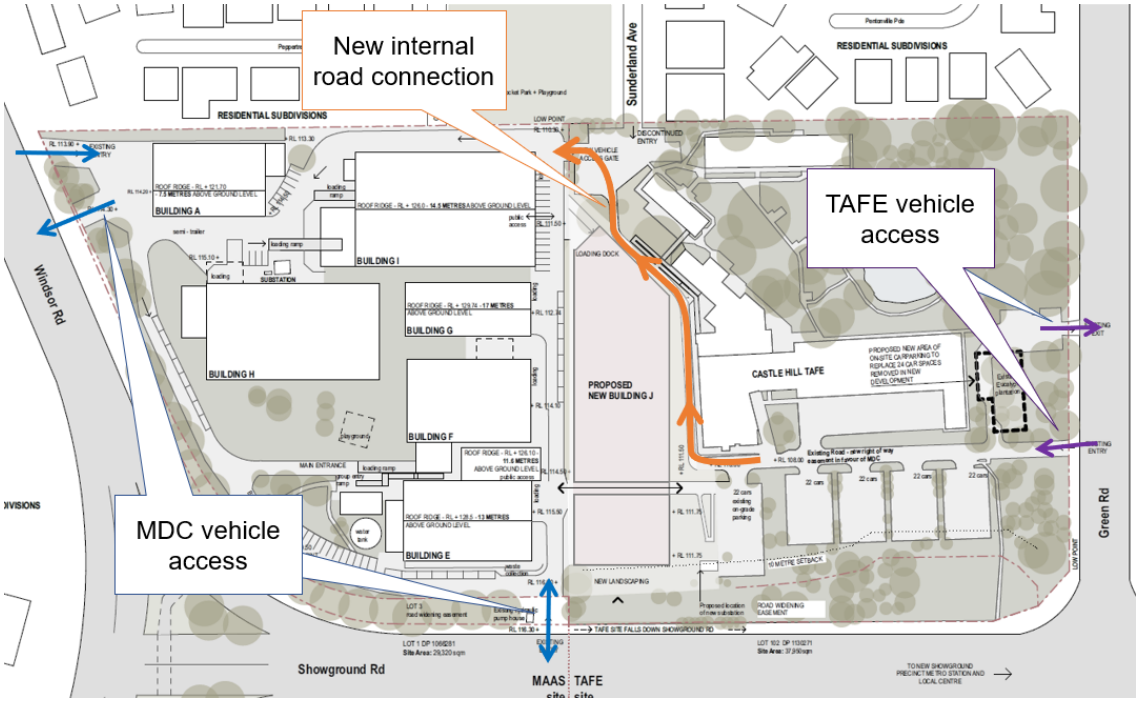

Figure 13 Proposed vehicle circulation

4.5 Car parking

4.5.1 Weekday parking demands

On the basis there are no relevant Council or Transport for NSW guidelines with respect to parking facilities for bespoke uses such as the Museum Discovery Centre, a merits based assessment has been undertaken to confirm the suitability of the on-site parking provided.

As previously noted in Table 4, approximately 25% of staff are expected to arrive to the MDC site by non-car modes. Therefore the overall parking demand generated by the 50 staff that are present on weekdays is expected to be 37 vehicles – well short of the current parking provision of 54 spaces on the site. The additional 17 spaces can be used by visitors that occasionally visit the site on weekdays or Powerhouse fleet vehicles. The existing and future parking demands generated by the site are summarised in Table 7 below.

Table 7 MDC weekday parking demands

Scenario	MDC Parking Supply	MDC Staff Numbers	MDC Parking Demand
Existing	54	15	12
Proposed		50	37

4.5.2 Weekend parking demands

For the 2017/2018 financial year the MDC welcomed 17,481 visitors. There were many reasons visitors were at the MDC including however not limited to:

- Booked group tours;
- Education tours; and
- General admission.

Excluding the free weekend, open weekend, booked group tours and education visits, there were a total of 7,767 visitors. Given the site is only open to general admission on weekends, this results in an average of approximately 80 visitors per day. Given most cars contain family groups of between 3 and 4 passengers, approximately 25 vehicles per day would arrive to the site. Even allowing for some growth in visitation due to the proposed MDC expansion, as well as the 5-10 staff on-site during weekend periods, the projected weekend parking demands are still well below the on-site parking capacity of 54 spaces.

4.5.3 TAFE car parking

The proposed Building J is to be positioned over an existing section of the TAFE parking lot occupying a total of 22 spaces. To offset the loss of these spaces, it is proposed to extend the existing car parking area at the eastern end

of the TAFE site to provide for 24 car parking spaces as identified Figure 14. The car park has been designed in accordance with Australian Standards for Off-Street Car Parking AS 2890.1 and is provided as Appendix B of this document. This would then result in a net change of 1 additional car parking spaces for the TAFE site.

It is noted that the proposal is also located on the area of the site previously identified as 'informal parking' for up to 38 parking spaces for the TAFE. Condition 2 of Development Consent No. 1674/2007/HA for the TAFE site noted the following in relation to these informal car spaces:

> **2. Carparking**
> The provision and maintenance thereafter of a total of 219 spaces comprising 181 sealed parking spaces and 38 informal spaces. Should Council's Manager Development Control determine that 22 of the 38 informal spaces are required on a permanent basis, the informal spaces are required to be sealed and available for use within an agreed time after the written request of Council.

From discussions with TAFE these spaces have never been required to be utilised to accommodate their parking needs. Further, Council has never required the permanent sealing of the 22 of the 38 informal spaces given the low actual demand for these parking spaces since approval of DA No. 1674/2007/HA on 26 September 2007. TAFE did not raise any concerns with the proposed car parking relocation within the TAFE site following a review of the Planning Proposal before lodgement with Council.

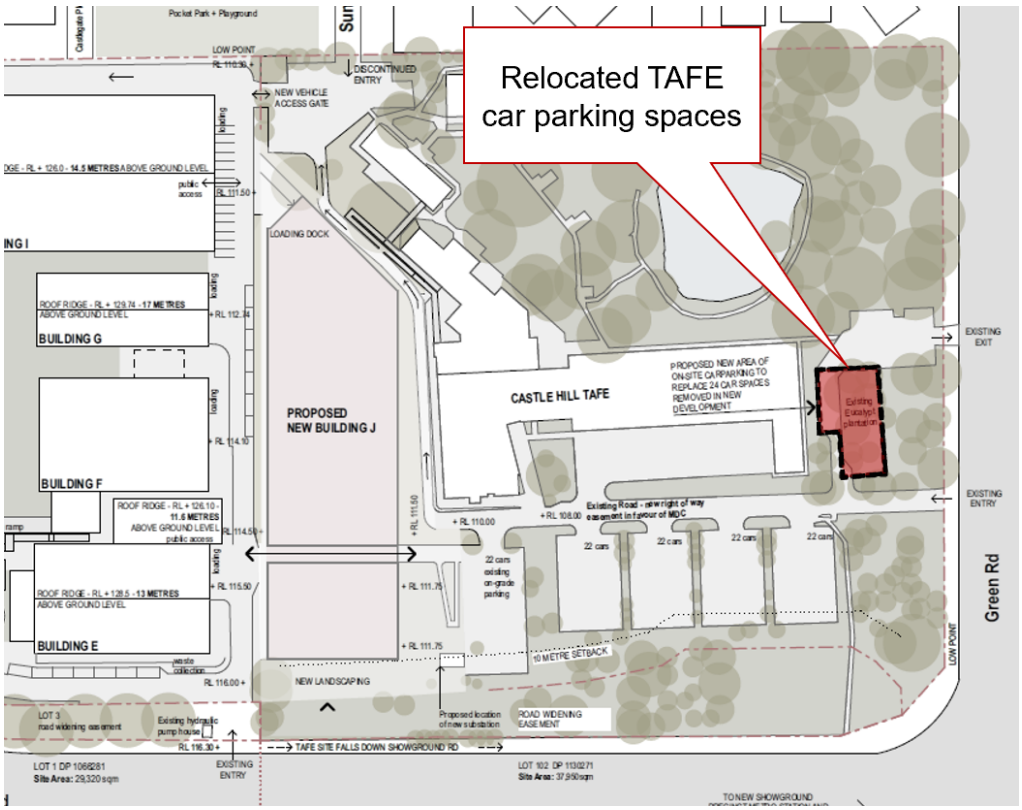

Figure 14 Proposed relocation of TAFE parking spaces

4.5.4 Weekend event parking

Four to seven times throughout the year the MDC hold ‘open days’ which attract a higher number of visitors to the site when compared with a typical weekend. On these days visitor services officers manage traffic flow and parking demand by actively directing visitors where to park on the site to maximise the number of available parking spaces. This proactive management facilitates the availability of more than 100 parking spaces within the site by more efficiently parking vehicles within existing areas. This parking provision is sufficient to accommodate the demands generated by visitors on these busier days.

For previous open days held at the MDC MAAS have provided a free shuttle bus service which operated between Hills Showground metro station and the site. The intent of this service was to reduce car dependency and provide an alternative form of access for visitors to the site.

No overflow parking is utilised in the adjacent TAFE site on weekends given the demand can be accommodated within the MDC site.

4.5.5 Bus parking

There is an existing dedicated bus parking bay provided within the site as shown in Figure 15 below. This is to be maintained as part of the future development project and will be available for use by school groups that visit the MDC site.

Figure 15 Existing bus parking bay

4.6 Servicing and loading

The proposed Building J will contain an on-site loading dock to service the building, particularly in relation to the loading/unloading of collection items. The loading dock is located at the northern end of Building J.

All vehicles will enter and exit the site in a forwards direction. Vehicles would enter the site from Showground Road and travel north within the site before reversing back into the loading dock. Vehicles exit the site via Windsor Road by travelling in an anti-clockwise direction along the existing carriageway. These arrangements, including the location of the loading dock, is shown in Figure 16 below. Detailed swept path analysis for vehicles accessing the loading dock is provided in Appendix C of this document.

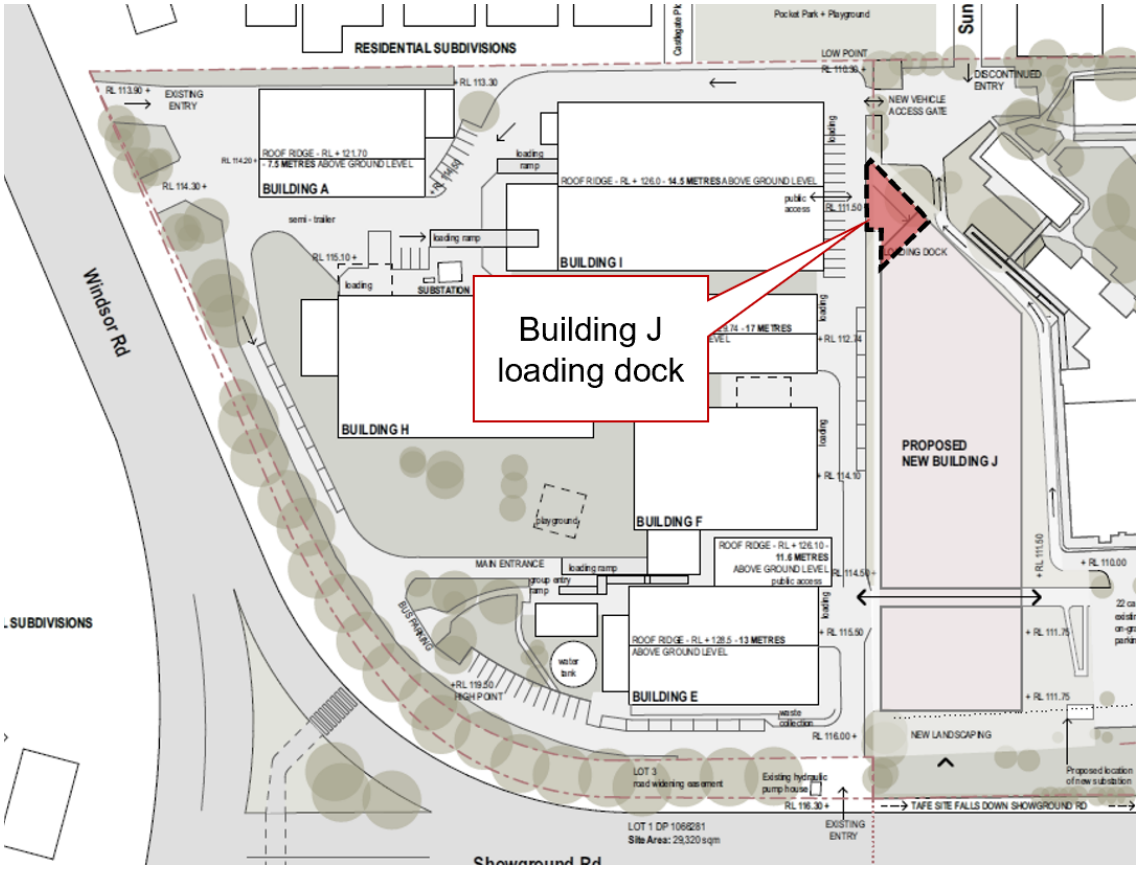

Figure 16 Building J loading dock

It is expected the site will generate (at most) 5 - 10 daily service vehicle movements, with these vehicles ranging in size from smaller vans through to 19m long semi-trailers. These movements will be distributed over the course of the day and will not impact the operation of the road network. It should also be noted that there will be numerous days where Building J will not generate any service vehicle movements at all as service vehicle activity is dependent on the exhibition program at Powerhouse Parramatta. On days where there is no changes to the exhibition spaces at Parramatta there are unlikely to be any service vehicle movements at Building J.

4.7 Emergency vehicles

Emergency vehicles will access the site via either the Showground Road or Windsor Road gates, consistent with general traffic and service vehicles. No special arrangements are required to accommodate emergency vehicle movements on the site.

4.8 Public transport

As previously noted in Section 2.6 the MDC site is serviced by a number of different bus routes as well as the recently opened Sydney Metro Northwest, with the closest station being Hills Showground. A number of initiatives are proposed in the Green Travel Plan within Section 5 of this document to take advantage of these public transport services and reduce reliance on private vehicles as a mode of access to the site.

The travel demand assessment indicates the proposal may generate an additional 20 daily trips on the public transport network, which can easily be accommodated given the extent of available services.

4.9 Bicycles

Bicycle parking for staff and visitors is to be provided on western side of building in an undercover location, adjacent to the existing security area. It should also be noted that the MDC site is already fenced off on weekdays which provides an added layer of security for parked bicycles, with access only for staff obtained via swipe card entry.

Space for five bicycles to park at any one time is to be provided which is equivalent to 10% of the total staff population. Showers and changing areas are already provided on the MDC site for use by staff who choose to ride their bikes.

4.10 Road user safety

No impacts to road user safety are expected given:

- The minor increase in traffic flows associated with the proposal;
- Retention of existing site access points; and
- Encouragement of sustainable transport modes as described in Section 5 of this document.

5 Green Travel Plan

5.1 Overview

Based on the review of existing and future conditions around both the MDC site, this section identifies the potential measures which may be introduced to promote travel by sustainable transport modes and reduce reliance on private vehicles. The measures build on the walking and public transport networks already available within and surrounding the precinct, as well as the limited on-site car parking provision, identifying measures which may be best suited to meet the needs of each site.

Transport for NSW has recently created a Travel Choices team to help develop travel action plans for businesses. As part of this program, the framework proposes to assess travel demand management is a series of four 'R's. These are remode, retime, reroute and reduce as shown in Figure 17.

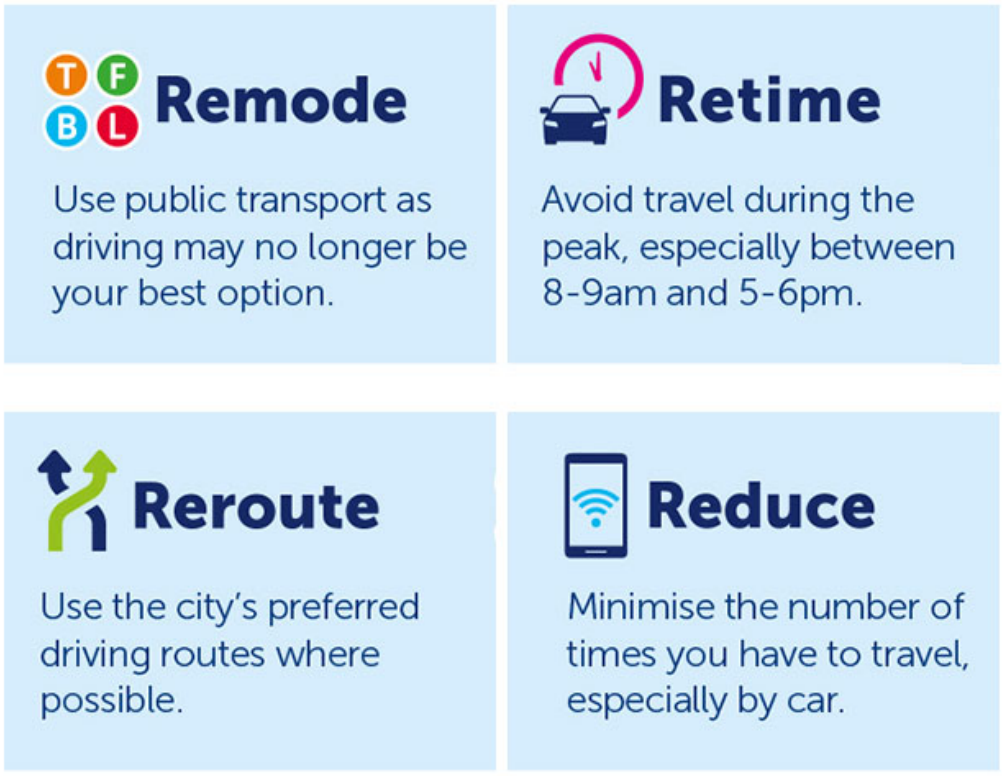

Figure 17 The four components of travel demand management

5.2 Car pooling

Car pooling is an effective means of reducing travel and parking demand by increasing the number of car journeys containing more than one occupant. Car pooling however is generally only effective when incentives are provided to staff that do car pool. Powerhouse could encourage car pooling to travel to work (at the MDC at Castle Hill) by:

- Holding a staff event and providing information around the option of car pooling, including the opportunity for staff members to 'pair up' based on their home location and travel preferences (as part of the annual travel morning tea information session as described in Section 5.4); and
- Providing incentives for those that car pool, e.g. priority parking within the site or coffee / lunch vouchers

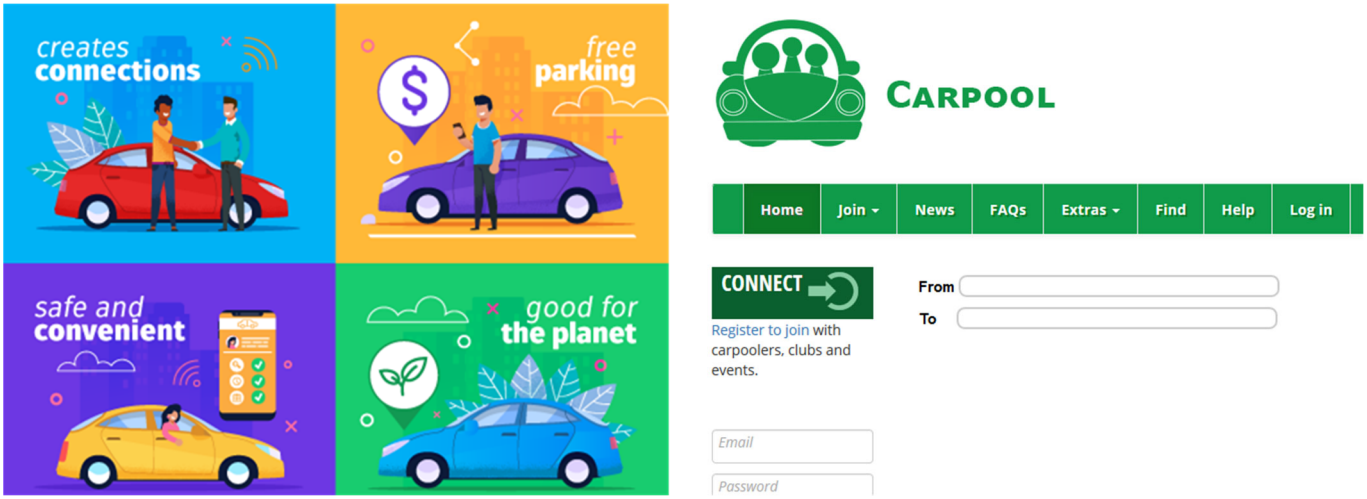

Figure 18 Existing car pooling websites

5.3 Cycling

Cycling may only be a viable mode of transport for a relatively small proportion of staff, however it can still contribute to reducing traffic and parking demands for Powerhouse sites. It may be a convenient way for staff to travel between the Hills Showground metro station and the MDC site, which will take just over five minutes on a bike compared to a 25 minute walk.

A number of organisations provide 'pool bikes' for their staff to use for travel during the day. Powerhouse could consider purchasing 2-3 bikes for staff to use during the day, including potential e-bikes which require less effort than traditional bicycles. Staff members can then be provided the option of using the bikes to travel to/from the Hills Showground metro station, leaving it parked overnight in the secure parking area. Examples of organisations that have purchased e-bikes and allow their staff to use them for trips to/from work include City of Sydney Council, North Sydney Council and Bangarra Dance Company.

Figure 19 City of Sydney and North Sydney Council pool bike schemes

On-site facilities for cyclists such as bicycle parking (in a secure and undercover area) supported by lockers, showers and change-rooms should be provided as part of the future development of the MDC. This will enable use of bicycles as a means of travel to the site, including from nearby public transport stops.

Other measures for consideration to be implemented by Powerhouse to encourage cycling include the following:

- Supply a workplace toolkit-this can consist of puncture repair equipment, a bike pump, a spare lock and lights
- Provide local cycle maps to staff (included within the ‘Transport Access Guide’ as described in Section 5.4 of this document).
- Participate in annual events such as 'Ride to Work Day' and ‘Sydney Rides Festival’
- Make staff aware of public transport cycling carriage policies and cycle storage facilities at rail / metro stations
- Encourage staff interested in cycling to connect with other more confident and experienced riders to provide further encouragement or advice
- Provide cycle safety training courses (provided by others) for staff to improve cycling confidence.

5.4 General marketing and promotion

The objectives of the transport strategy will only be achieved with the buy in and support of Powerhouse employees. Marketing the benefits and promoting the sustainable alternatives available are therefore crucial in encouraging staff to adopt the proposed measures. It is important staff are made aware of the travel options available to them.

In addition to raising general awareness, any successes achieved will be fully publicised to staff in order to motivate them to use sustainable modes of transport. For example on the Powerhouse worker intranet page staff could be given information about how others travel which has the effect of 'normalising' public transport use – see Figure 20 for an example of this.

Case studies are another powerful tool in promoting sustainable travel modes, highlighting success stories of how certain staff members have successfully changed their travel arrangements. For example "*Lisa catches the metro to Hills Showground station and then hops on the 609 bus. Her commute time has remain largely unchanged as she avoids the traffic and avoids the stress of having to navigate her way through peak traffic"*

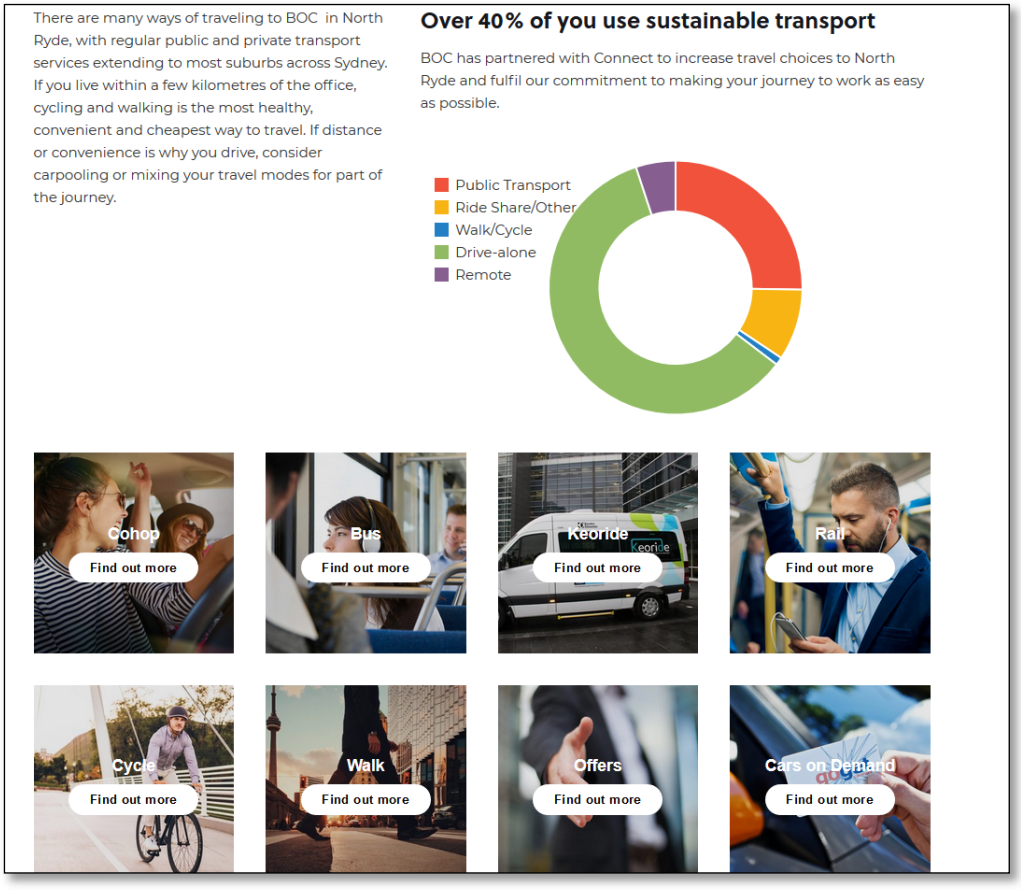

Figure 20 Example of promotion of travel plan

Source: BOC Macquarie Park

It is important that Powerhouse workers are made aware of the travel choices available to them when they first commence work. A common issue experienced across workplaces is that employees are unaware of the travel options available to them, and instead default to their existing habits of driving private vehicles. Mechanisms for providing this information to staff include:

- Incorporating travel information as part of the staff induction process so new staff members are aware of the travel choices available to them. This would also include a tour of the office to include visit cycle parking areas and shower and changing facilities.
- Holding an annual morning tea / lunchtime presentation to describe the travel options available to staff and facilities offered to enable travel by sustainable transport modes. This forum also provides an opportunity to allow staff interested in car pooling to connect with other like-minded staff members, as well as get up to date on the latest transport developments in the area.
- Development of a 'Transport Access Guide' (TAG) which is a physical flyer provided to all staff members on their commencement date. The TAG contains critical travel information including key public transport routes, travel options available to staff and travel planning apps. This information would also be available via a staff intranet page.

Figure 21 Example Transport Access Guide (TAG)

Source: Connect Macquarie Park

5.5 Workplace challenges

Workplace travel challenges can create a culture where sustainable transport options are normalised and celebrated. This may culminate at the annual travel morning tea information session where awards are handed out to staff members. There are already a number of existing challenges (see Figure 22) which Powerhouse staff could participate in. These would be promoted internally to staff and help encourage use of sustainable travel modes – particularly taking advantage of the walk or cycle between Hills Showground and the MDC.

Figure 22 Existing workplace challenges

5.6 Public transport

To promote the availability of public transport to/from the site, it is recommended that:

- Consideration be given to the provision of static wayfinding signage within the site to support pedestrian and cyclist movements to/from public transport stops.
- Providing public transport information to visitors on the MDC website informing them of the available access options.

5.7 Reducing the need to travel

To ensure that sustainable transport options are promoted to staff when making journeys for work purposes, and to reduce the need to travel, the following measures should be implemented.

- Providing for 'default flexibility' for all staff – not just permitting but encouraging more flexible working hours or locations. This involves creating a culture whereby a staff member is not required to provide an excuse to work flexibility or from home, instead it is accepted as normal practice. This contributes to reducing the overall travel demand generated by the sites.
- Active promotion of the video-conferencing facilities as an alternative to face to face meetings.
- Currently the highest travel demand occurs in the peak periods between 7am and 9am and 4pm to 6pm. Public Transport services are in lower demand during the inter peak and off peak and also the road congestion is lower. Powerhouse employees could be encouraged, where practical, to arrive at work and leave work during the shoulders of the peak e.g. start work at 10am and finish at 6.30 pm or start at 7am and finish at 3.30pm.

6 Preliminary Construction Pedestrian Traffic Management Plan

6.1 Overview

This section details an outline Construction Pedestrian and Traffic Management Plan (CPTMP) for the proposed development of Building J on the MDC site. The purpose of the CPTMP is to assess the proposed access and operation of construction traffic associated with the proposed development with respect to safety and capacity. The Contractor (once appointed) will prepare a more detailed CPTMP prior to the commencement of works on the site. This plan will contain additional information to that presented in this document such as:

- Site compound locations
- Driver facility areas
- Crane locations
- Vehicle turning paths
- Traffic control plans including location of traffic controllers, site fencing/hoarding and other management measures

6.2 Working hours and construction timeframe

Typically works will be undertaken during standard Council hours of between 7am and 5pm Monday to Friday, and 7am and 3pm on Saturdays. No work is permitted to be carried out on Sundays or public holidays.

The construction works are expected to take approximately 18 months to two years to complete. It is anticipated construction will commence sometime in the first half of 2021 and conclude in the second half of 2022.

6.3 Construction vehicle types

Given the nature of the works the largest vehicles expected to access the site during standard construction hours will generally be 12.5m Heavy Rigid Vehicles (HRVs) and 8.8m Medium Rigid Vehicles (MRVs). On occasions through the construction period larger 19m long semi-trailers may also be required to access the site.

6.4 Work zones

All construction vehicles will be unloaded within the existing site, with no vehicle loading / unloading to occur outside of the boundary on public streets. No on-street works zones are proposed as part of the construction works.

6.5 Construction traffic volumes

The number of daily construction vehicles accessing the site is expected to be low – in the order of 40 to 50 vehicles per day. This equates to a small number of hourly movements of up to eight vehicles travelling to or from the site. Given this small number of construction vehicles the impact on the operation of the adjacent road network associated with the project is considered negligible.

6.6 Construction vehicle site access

Access for construction vehicles will be via the existing vehicle driveway on Showground Road, with movements to be maintained as left in – left out only. Construction vehicle access will be fully separated with general MDC access, with staff and visitors to be directed to access the site via Windsor Road. These proposed access arrangements are shown in Figure 23.

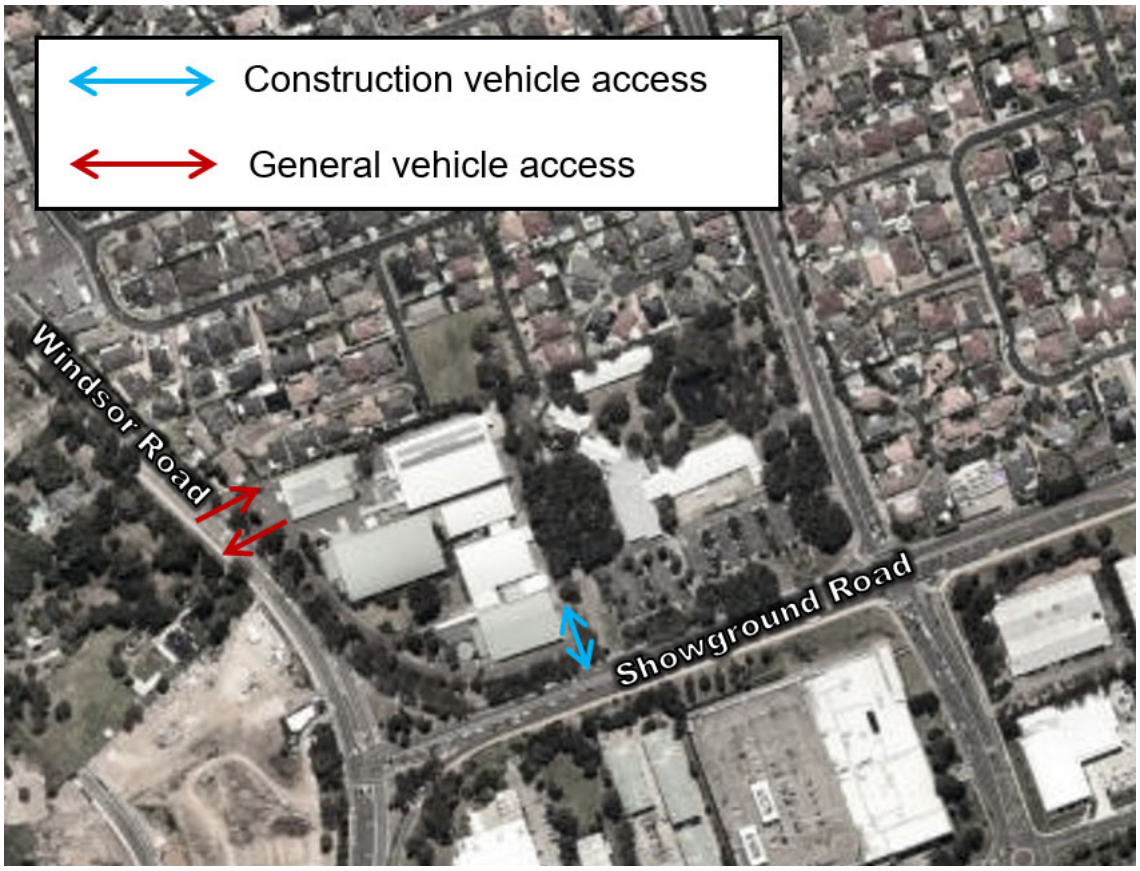

Figure 23 Construction vehicle site access

6.7 Construction vehicle routes

The proposed construction vehicle access routes to the site are illustrated in Figure 24 below. Construction vehicle routes have been selected to align with key arterial roads such as the M2 Motorway, Windsor Road and Old Windsor Road. All vehicles will turn right from Bridge Street into Phillip Street to access the site, with left turn out from Phillip Street onto Bridge Street when exiting.

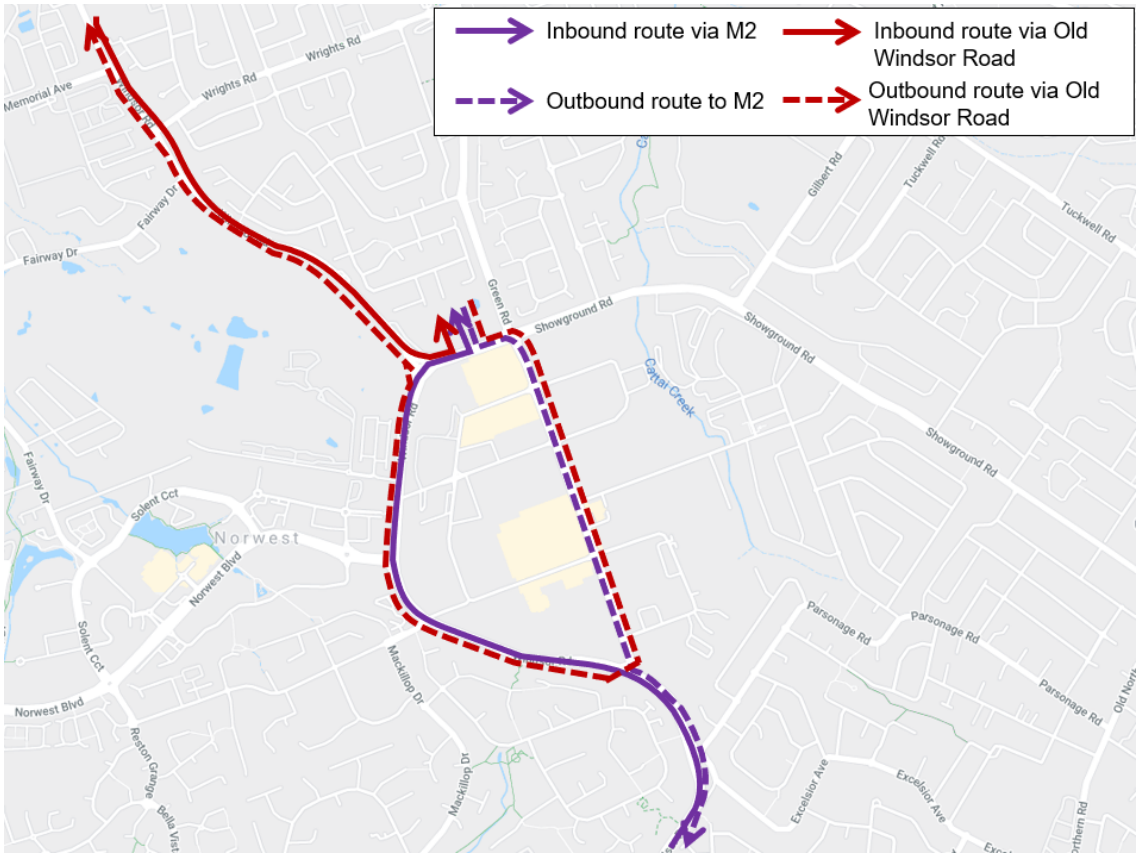

Figure 24 Construction vehicle routes

6.8 Parking

Some parking for construction workers will be available within the site, with the amount of spaces to be confirmed following the appointment of the contractor and noted in the detailed CPTMP to be prepared prior to the start of construction. There will also be potential for construction workers to utilise the 54 existing parking spaces on the MDC site, given there is currently spare capacity as only 10-15 workers attend the site on a daily basis.

Given the location of the site in proximity to the Hills Showground metro station, workers will also be encouraged to use public transport as a means of access.

6.9 Pedestrians and cyclists

At this stage it is not envisaged that any footpath closures will be required to facilitate the construction project. No impacts to existing cycling routes are anticipated as a result of the construction works.

6.10 Mitigation measures

Construction traffic will generally be managed in the following way:

- Designated transport routes will be communicated to all personal, and enforced;
- Designated peak hour and non-peak hour delivery vehicle waiting areas;
- Strict scheduling of vehicle movement will occur to minimise off site waiting times;
- Vehicle movements will be compliant with conditions of Consent and broader road-use regulations, particularly with regard to hours of work, materials loading and unloading, and over size deliveries and installation
- Stakeholder feedback will be obtained throughout the construction period
- Activities related to the construction works would not impede traffic flow along adjacent roads;

7 Summary

This report has been prepared by JMT Consulting on behalf of Create Infrastructure to consider the transport implications of the proposed expansion of the Museums Discovery Centre (MDC) site at 2 Green Road, Castle Hill. The proposal includes the construction of Building J on the site which will accommodate a range of uses including storage for the Powerhouse collection and archives as well as flexible spaces for education and public programs, workshops, talks, exhibitions and events.

Key findings arising from the transport assessment are as follows:

- The proposal is anticipated to generate only a small number of additional trips during the three hour morning peak period – approximately 40 in total of which 30 would be by private vehicle.
- Traffic modelling demonstrates that the minor increase of 30 traffic movements associated with the introduction of Building J on the site will not impact the operation of the surrounding road network.
- No changes are proposed with respect to vehicle access to the MDC site, which is to remain via Showground Road (left in / left out) or Windsor Road.
- There is sufficient parking on the site to accommodate the increased demand generated by staff on weekdays.
- Weekend parking demand will remain unchanged as a result of the proposal, with sufficient parking capacity available to accommodate likely demands.
- To offset the loss of 22 car parking spaces as a result of the new Building J, it is proposed to extend the existing car parking area at the eastern end of the TAFE site to provide for an additional 24 car parking spaces.
- The proposed Building J will contain an on-site loading dock to service the building, particularly in relation to the loading/unloading of collection items.
- Bicycle parking for staff and visitors is to be provided on western side of building in an undercover location.
- A green travel plan has been prepared to promote travel by sustainable transport modes and reduce reliance on private vehicles – taking advantage of the available public transport including the nearby Hills Showground metro station.

It is therefore concluded that the transport impacts arising from the proposal are minimal and can be managed by existing facilities within the site as well as the external transport network.

Appendix A: Traffic Modelling Outputs

MOVEMENT SUMMARY

Site: 101 [AM Existing (Site Folder: Windsor - Showground)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
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: Windsor Road (S)														
2	T1	411	0.0	411	0.0	0.144	5.0	LOS A	3.5	24.4	0.32	0.27	0.32	55.5
3	R2	368	0.0	368	0.0	*0.779	58.2	LOS E	15.7	110.2	0.97	0.86	1.06	30.6
Approach		779	0.0	779	0.0	0.779	30.1	LOS C	15.7	110.2	0.63	0.55	0.67	40.1
East: Showground Road														
4	L2	718	0.0	718	0.0	0.387	11.2	LOS B	0.0	0.0	0.00	0.53	0.00	54.8
6	R2	463	0.0	463	0.0	*0.748	60.0	LOS E	13.6	95.2	1.00	0.87	1.09	30.0
Approach		1181	0.0	1181	0.0	0.748	30.3	LOS C	13.6	95.2	0.39	0.66	0.43	41.5
North: Windsor Road (N)														
7	L2	855	0.0	855	0.0	0.460	5.8	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
8	T1	1578	0.0	1578	0.0	*0.809	27.2	LOS C	38.6	270.5	0.91	0.84	0.91	41.6
Approach		2433	0.0	2433	0.0	0.809	19.7	LOS B	38.6	270.5	0.59	0.73	0.59	45.4
All Vehicles		4393	0.0	4393	0.0	0.809	24.4	LOS C	38.6	270.5	0.54	0.68	0.56	43.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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: Windsor Road (S)												
P1	Full	50	50	54.3	LOS E	0.2	0.2	0.95	0.95	90.5	47.1	0.52
East: Showground Road												
P2	Full	50	50	54.3	LOS E	0.2	0.2	0.95	0.95	85.4	40.5	0.47
All Pedestrians		100	100	54.3	LOS E	0.2	0.2	0.95	0.95	88.0	43.8	0.50

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 [AM w Building J (Site Folder: Windsor - Showground)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
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: Windsor Road (S)														
2	T1	421	0.0	421	0.0	0.147	5.0	LOS A	3.6	25.1	0.32	0.27	0.32	55.5
3	R2	383	0.0	383	0.0	* 0.811	59.6	LOS E	16.8	117.6	0.97	0.87	1.09	30.3
Approach		804	0.0	804	0.0	0.811	31.0	LOS C	16.8	117.6	0.63	0.56	0.68	39.8
East: Showground Road														
4	L2	718	0.0	718	0.0	0.387	11.2	LOS B	0.0	0.0	0.00	0.53	0.00	54.8
6	R2	463	0.0	463	0.0	* 0.748	60.0	LOS E	13.6	95.2	1.00	0.87	1.09	30.0
Approach		1181	0.0	1181	0.0	0.748	30.3	LOS C	13.6	95.2	0.39	0.66	0.43	41.5
North: Windsor Road (N)														
7	L2	855	0.0	855	0.0	0.460	5.8	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
8	T1	1578	0.0	1578	0.0	* 0.809	27.2	LOS C	38.6	270.5	0.91	0.84	0.91	41.6
Approach		2433	0.0	2433	0.0	0.809	19.7	LOS B	38.6	270.5	0.59	0.73	0.59	45.4
All Vehicles		4418	0.0	4418	0.0	0.811	24.6	LOS C	38.6	270.5	0.54	0.68	0.57	43.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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: Windsor Road (S)												
P1	Full	50	50	54.3	LOS E	0.2	0.2	0.95	0.95	90.5	47.1	0.52
East: Showground Road												
P2	Full	50	50	54.3	LOS E	0.2	0.2	0.95	0.95	85.4	40.5	0.47
All Pedestrians		100	100	54.3	LOS E	0.2	0.2	0.95	0.95	88.0	43.8	0.50

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 [PM Existing (Site Folder: Windsor - Showground)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
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: Windsor Road (S)														
2	T1	1300	0.0	1300	0.0	0.571	16.5	LOS B	23.4	163.7	0.68	0.61	0.68	47.3
3	R2	466	0.0	466	0.0	*0.678	47.0	LOS D	17.7	124.0	0.92	0.82	0.92	33.7
Approach		1766	0.0	1766	0.0	0.678	24.6	LOS C	23.4	163.7	0.74	0.67	0.74	42.7
East: Showground Road														
4	L2	422	0.0	422	0.0	0.227	6.5	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
6	R2	786	0.0	786	0.0	*0.668	43.9	LOS D	20.0	139.7	0.93	0.85	0.93	34.6
Approach		1208	0.0	1208	0.0	0.668	30.8	LOS C	20.0	139.7	0.60	0.74	0.60	39.8
North: Windsor Road (N)														
7	L2	377	0.0	377	0.0	0.203	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
8	T1	688	0.0	688	0.0	*0.662	42.3	LOS D	18.0	126.1	0.95	0.81	0.95	35.5
Approach		1065	0.0	1065	0.0	0.662	29.4	LOS C	18.0	126.1	0.61	0.71	0.61	40.6
All Vehicles		4039	0.0	4039	0.0	0.678	27.7	LOS C	23.4	163.7	0.67	0.70	0.67	41.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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: Windsor Road (S)												
P1	Full	50	50	54.3	LOS E	0.2	0.2	0.95	0.95	90.5	47.1	0.52
East: Showground Road												
P2	Full	50	50	54.3	LOS E	0.2	0.2	0.95	0.95	85.4	40.5	0.47
All Pedestrians		100	100	54.3	LOS E	0.2	0.2	0.95	0.95	88.0	43.8	0.50

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 [PM w Building J (Site Folder: Windsor - Showground)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
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: Windsor Road (S)														
2	T1	1300	0.0	1300	0.0	0.571	16.5	LOS B	23.4	163.7	0.68	0.61	0.68	47.3
3	R2	466	0.0	466	0.0	* 0.658	46.0	LOS D	17.5	122.4	0.91	0.82	0.91	34.0
Approach		1766	0.0	1766	0.0	0.658	24.3	LOS C	23.4	163.7	0.74	0.67	0.74	42.9
East: Showground Road														
4	L2	422	0.0	422	0.0	0.227	6.5	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
6	R2	786	0.0	786	0.0	* 0.668	43.9	LOS D	20.0	139.7	0.93	0.85	0.93	34.6
Approach		1208	0.0	1208	0.0	0.668	30.8	LOS C	20.0	139.7	0.60	0.74	0.60	39.8
North: Windsor Road (N)														
7	L2	377	0.0	377	0.0	0.203	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
8	T1	678	0.0	678	0.0	* 0.673	43.2	LOS D	17.9	125.4	0.96	0.82	0.96	35.2
Approach		1055	0.0	1055	0.0	0.673	29.8	LOS C	17.9	125.4	0.61	0.72	0.61	40.4
All Vehicles		4029	0.0	4029	0.0	0.673	27.7	LOS C	23.4	163.7	0.66	0.70	0.66	41.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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: Windsor Road (S)												
P1	Full	50	50	54.3	LOS E	0.2	0.2	0.95	0.95	90.5	47.1	0.52
East: Showground Road												
P2	Full	50	50	54.3	LOS E	0.2	0.2	0.95	0.95	85.4	40.5	0.47
All Pedestrians		100	100	54.3	LOS E	0.2	0.2	0.95	0.95	88.0	43.8	0.50

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 [AM Existing (Site Folder: Windsor - Victoria)]

Showground - Victoria
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)
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: Victoria Ave (S)														
1	L2	85	0.0	85	0.0	0.131	23.0	LOS B	2.3	15.9	0.71	0.72	0.71	37.1
2	T1	285	0.0	285	0.0	0.238	38.6	LOS C	7.2	50.3	0.79	0.65	0.79	30.7
3	R2	85	0.0	85	0.0	0.493	72.8	LOS F	5.7	40.0	0.99	0.78	0.99	21.3
Approach		455	0.0	455	0.0	0.493	42.1	LOS C	7.2	50.3	0.81	0.69	0.81	29.2
East: Showground Road (E)														
4	L2	112	0.0	112	0.0	0.863	47.6	LOS D	32.0	224.3	0.99	1.01	1.09	29.4
5	T1	1047	0.0	1047	0.0	*0.863	41.3	LOS C	32.0	224.3	1.00	1.01	1.09	35.8
6	R2	85	0.0	85	0.0	0.146	60.6	LOS E	2.5	17.6	0.90	0.73	0.90	29.8
Approach		1244	0.0	1244	0.0	0.863	43.2	LOS D	32.0	224.3	0.99	0.99	1.08	34.8
North: Green Road (N)														
7	L2	116	0.0	116	0.0	*0.878	69.4	LOS E	37.6	262.9	1.00	1.03	1.14	28.7
8	T1	865	0.0	865	0.0	*0.878	60.9	LOS E	37.6	262.9	0.98	1.01	1.14	23.8
9	R2	156	0.0	156	0.0	*0.905	88.6	LOS F	12.3	85.9	1.00	1.02	1.47	24.4
Approach		1137	0.0	1137	0.0	0.905	65.6	LOS E	37.6	262.9	0.99	1.01	1.19	24.5
West: Showground Road (W)														
10	L2	89	0.0	89	0.0	0.938	84.3	LOS F	41.8	292.3	1.00	1.15	1.34	26.0
11	T1	905	0.0	905	0.0	0.938	78.7	LOS F	41.9	293.3	1.00	1.15	1.34	26.2
12	R2	133	0.0	133	0.0	*0.836	87.1	LOS F	5.0	35.3	1.00	0.91	1.41	18.8
Approach		1127	0.0	1127	0.0	0.938	80.2	LOS F	41.9	293.3	1.00	1.12	1.35	25.4
All Vehicles		3963	0.0	3963	0.0	0.938	60.0	LOS E	41.9	293.3	0.97	1.00	1.16	28.1

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: Victoria Ave (S)												
P1	Full	50	50	35.8	LOS D	0.1	0.1	0.92	0.92	209.1	225.4	1.08
East: Showground Road (E)												
P2	Full	50	50	64.3	LOS F	0.2	0.2	0.96	0.96	235.6	222.8	0.95
North: Green Road (N)												

MOVEMENT SUMMARY

Site: 101 [AM w Building J (Site Folder: Windsor - Victoria)]

Showground - Victoria
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)
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: Victoria Ave (S)														
1	L2	88	0.0	88	0.0	0.135	23.0	LOS B	2.4	16.5	0.72	0.73	0.72	37.1
2	T1	285	0.0	285	0.0	0.244	39.4	LOS C	7.3	50.9	0.80	0.65	0.80	30.4
3	R2	85	0.0	85	0.0	0.458	71.5	LOS F	5.6	39.5	0.99	0.78	0.99	21.5
Approach		458	0.0	458	0.0	0.458	42.2	LOS C	7.3	50.9	0.82	0.69	0.82	29.1
East: Showground Road (E)														
4	L2	112	0.0	112	0.0	0.886	51.7	LOS D	33.8	236.5	1.00	1.05	1.14	28.0
5	T1	1053	0.0	1053	0.0	*0.886	45.3	LOS D	33.8	236.5	1.00	1.04	1.14	34.4
6	R2	85	0.0	85	0.0	0.153	61.6	LOS E	2.5	17.8	0.91	0.74	0.91	29.5
Approach		1250	0.0	1250	0.0	0.886	47.0	LOS D	33.8	236.5	0.99	1.02	1.13	33.6
North: Green Road (N)														
7	L2	116	0.0	116	0.0	*0.899	74.6	LOS F	39.4	275.9	1.00	1.07	1.19	27.6
8	T1	865	0.0	865	0.0	*0.899	66.1	LOS E	39.4	275.9	0.99	1.05	1.20	22.6
9	R2	162	0.0	162	0.0	*0.872	83.6	LOS F	12.3	86.0	1.00	0.97	1.35	25.2
Approach		1143	0.0	1143	0.0	0.899	69.5	LOS E	39.4	275.9	0.99	1.04	1.22	23.7
West: Showground Road (W)														
10	L2	89	0.0	89	0.0	0.914	75.2	LOS F	39.0	272.8	1.00	1.08	1.25	27.8
11	T1	905	0.0	905	0.0	0.914	69.6	LOS E	39.2	274.1	1.00	1.08	1.25	28.1
12	R2	133	0.0	133	0.0	*0.716	82.4	LOS F	4.9	34.0	1.00	0.83	1.17	19.5
Approach		1127	0.0	1127	0.0	0.914	71.6	LOS F	39.2	274.1	1.00	1.05	1.24	27.1
All Vehicles		3978	0.0	3978	0.0	0.914	59.9	LOS E	39.4	275.9	0.97	1.00	1.15	28.2

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: Victoria Ave (S)												
P1	Full	50	50	35.8	LOS D	0.1	0.1	0.92	0.92	209.1	225.4	1.08
East: Showground Road (E)												
P2	Full	50	50	64.3	LOS F	0.2	0.2	0.96	0.96	235.6	222.8	0.95
North: Green Road (N)												

MOVEMENT SUMMARY

Site: 101 [PM Existing (Site Folder: Windsor - Victoria)]

Showground - Victoria
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)
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: Victoria Ave (S)														
1	L2	380	0.0	380	0.0	*0.700	30.5	LOS C	14.4	100.8	0.95	0.84	0.95	33.2
2	T1	939	0.0	939	0.0	0.824	50.3	LOS D	29.4	206.0	1.00	0.94	1.08	26.7
3	R2	233	0.0	233	0.0	*0.906	80.9	LOS F	17.2	120.5	1.00	1.02	1.42	19.9
Approach		1552	0.0	1552	0.0	0.906	50.0	LOS D	29.4	206.0	0.99	0.93	1.10	26.6
East: Showground Road (E)														
4	L2	158	0.0	158	0.0	0.918	58.1	LOS E	33.9	237.1	1.00	1.15	1.24	25.9
5	T1	1063	0.0	1063	0.0	*0.918	51.9	LOS D	33.9	237.1	1.00	1.14	1.24	32.4
6	R2	268	0.0	268	0.0	0.375	55.2	LOS D	7.5	52.2	0.92	0.79	0.92	31.2
Approach		1489	0.0	1489	0.0	0.918	53.2	LOS D	33.9	237.1	0.99	1.08	1.18	31.6
North: Green Road (N)														
7	L2	150	0.0	150	0.0	*0.904	75.0	LOS F	27.5	192.2	1.00	1.11	1.30	27.3
8	T1	600	0.0	600	0.0	*0.904	68.9	LOS E	27.5	192.2	1.00	1.09	1.31	22.0
9	R2	83	0.0	83	0.0	0.726	75.8	LOS F	5.6	39.2	1.00	0.84	1.17	26.6
Approach		833	0.0	833	0.0	0.904	70.7	LOS F	27.5	192.2	1.00	1.07	1.29	23.6
West: Showground Road (W)														
10	L2	79	0.0	79	0.0	0.952	93.1	LOS F	41.7	292.0	1.00	1.24	1.44	24.5
11	T1	922	0.0	922	0.0	0.952	84.4	LOS F	41.7	292.2	1.00	1.23	1.44	25.2
12	R2	154	0.0	154	0.0	0.539	70.8	LOS F	4.9	34.5	1.00	0.77	1.00	21.6
Approach		1155	0.0	1155	0.0	0.952	83.2	LOS F	41.7	292.2	1.00	1.17	1.38	24.8
All Vehicles		5029	0.0	5029	0.0	0.952	62.0	LOS E	41.7	292.2	0.99	1.05	1.22	27.0

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: Victoria Ave (S)												
P1	Full	50	50	29.3	LOS C	0.1	0.1	0.91	0.91	202.7	225.4	1.11
East: Showground Road (E)												
P2	Full	50	50	59.3	LOS E	0.2	0.2	0.96	0.96	230.6	222.8	0.97
North: Green Road (N)												

MOVEMENT SUMMARY

Site: 101 [PM w Building J (Site Folder: Windsor - Victoria)]

Showground - Victoria
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)
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: Victoria Ave (S)														
1	L2	380	0.0	380	0.0	*0.700	30.5	LOS C	14.4	100.8	0.95	0.84	0.95	33.2
2	T1	939	0.0	939	0.0	0.824	50.3	LOS D	29.4	206.0	1.00	0.94	1.08	26.7
3	R2	233	0.0	233	0.0	*0.959	98.8	LOS F	19.5	136.4	1.00	1.14	1.68	17.3
Approach		1552	0.0	1552	0.0	0.959	52.7	LOS D	29.4	206.0	0.99	0.95	1.14	25.8
East: Showground Road (E)														
4	L2	158	0.0	158	0.0	0.897	51.8	LOS D	31.4	220.0	1.00	1.10	1.18	27.8
5	T1	1063	0.0	1063	0.0	*0.897	45.8	LOS D	31.4	220.0	1.00	1.10	1.18	34.2
6	R2	268	0.0	268	0.0	0.361	54.2	LOS D	7.4	51.7	0.91	0.79	0.91	31.4
Approach		1489	0.0	1489	0.0	0.897	47.9	LOS D	31.4	220.0	0.98	1.04	1.13	33.1
North: Green Road (N)														
7	L2	150	0.0	150	0.0	*0.904	75.0	LOS F	27.5	192.2	1.00	1.11	1.30	27.3
8	T1	600	0.0	600	0.0	*0.904	68.9	LOS E	27.5	192.2	1.00	1.09	1.31	22.0
9	R2	83	0.0	83	0.0	0.830	80.1	LOS F	5.8	40.8	1.00	0.92	1.38	25.8
Approach		833	0.0	833	0.0	0.904	71.1	LOS F	27.5	192.2	1.00	1.08	1.31	23.5
West: Showground Road (W)														
10	L2	85	0.0	85	0.0	0.964	99.7	LOS F	44.1	308.4	1.00	1.29	1.50	23.5
11	T1	928	0.0	928	0.0	0.964	91.0	LOS F	44.1	308.5	1.00	1.28	1.50	24.2
12	R2	157	0.0	157	0.0	0.550	70.8	LOS F	5.0	35.2	1.00	0.77	1.00	21.5
Approach		1170	0.0	1170	0.0	0.964	88.9	LOS F	44.1	308.5	1.00	1.21	1.43	23.8
All Vehicles		5044	0.0	5044	0.0	0.964	62.7	LOS E	44.1	308.5	0.99	1.06	1.23	26.9

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: Victoria Ave (S)												
P1	Full	50	50	29.1	LOS C	0.1	0.1	0.91	0.91	202.4	225.4	1.11
East: Showground Road (E)												
P2	Full	50	50	59.3	LOS E	0.2	0.2	0.96	0.96	230.6	222.8	0.97
North: Green Road (N)												

Appendix B: Proposed Relocated TAFE Car Park Layout

VERIFIER:

JOB MANAGER:

DESIGNED:

DRAWN:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	SKETCH FOR INFORMATION	J.P		E.F	12.06.20
2	ISSUE FOR CO-ORDINATION	E.F		E.F	23.06.20

CLIENT

NSW GOVERNMENT Planning & Environment

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT

lahznimmo architects

ALL SETOUT TO ARCHITECT'S DRAWINGS. DIMENSIONS TO BE VERIFIED WITH THE ARCHITECT AND ON SITE BEFORE MAKING SHOP DRAWINGS OR COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.

SCALE 1:100 @ A1

0 1 2 3 4 5m

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PROJECT

POWERHOUSE MUSEUM DISCOVERY CENTRE

DRAWING TITLE

CARPARK LAYOUT OPTION 2 - SKETCH

JOB NUMBER **181569**

DRAWING NUMBER **SK04**

REVISION **2**

DRAWING SHEET SIZE = A1

Date : 23-6-20 4:54pm Plotted By : dtenhave Found : \\NEWDL-DATA\My Documents\w\jobs\2018\181569 - Powerhouse Museum\0-Drawings\0-Northrop\C-CIVIL\4-SKETCH\CARPARK LAYOUT 2.dwg

Appendix C: Swept Path Analysis

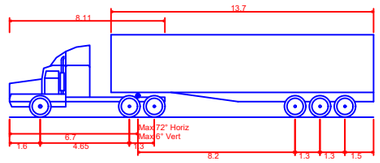
Client
Create Infrastructure

Job Title
Museum Discovery Centre Expansion

Drawing Title
Turning Paths

Legend
- Body Envelope
- 300mm Envelope
- 600mm Envelope
- Wheel Envelope

Vehicle type(s)



Single Articulated (19 m)	
Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	12.500m

Date
01/07/20

Job No
1942

Drawing No
SKT01

Drawing Status
Draft

Scale at A3
1:750

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