



Former Manly Hospital Site

Transport Assessment

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PROJECT INFORMATION

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1 Introduction

JMT Consulting was engaged by Property & Development NSW to prepare a transport assessment to inform the preparation of a Planning Proposal for the former Manly Hospital site.

In late 2018 all services provided at Manly Hospital were transferred to the new Northern Beaches Hospital at Frenchs Forest. The site is currently vacant and a planning is currently being undertaken for it's future use.

The site is known as 150 Darley Road (Lot 2619 in DP 752038, Lot 2727 in DP 752038, and Lot 2774 in DP752038), Manly in the Northern Beaches Local Government Area (LGA) approximately 1km east of the Manly Town Centre, 10km south east of Northern Beaches Hospital in Frenchs Forest and 17km north east of the Sydney Central Business District (CBD). The site is located on the southern side of the Manly peninsula fronting Spring Cove, North Harbour. It interfaces with the historic St Patrick's Estate, North Head Sanctuary and Sydney Harbour National Park.

The site is comprised of 4.66 and is bounded by Darley Road and North Head Scenic Road and is shown in Figure 1 below.



Figure 1 Former Manly Hospital site

2 Existing Conditions

2.1 Site access

Following the closure of Manly Hospital in late 2018 only one vehicle access point into the site is currently operational - that being a driveway on Darley Road. This driveway location is indicated in Figure 2 below and Figure 3 on the following page, and provides access and egress for vehicles travelling in both directions on Darley Road.

A second driveway on Darley Road (immediately west of the existing access point) was previously operational which provided access for hospital staff and visitors to the on-site car parking areas. A third vehicle access into the site also previously existed via a narrow roadway connecting to Collins Beach Road (Figure 4). This access point was not available to the general public and was used infrequently by staff and delivery vehicles accessing the site.

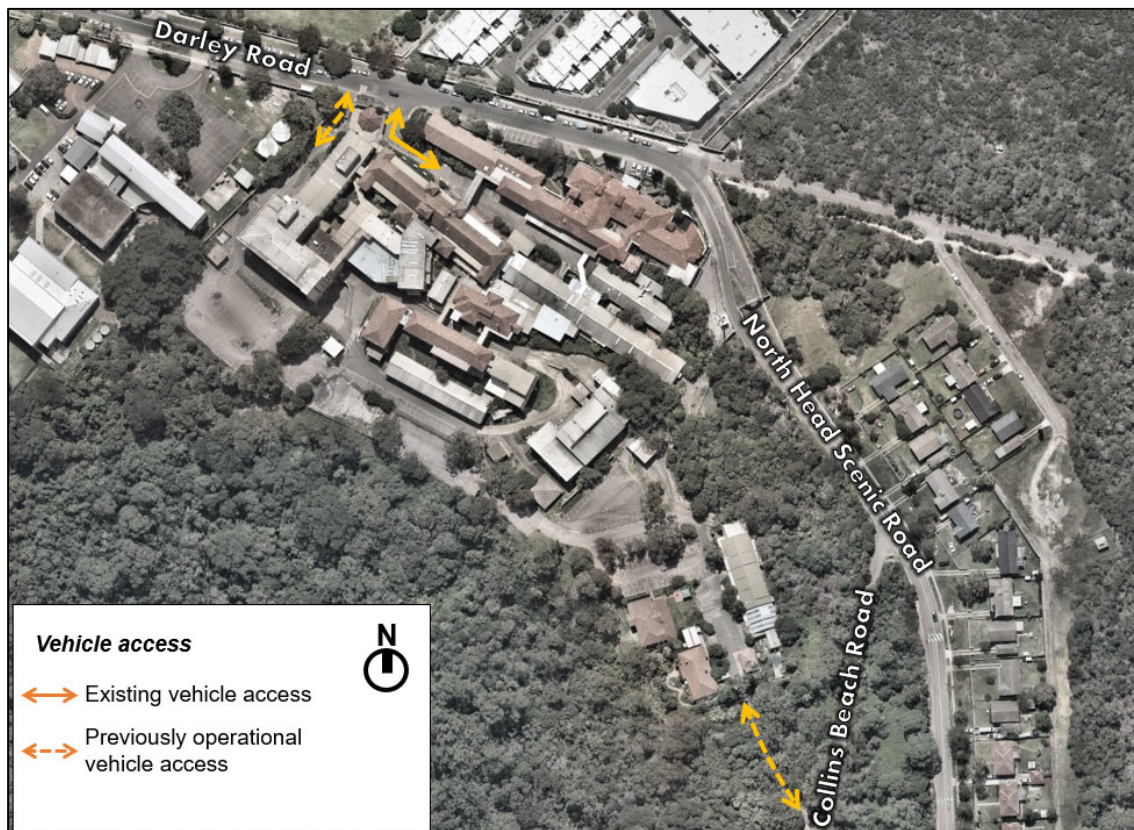


Figure 2 Vehicle site access



Figure 3 Existing Darley Road access point



Figure 4 Collins Beach Road access point

2.2 Travel behaviours

A review of 2016 Journey to Work Census data was undertaken to understand how people travel to the area surrounding the former Manly Hospital site. The area considered as part of the analysis takes in the former hospital as well as surrounding areas up to North Head, as shown in Figure 5.

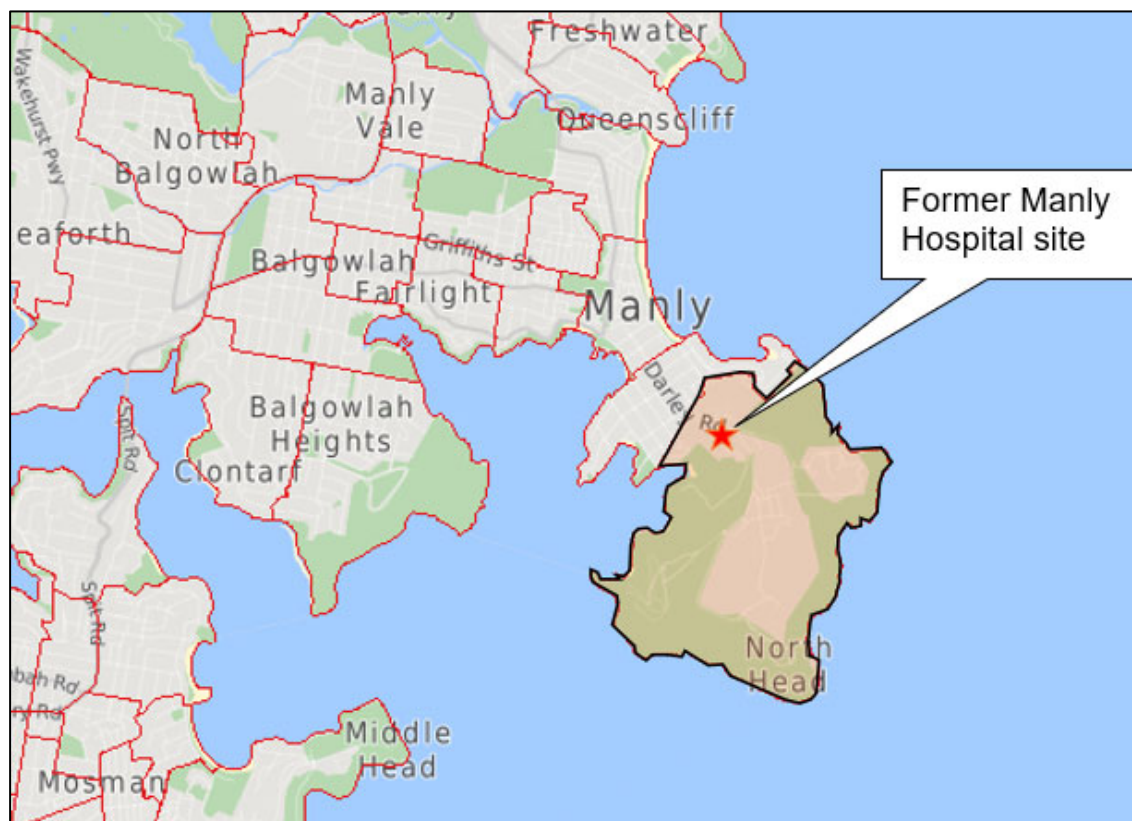


Figure 5 Geographical area considered in travel behaviour analysis

The results of the analysis are illustrated in Figure 6 (modal share) Figure 7 (home location of workers). The modal share analysis indicates the majority of people currently drive to the site due to the availability of on-site parking and the limited nature of public transport services.

Figure 7 shows that the majority of work related trips to the site originate from the Northern Beaches area, with only a small proportion originating from outside the LGA. This localised trip catchment indicates there may be a potential to increase public transport, walking and cycling usage to the site in future years.

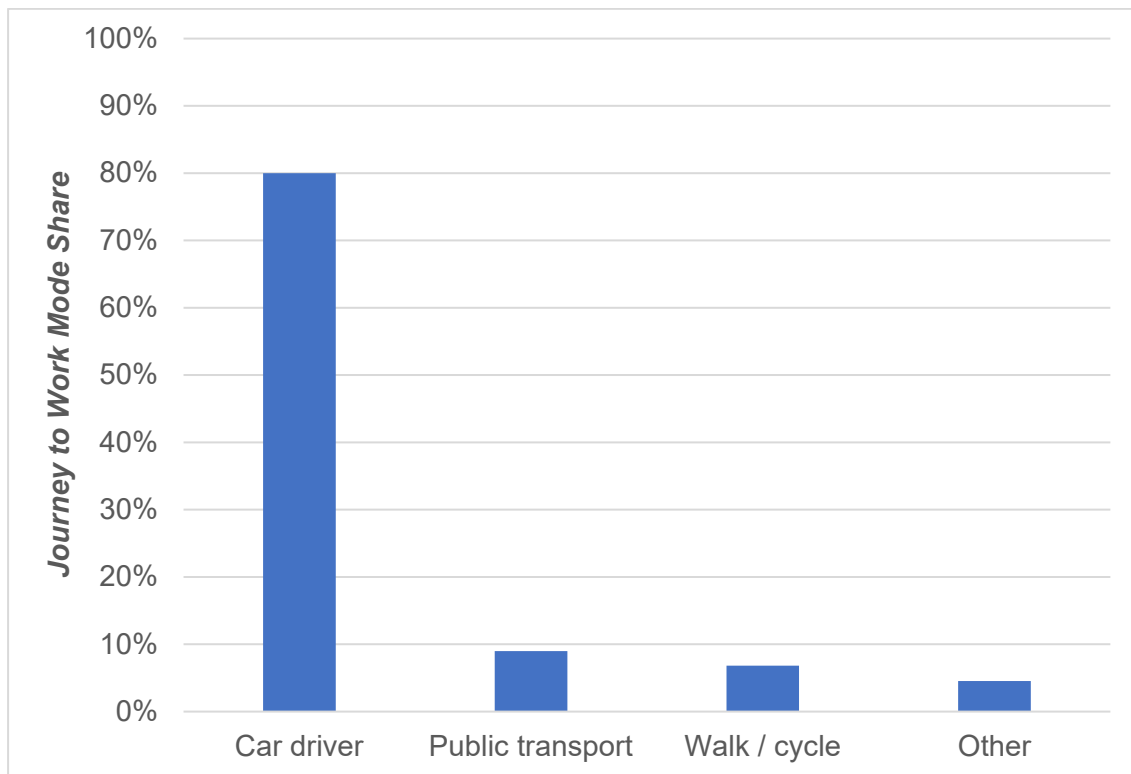


Figure 6 Existing mode share for workers travelling to former Manly Hospital

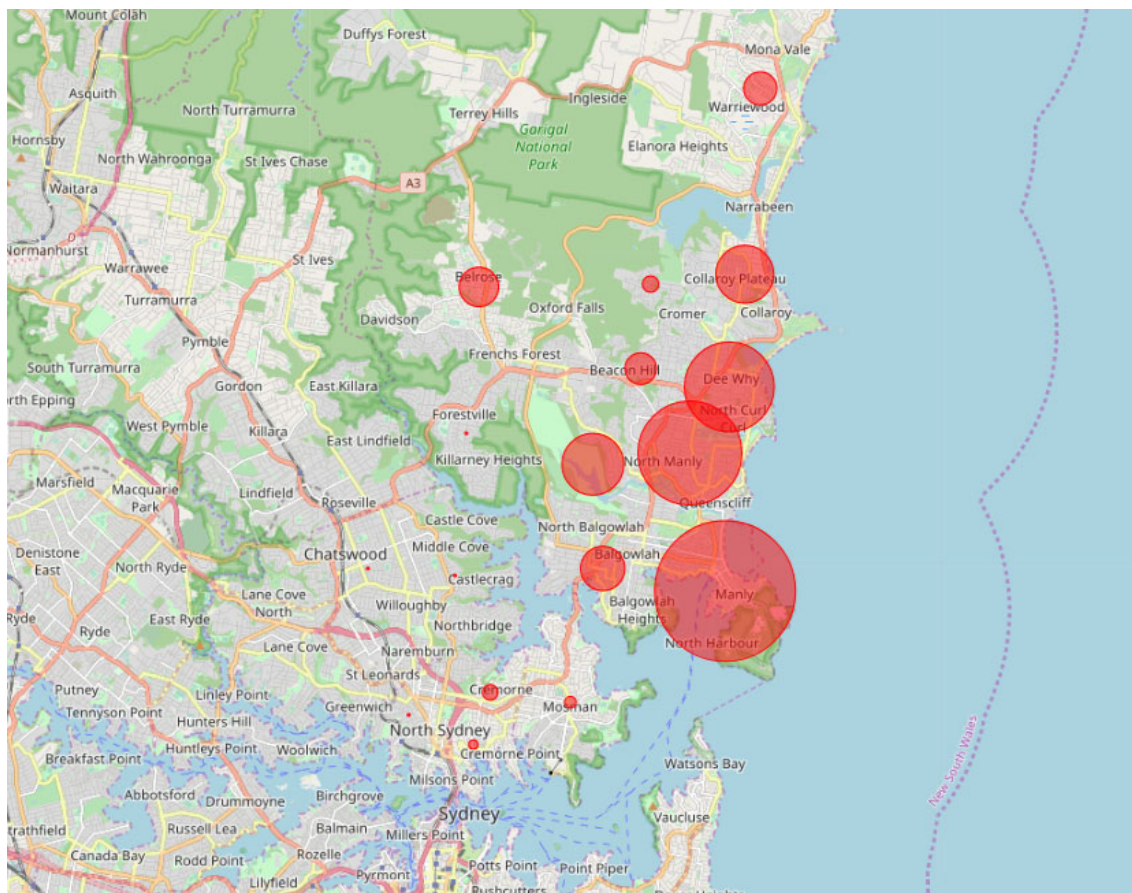


Figure 7 Home location of workers travelling to former Manly Hospital

2.3 Traffic volumes

Traffic counts were undertaken in December 2019 to understand the level of traffic currently utilising Darley Road adjacent to the site. The counts recorded traffic movements in both directions every hour for a one week period, commencing Tuesday 10 December 2019. The traffic count was undertaken during school term, with data collected on Darley Road immediately east of Marshall Street.

The survey results are presented in Figure 8 below which indicate the traffic flows on Darley Road for the busiest day of the week. This shows traffic volumes never exceeded 300 vehicles per hour in one direction across the day. The typical capacity of a traffic lane is up to 900 vehicles per hour, indicating there is spare capacity along Darley Road to accommodate future site uses.

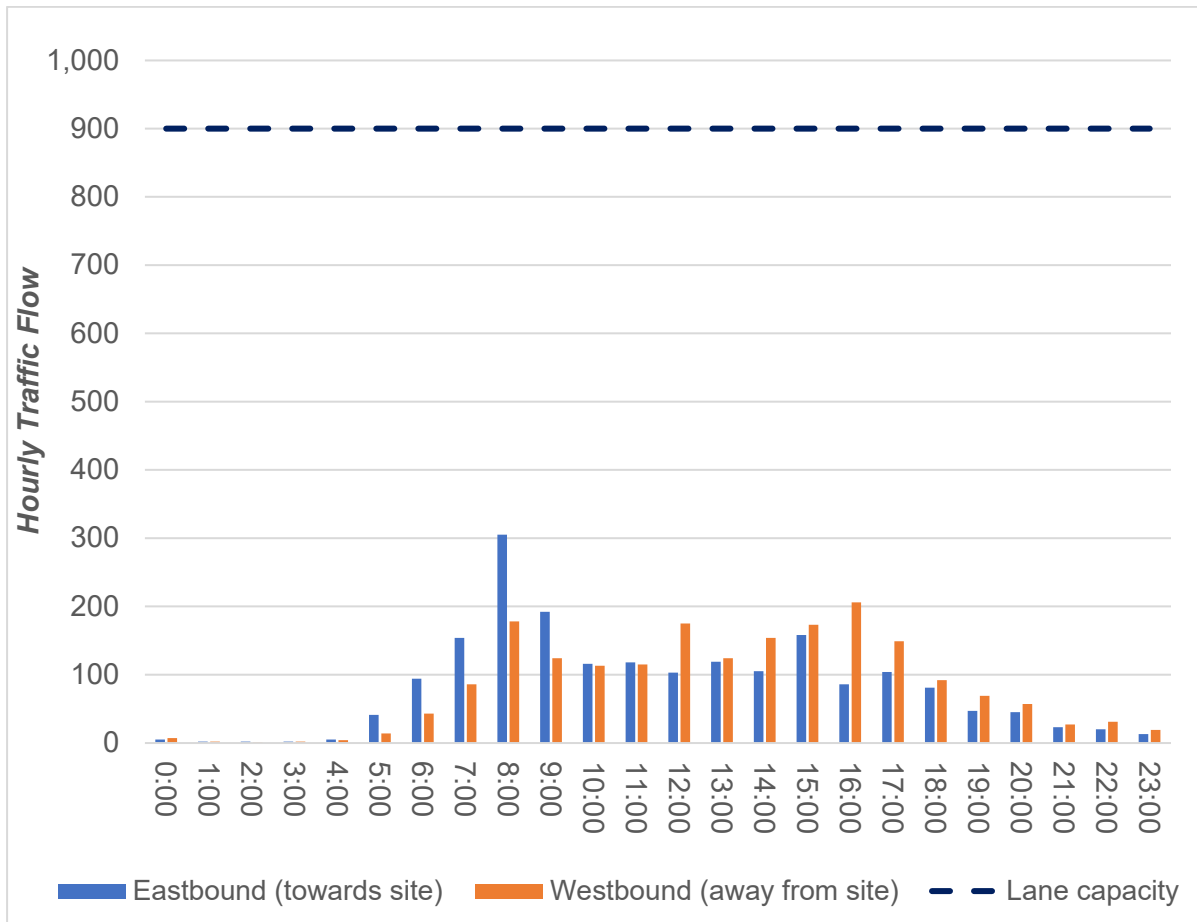


Figure 8 Existing Darley Road traffic volumes

2.4 Public transport

The site is located immediately adjacent to a pair of bus stops on Darley Road which services the 135 bus route, as shown in Figure 9. The Manly Ferry Wharf is located approximately 1.2km away from the site entry, equivalent to approximately 20 minute walk. The 135 bus route servicing the site also provides a connection to the ferry wharf.



Figure 9 Existing public transport services

Although the 135 bus routes provides good connectivity into Manly and Warringah Mall it's infrequent nature results in relatively low levels of usage by residents and workers of the area. Typically services run every 30 minutes during peak weekday periods, which reduces to every hour during off-peak and on weekends.

Transport for NSW recently trialled an on-demand bus service (known as 'Ride Plus') which serviced the Manly area – including the former hospital site. This on-demand service ceased operating in May 2019.

3 Overview of Proposal

The Planning Proposal intends to amend the Manly Local Environmental Plan 2013 (MLEP 2013) to allow for additional permitted uses at the site. This will be achieved by permitting additional uses under Schedule 1 pursuant to clause 2.5 of the MLEP 2013.

The LEP amendment proposed will enable the making of a site-specific DCP which will inform the sites redevelopment in the future, reflective of extensive market sounding, needs-based analysis and community and stakeholder engagement undertaken to date by the relevant NSW Government Departments. Up to 30,000m² GFA may be delivered on the site under the proposed planning controls. The draft concept masterplan prepared by COX Architecture illustrates the general location of the envelopes for the envisaged health and wellbeing precinct and provides for the following:

- Site preparation works including demolition and excavation;
- The provision of 10 building envelopes and the adaptive reuse of potentially heritage significant items;
- The reinstatement of open car parking areas within the rear of the site;
- Soft landscaping and public domain upgrades; and
- Tree removal and replacement planting.



Figure 10 Concept masterplan

Source: COX Architecture

4 Preliminary Transport Assessment

4.1 Site access and circulation

Planning for the site provides an opportunity to rationalise the existing vehicle access arrangements and provide for improved legibility and pedestrian connectivity. Figure 11 provides a summary of the future vehicle circulation within the site. The proposed arrangements provide for an improved transport outcome by reducing vehicle conflicts at entry/exit points and providing for a more legible environment for visitors to the site. The proposed arrangements include:

- Consolidating the two existing driveway crossovers into a single vehicle site access point via Darley Road
- A two-way circulation road to provide primary vehicle access to the on-site car parking areas
- A secondary one-way road that will act as low speed shared zone to facilitate drop off / pick up movements to the various facilities on the site

In the event of an emergency access to the west of the site via the existing Little Collins Beach Road may also be provided, however the proposal is not reliant on this access to facilitate safe evacuation from the site (see Section 5) for further details.

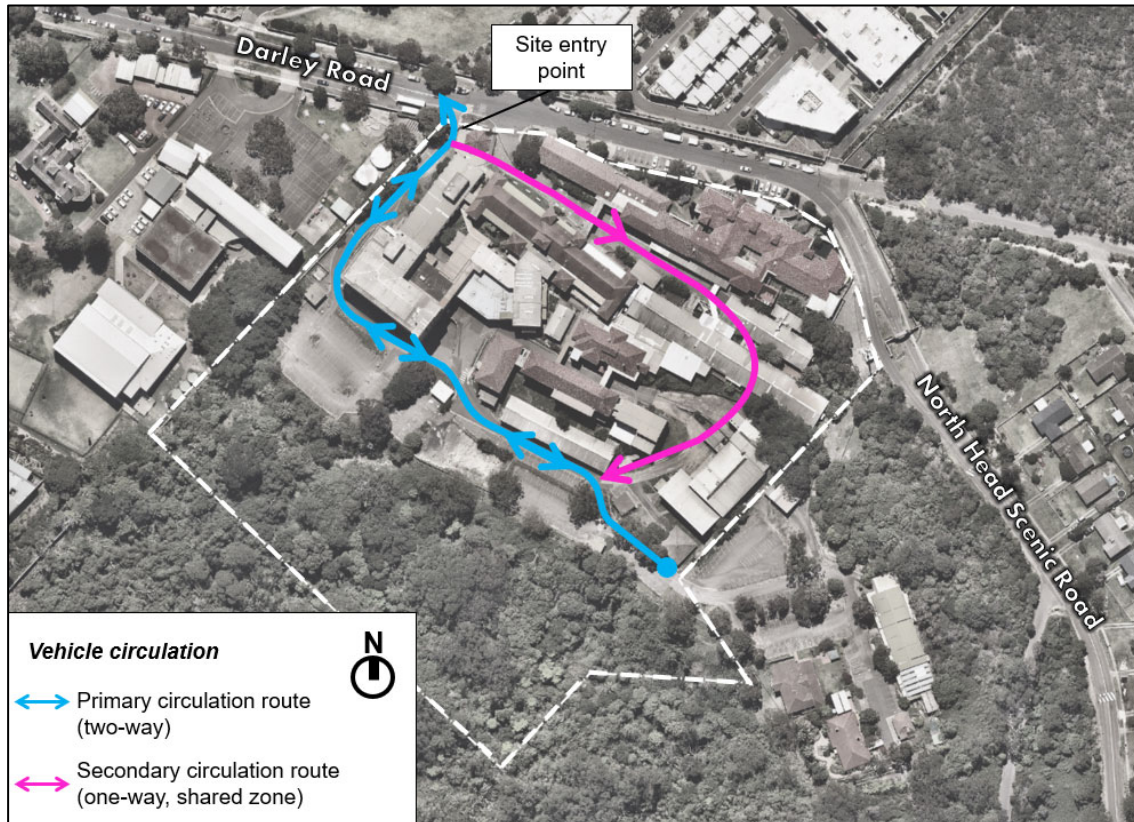


Figure 11 Potential vehicle circulation

4.2 Car parking

As a number of different land uses would be permissible under the Planning Proposal for the site, the exact number of parking spaces to be provided can not be determined at this preliminary stage. The future parking provision will be detailed as part of future Development Applications made for the site.

Generally on-site parking is to be provided in accordance with the rates outlined in the Manly Development Control Plan (DCP) 2013 or those contained in the Housing SEPP 2021.

Table 1 Potential car parking requirement

Use	Parking Rate	Reference
Seniors Living (ILU)	0.5 spaces / bedroom	Housing SEPP 2021
Seniors Living (RAC)	1 space / 15 beds; and 0.5 spaces / staff member	Housing SEPP 2021
Restaurants / Cafes & take away food and drink	1 space / 40m ² GFA of serviced area	Manly DCP 2013
Retail and commercial	1 space / 40m ² GFA	Manly DCP 2013

Where it can be demonstrated that parking requirements for different uses may be complementary to one another (generating peak demands at different times of the day) then consideration could be given to modifying the above rates.

4.3 Future mode share

Future planning for the former Manly Hospital site should seek to achieve a modal shift away from private vehicle towards public transport in order to provide for an improved pedestrian environment within the site. To obtain a strong modal shift a number of measures will be required to be implemented as the site is developed, potentially including:

- Development of green travel plan for the site to promote non-car modes of transport
- Facilitating car pooling by staff to reduce the instances of single occupant vehicle trips
- Improvement in public transport frequencies (which will require discussions with Transport for NSW)
- Provision of suitable bicycle parking and end of trip facilities to encourage travel by walking and cycling

The potential future mode share is summarised in Figure 12 below.

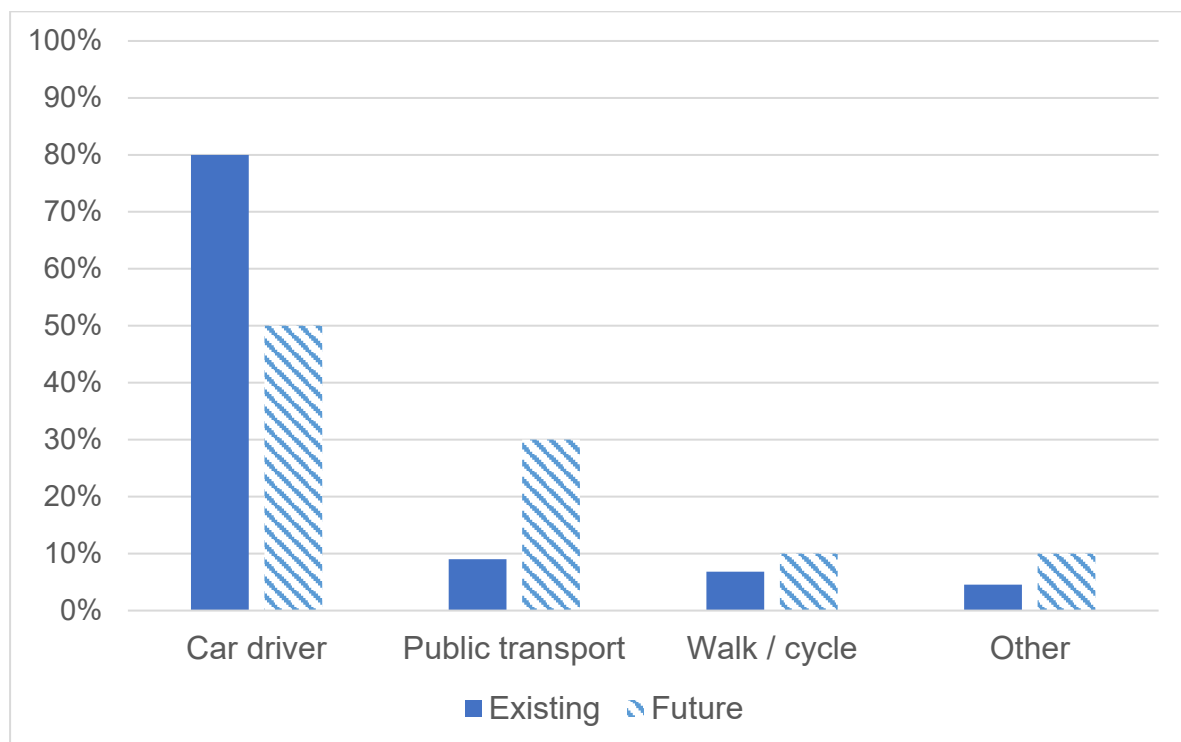


Figure 12 Future modal share

The future modal share and proposed measures to be implemented will be confirmed at subsequent stages of the planning process following refinement of future site uses.

4.4 Traffic impacts

It is important to recognise that the former Manly Hospital contained approximately 160 beds and 300 car parking spaces, which would have generated upwards of 200 vehicle movements per hour. The future site uses, those being focused around seniors housing and health and wellbeing, are typically of lower traffic intensity when compared with a public hospital.

The *RMS Guide to Traffic Generating Developments* document provides guidance in relation to rates of peak hour traffic generation for the potential site uses, those being:

- Health and wellbeing uses: 0.5 traffic movements / parking space
- Seniors housing: 0.1 traffic movements / dwelling

Based on preliminary planning for the site undertaken to support the Planning Proposal and adopting the above rates there is likely to be less than 100 vehicle movements generated by the site during the peak hour of the day. This is significantly less traffic movements compared to what would have been generated when the Manly Hospital was in operation.

Further, the traffic count undertaken on Darley Road in December 2019 indicated there was spare capacity to accommodate additional traffic movements from the site which is well in excess of that forecast to be generated by the future health and wellbeing focused uses.

The final traffic generation forecasts will be confirmed at subsequent stages of the planning process following refinement of future site uses.

4.5 Pedestrians and cyclists

The development of the site provides the opportunity to significantly enhance access for pedestrians and cyclists. Initial planning undertaken as part of this Planning Proposal has considered the following measures in response to this objective:

- Consolidation of vehicle entry points into the site to reduce conflicts between vehicles and pedestrians on Darley Road
- Introduction of a shared zone within the site which facilitates low vehicles speeds (maximum 10km/h) and good quality pedestrian links
- Improved network of pedestrian paths within the site to provide connections in both a north-south and east-west direction
- Provision of publicly accessible through-site links to improve pedestrian accessibility within the site
- Potential for new pedestrian paths adjacent to the National Park to provide connections to external destinations such as Collins Beach
- Provision of bicycle parking for staff and visitors as part of future development applications, to be provided consistent with the rates outlined in the Manly DCP 2013.

4.6 Public transport

As previously noted the site is located immediately adjacent to a pair of bus stops on Darley Road which services the 135 bus route. Planning for the site will consider how to maximise the benefit of these bus stops by providing for high quality pedestrian connections from within the site to the external street network. To improve the attractiveness of bus travel to the site, discussions will be held with Transport for NSW to identify the potential for increasing the frequency of the 135 bus route. These discussions will occur closer to the time of initial occupation of the site once the likely number of site users (and associated public transport demand) is better understood.

Given the anticipated nature and scale of uses it is not anticipated any upgrades to the public transport network will be required to support the site development. This will be confirmed as part of future Development Applications made for the site.

5 Bushfire Evacuation Assessment

5.1 Overview

This section summarises the ability of the road network to accommodate traffic flows associated with the potential development of the former Manly Hospital Site during a bushfire evacuation scenario. The assessment has been informed by discussions with the lead consultant Cox Architecture as well as Peterson Bushfire (bushfire consultant).

5.2 Assumptions Adopted

Following discussions with Peterson Bushfire the following assumptions have been adopted as part of the bushfire evacuation traffic modelling.

5.2.1 Extent of evacuation area

The extent of the evacuation area covers all sites in North Head east of St Paul's College on Darley Road as illustrated in Figure 13 below. The International College of Management considered to be outside evacuation area given it's buffer to neighbouring bushland.



Figure 13 Extent of evacuation area

5.2.2 Traffic routes and road operations

Darley Road provides the single access route into and out of the precinct. During a bushfire evacuation Darley Road has been assumed to operate as a single lane out towards the Manly town centre, with no traffic management overlay assumed by the RFS.

To assess whether vehicles travelling north on Darley Road will be able to clear sections of road bordered by the evacuation zone, the study has considered the critical downstream pinch point from which potential blocking back would limit driver's ability to depart the area. This location is just prior to Marshall Street as shown in Figure 14 below. From Marshall Street onwards evacuating traffic has the ability to disperse across a number local streets outside of the evacuation area.

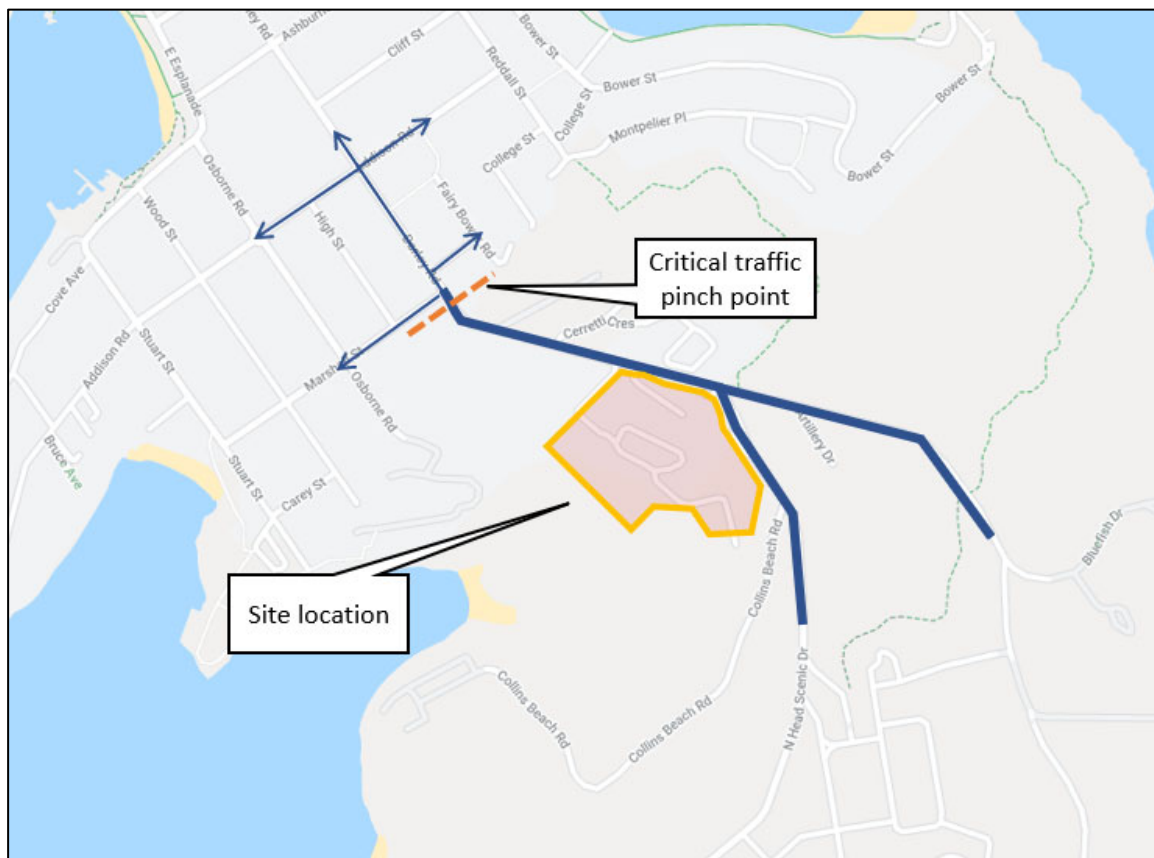


Figure 14 Distribution of traffic movements away from evacuation zone

5.2.3 Potential traffic movements

The number of potential traffic movements within the evacuation area has been based on the physical number of available parking spaces within the precinct as summarised in Table 2 below. The full set of assumptions in relation to the number of available parking spaces in the precinct is provided in Appendix A of this document.

Based on the potential land uses to be provided in the former Manly Hospital site up to 300 parking spaces has been assumed. This is a significantly higher level of parking supply compared with that envisaged in the Concept Master Plan of approximately 110 spaces – representing a conservative assumption.

Table 2 Number of parking spaces within evacuation zone

Location	No. of Parking Spaces
Q Station	105
North Head (South)	135
North Head (North)	117
Wastewater Treatment Plant	53
AIPM	55
Darley Road residences	32
Former Manly Hospital	300
St Patrick's Estate	100
St Paul's College Manly	60
Darley Road on-street parking	45
Total	1,002

5.2.4 Dwellings occupied on day of fire

The unoccupied number of dwellings as per the 2016 ABS Census data is approximately 10% on any given day (vacant homes, occupants on vacation etc). This is considered conservative as it is highly unlikely that a fire would suddenly threaten the suburb during the night when most people are home. It is likely that it would occur during the day and, most likely late in the day. Therefore, many people will not be home when the fire threatens. Accordingly, the number of dwellings occupied at the time of day that the fire threatens is likely to be considerably less than the number of occupied dwellings on the day of the fire.

5.2.5 Vehicles from risk zone leaving in final hour

A study undertaken analysing behavioural aspects of the 2009 Victoria Bushfires¹ indicated that 54% of residents evacuated during a bushfire, and of those residents that evacuated 47% left prior to the last hour before the bushfire arrived. Given the site's more urban location and nature of bushfire event as advised by Peterson Bushfire, 100% of all vehicles have been assumed to depart the precinct in the hour before the bushfire arrives. This is a conservative assumption as it is likely some residents / visitors will choose to leave the area earlier than this.

5.2.6 Proportion of people that shelter in place

This assumption considers the proportion of residents who will stay at home in the event of a bushfire, as opposed to using their private vehicles to evacuate.

All staff and visitors of the precinct have been assumed to evacuate the precinct. 25% of residents of St Patricks Estate, Darley Road as well as the former Manly Hospital site have been assumed to remain in the precinct. This figure is consistent with that adopted as part of the work recently undertaken for the Ingleside.

Residential buildings within the precinct will have an Asset Protection Zone (APZ) to the identified bushfire hazards that will ensure radiant heat at the building will not breach 10 kW/m² as per the design fire requirements. This level of hazard separation achieves the acceptable solution for shelter in place as stated within the NSW Rural Fire Service document 'Neighbourhood Safer Places: Guidelines for the identification and inspection of Neighbourhood Safer Places in NSW'. Given the large APZ and other compliant bushfire measures that will form part of the development, such as BAL-12.5 construction standards, residents will have the option of shelter in place as oppose to off-site evacuation. Due to the small fire catchment and limited time for evacuation prior to the impact of fire, many residents may opt for shelter in place.

¹ Bushfire Cooperative Research Centre, 2009

5.3 Evacuation Assessment

5.3.1 Scenarios considered

The traffic analysis has considered both a weekday and weekend/holiday scenario due to the differing parking demands generated by the various land uses within the precinct on these days. For example visitor attendance at sites within Sydney Harbour National Park are higher on weekends when compared to weekdays, while school attendance is significantly lower on weekends.

The assumptions relating to parking occupancy on weekdays and weekends/holidays is summarised in Table 3.

Table 3 Assumed parking occupancy levels

Location	% of Parking Spaces Occupied	
	Weekday	Weekend / Holidays
Q Station	100%	100%
Sydney Harbour National Park (South)	80%	100%
Sydney Harbour National Park (North)	80%	100%
Wastewater Treatment Plant	100%	80%
AIPM	100%	100%
Darley Road residences	90%	90%
Former Manly Hospital	100%	100%
St Patrick's Estate	90%	90%
St Paul's College Manly	100%	50%
Darley Road on-street parking	100%	100%

These assumed parking occupancy levels, particularly for Sydney Harbour National Park, are considered very conservative based on a review of historical aerial Nearmap imagery. A selection of these images is provided on the following page and indicates the public parking areas, even during weekends or Christmas holiday periods, have significant spare capacity.



Figure 15 Historical aerial imagery of parking occupancy

5.3.2 Number of evacuating vehicles

Based on the assumptions adopted as described in the previous sections of this document the number of evacuating vehicles during the critical peak hour can be determined. The analysis indicates the following number of vehicles would leave the area and travel north along Darley Road towards the Manly town centre:

- 835 vehicles on a weekday; and
- 844 vehicles on a weekend.

The detailed analysis supporting this evacuation assessment is provided in Table 4 below.

Table 4 Number of evacuating vehicles during bushfire emergency

Location	% of Parking Spaces Occupied		% of spaces that remain in place / stay & defend		Number of Evacuating Vehicles	
	Weekday	Weekend / Holidays	Weekday	Weekend / Holidays	Weekday	Weekend / Holidays
Q Station	100%	100%	0%	0%	105	105
Sydney Harbour National Park (South)	80%	100%	0%	0%	108	135
Sydney Harbour National Park (North)	80%	100%	0%	0%	94	117
Wastewater Treatment Plant	100%	80%	0%	0%	53	42
AIPM	100%	100%	0%	0%	55	55
Darley Road residences	90%	90%	25%	25%	22	22
Former Manly Hospital	100%	100%	25%	25%	225	225
St Patrick's Estate	90%	90%	25%	25%	68	68
St Paul's College Manly	100%	50%	0%	0%	60	30
Darley Road on-street parking	100%	100%	0%	0%	45	45
Total					835	844

5.3.3 Traffic analysis

The typical traffic carrying capacity of Darley Road (as noted in the transport study supporting the Planning Proposal) is approximately 900 vehicles per hour in each direction. Taking into consideration the set of highly conservative assumptions as noted in this document, a maximum traffic flow of 816 vehicles per hour could be expected during a major bushfire evacuation event. This provides a *volume to capacity* (V/C) ratio of 0.94 – with a V/C ratio of 1.00 representing maximum road capacity to accommodate potential demands.

As the V/C ratio is less than 1.00 the analysis demonstrates that Darley Road would have sufficient capacity to support traffic movements in the event of a major bushfire event.

It is important to recognise that this 0.94 V/C ratio is based on a highly conservative set of assumptions including proportion of total car spaces occupied at the time of the fire, level of car parking to be provided on the former Manly Hospital site and evacuation time periods. Therefore the analysis is considered to provide robust basis for confirming the ability of Darley Road to accommodate traffic demands during a bushfire evacuation event.

6 Summary

JMT Consulting was engaged by Property & Development NSW to undertake a transport assessment to support a Planning Proposal for the former Manly Hospital site. Key findings of the assessment to date are as follows:

- Traffic counts undertaken in December 2019 on Darley Road demonstrated that traffic volumes never exceeded 300 vehicles per hour in one direction – indicating there is spare capacity to accommodate future site uses.
- The master planning for the site provides an opportunity to rationalise the existing vehicle access arrangements and provide for improved legibility and permeability.
- The proposed circulation arrangements provide for an improved transport outcome by reducing vehicle conflicts at entry/exit points through consolidating the two existing driveway crossovers into a single vehicle site access point via Darley Road
- The number of parking spaces will be detailed as part of future Development Applications made for the site however generally on-site parking is to be provided in accordance with the rates outlined in the Manly Development Control Plan (DCP) 2013 or those contained in the Seniors Housing SEPP.
- Preliminary analysis indicates that there is likely to be less than 100 vehicle movements generated by the site during the peak hour of the day, which is significantly less than what would have been generated when the Manly Hospital was in operation.
- The development of the site provides the opportunity to significantly enhance access for pedestrians and cyclists, including the introduction of new pedestrian pathways to provide for improved internal and external connections.
- The forecast volume of traffic using Darley Road to evacuate the precinct during a bushfire emergency, on both a weekday and weekend, is predicted to be lower than the road carrying capacity of Darley Road. This indicates Darley Road would have sufficient capacity to support traffic movements in the event of a major bushfire event..
- Given the anticipated nature and scale of uses it is not anticipated any upgrades to the public transport network will be required to support the site development.

In the above context, the transport assessment has concluded that the proposed Planning Proposal for the former Manly Hospital site, with a focus on health and wellbeing uses, will result in an acceptable transport outcome. Further transport analysis will be undertaken at subsequent stages of the planning process following refinement of future site uses.