Carter Street Urban Activation Precinct

Traffic and Transport submission

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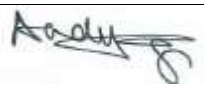
0	30-Apr-2014	Final Report	Andy Yung Associate Director, Transport Advisory	

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1.0 Introduction

1.1 Background

The NSW Government aims to increase the delivery of housing and jobs across Sydney. The Draft Metropolitan Strategy for Sydney sets out a plan for the city's future over the next two decades. By 2031, Sydney's population has an expected growth of 1.3 million additional people requiring 545,000 more homes and 625,000 more jobs.

To support the delivery of additional homes and jobs by 2031, the Urban Activation Precincts program was established. Through consultation with local communities and councils, Urban Activation Precincts aim to regenerate existing areas of Sydney to deliver more housing and open spaces, schools, community facilities and other infrastructure. Eight Urban Activation Precincts have been identified with the potential to deliver 30,000 dwellings.

1.2 Carter Street Urban Activation Precinct

The rising costs of car ownership, traffic congestion and an awareness of the impacts of climate change, have led some people to reconsider their need for a car. Fewer young people are getting their driver's licence and therefore fewer young people own a car. Many socialise using social media and shop online, so a car is not a priority for them.

People want to live close to their workplace, shops and services. By locating apartments close to public transport, more people can use it. Increased use of public transport benefits the community through lower greenhouse emissions and reduced traffic congestion.

Urban Activation Precincts encourage active transport (walking and cycling) by planning for apartments close to public transport, shops and services.

Carter Street was chosen as an Urban Activation Precinct (UAP) to accommodate some of Sydney's growth because it optimises the significant government infrastructure investment in the transport network including the Olympic Park Train Station, existing bus services, M4 Motorway, Parramatta Road and the recently announced WestConnex. Future development at this site will be supported by a range of transport initiatives including intersection upgrades and new bus services. Traffic and parking provisions will be managed as the precinct rejuvenates.

1.3 Purpose of Report

Goodman owns 27.9ha of land within the Carter Street Urban Activation Precinct (52ha). The potential redevelopment of the Goodman site within the Carter Street UAP provides a mixture of housing and employment opportunities complemented by improved public transport services and good access by walking and cycling to the surrounding open space and recreational facilities.

Throughout the UAP process, Goodman has prepared a Masterplan of the 27.9ha site which proposes a number land uses including residential, retail, commercial and open spaces, similar to those proposed by NSW Planning & Infrastructure (NSW P&I) within the Goodman site north of Carter Street. AECOM was engaged to provide traffic and transport infrastructure advice for defining and refining the Masterplan for the Goodman site. As a result of the public exhibition of the Carter Street UAP, AECOM has prepared a traffic and transport submission on behalf of Goodman to highlight any difference in opinion and assumptions that should be used to prepare the traffic and transport assessment and therefore the need to review infrastructure requirements to deliver the proposed development of the Carter Street UAP.

2.0 Government's current infrastructure plan

2.1 Introduction

Carter Street has been selected as an UAP due to its proximity to the Sydney Olympic Park specialised centre and its location within 800m of the Olympic Park Station. The development potential of the Carter Street UAP and the redevelopment of the Goodman site can fully capitalise the recent Government commitments and investments to improve walking and cycling connections and infrastructure as well as public transport connections, services and infrastructure to connect Sydney Olympic Park to other major centres including Parramatta, Burwood, Macquarie Park and the CBD. These public and active transport measures do not only address the existing transport deficiencies in the area, but will also establish a new pattern of travel and encourage uptake of sustainable forms of transport, i.e. non-car modes, wherever possible and to reduce the need to travel and hence reduce overall transport and travel demand and the impacts of new development.

The following table shows the historical trends of increasing public transport use (and reducing car use) at some key centres in Sydney which has significant increase in high density residential growth with supporting transport infrastructure.

	Public Transport				Car (driver & passenger)			
Year	2001	2006	2011	**Change from 2001 to 2011**	2001	2006	2011	**Change from 2001 to 2011**
Rhodes (West)	24%	37%	44%	**20%**	70%	51%	47%	**-23%**
Strathfield (South)	44%	51%	59%	**15%**	44%	39%	34%	**-10%**
Parramatta	31%	35%	41%	**10%**	51%	47%	43%	**-8%**
Burwood (North)	44%	45%	53%	**9%**	43%	41%	37%	**-6%**
Homebush	32%	35%	40%	**8%**	58%	56%	45%	**-13%**

Source: Bureau of Transport Statistics, 2014

It is also evident that higher density development with appropriate built form will be critical to continue to support a permeable, efficient and direct public and active transport network in the vicinity of the proposed development.

2.2 Existing public transport services

The NSW Government has carried out the biggest rewrite of public transport timetables – including buses, trains and ferries – to get more out of the network for customers from October 2013.

The timetables have been designed to improve connections for customers catching different modes of public transport by minimising how long they have to wait when changing from a bus to a train or ferry.

These changes had the following benefits for commuters in the Sydney Olympic Park area:

- **Train services** – Whilst direct, off-peak rail services between the CBD and the Park ceased on 20 October 2013, an extra 118 services per week are now provided between Lidcombe and Sydney Olympic Park to support a 10 minute service between 6am and 10pm. A number of off-peak western line services also now stop at Lidcombe from that date.
- **Bus services** – an extra 104 services per week are now provided to support access to Sydney Olympic Park. Route 526 (Burwood to Sydney Olympic Park Wharf) has improved night services to support local activity and connections to the ferry wharf. The timetable has amended times for Route 525 (Burwood to Parramatta) and Route 526 to improve the spacing of these bus services for access to Sydney Olympic Park.
- **Ferry services** – an extra 139 services per week now stop at Sydney Olympic Park wharf with more frequent services along the Parramatta River during weekdays and weekends. The new timetable also supports better bus connections between the ferry wharf and the Sydney Olympic Park precinct.

Once again, these extra services and the alignment of timetables to reduce interchange times is expected to improve customer experience, making the public transport system in Sydney and the Sydney Olympic Park area easier and more reliable for more commuters to use.

2.3 Current transport plan

In December 2012, the State Government presented the Long Term Transport Master Plan (LTTMP) which discussed the Government's 20-year vision for the delivery of a world-class public transport, roads and freight network to the State. The LTTMP is also supported by a series of modal specific plans including:

- Sydney's Walking Future
- Sydney's Cycling Future
- Sydney's Bus Future
- Sydney's Rail Future
- Sydney's Light Rail Future
- Sydney's Ferry Future.

This section of the report highlights key Government initiatives, plans and infrastructure proposed to improve traffic and transport conditions in the Sydney Olympic Park area which will optimise traffic and transport access to the Carter Street UAP.

2.3.1 Long Term Transport Master Plan

The Sydney Olympic Park is located in proximity to the Parramatta to CBD (via Strathfield) corridor, which is identified in the LTTMP as one of the most constrained strategic corridors. In identifying these existing and potential constrained corridors, a series of short, medium and long-term actions have also been identified for each of the modes to improve the transport network.

The extension of the M4 to Port Botany and Sydney Airport to be delivered as WestConnex, accompanied by improvements to connecting arterial roads, will alleviate congestion on Parramatta Road and improve conditions for bus services.

Improvements to rail infrastructure will improve the capacity of the corridor by increasing the frequency and speed of trains to and from the CBD. In the short term, timetable and operational improvements will stabilise services at a reliable 20 trains per hour.

In the long term, the construction of a new Harbour crossing and CBD line will provide additional capacity on the Western Line to the CBD, increasing the number of trains per hour on the line by a further 14 trains per hour.

Improved connections will be developed for pedestrians and cyclists moving through the Parramatta CBD. The Parramatta River cycleway and connections to Sydney Olympic Park will be progressed and better connections developed through or around Cumberland Hospital to Westmead, within the next five years.

The LTTMP has also acknowledged the process of reserving important transport corridors will enable the cost efficient, long term development of the transport network. Working with the Department of Planning and Infrastructure, Transport for NSW will improve the process for identifying and protecting corridors and, over time, will secure the land required to deliver new transport infrastructure. Macquarie Park to Sydney Olympic Park has been identified as one of the corridor preservations required to satisfy long-term transport requirements, indicating the strategic relationship between the two specialised precincts.

2.3.2 Sydney's Walking Future

Sydney's Walking Future goal is to make walking a more convenient, better connected and safer mode of transport. The plan for the future supports the integration of walking into the transport system through three pillars of activity; *Promote* benefits and provide information, *Connect* through infrastructure and technology and *Engage* through policy and partnership.

There is a focus on investing in connected walking routes within two kilometres of centres and public transport interchanges, aiming to increase opportunities for people to walk longer distances and help reduce congestion.

Sydney's Walking Future will support Sydney's population growth by encouraging people to choose walking as their preferred mode of transport to nearby centres. Sydney Olympic Park is identified as a specialised centre, with Carter Street located within the 2km walking catchment. The Goodman site is also located within 800m of the Olympic Park Station catchment. Therefore, it is expected high quality footpaths will be provided to encourage walking trips to the station and other local services.

2.3.3 Sydney's Cycling Future

Sydney's Cycling Future outlines the way we plan, prioritise and provide cycling in Sydney, with an overarching goal of making cycling a safe, convenient and enjoyable transport option for short trips. To make bicycle riding a feasible transport option three pillars have been identified which include *Connect*: Safe, connected networks; *Promote*: Better use of existing infrastructure; and *Engage*: Policy and Partnership.

The Connecting Centres Program aims to help councils complete local bicycle networks to major centres of metropolitan Sydney. Bicycle network plans will be developed with Councils within a five kilometre catchment of major centres, including Sydney Olympic Park.

The NSW Government will work in partnership with developers to deliver bicycle networks to new communities as part of linking cycling to urban growth. For example, as part of a major development the NSW Government is working with the developer to provide a new bridge connecting Wentworth Point and Rhodes to allow residents to access shops, employment areas, public transport services and infrastructure on either side of Homebush Bay.

In addition, cycle connections between Parramatta and Sydney Olympic Park will be improved as part of a larger urban renewal project for the Parramatta Valley. The State Government is working with Parramatta Council and Federal Government to complete the remaining Parramatta River foreshore public access missing cycle links. At completion, this will create a continuous off road link between Westmead, Parramatta City Centre and Sydney Olympic Park.

Part of the initiatives of the Sydney's Cycling Future is also to improve bike parking and information at public transport interchanges. This is aimed to make it convenient for customers to ride to transport hubs, leave their bikes securely locked up and transfer to public transport to continue their journey. Bicycle facilities will be progressively improved as transport interchanges are upgraded. New bicycle parking and wayfinding facilities include:

- Bike racks in highly visible locations near interchange entrances;
- Maps of the local bicycle network; and
- Secure access bicycle parking facilities built at the busiest interchanges. Customers will be able to use these new facilities by registering for an access card or their Opal card in the longer term. Secure bicycle parking will be built into the design of new interchanges and commuter car parks. Unused space such as old station buildings can be used at existing interchanges.

Opportunities will be explored to work in collaboration with businesses to improve end of trip facilities such as the provision of change rooms and showers.

The provision of end of trip cycle facilities and development of local bicycle network which connects to the regional network is expected to influence and encourage cycle trips as a sustainable travel alternative to future local residents and employees in the Carter Street UAP.

2.3.4 Sydney's Bus Future

Greater Sydney is changing into a city with many major centres. Employment, education and recreational opportunities extend well beyond the Sydney CBD. This means customers are increasingly looking to catch buses to and from other centres like Parramatta, Liverpool, Penrith, Castle Hill, Macquarie Park, Sydney Olympic Park and Sydney Airport. Customer demand for bus travel across metropolitan Sydney is set to grow by 30 per cent by 2031.

With most of Sydney's future growth set to take place in Western Sydney, a modern bus network that integrates with the wider transport network will be essential to connect customers to jobs, education and services. A clear, three-tiered network will operate with each level delivering a defined level of service consistency and reliability. Rapid service routes form the backbone of the new bus network, offering fast, reliable bus travel for customers between major centres. Rapid routes provide customers with mass transit level services between centres which

are not linked by trains or light rail. Suburban service routes and Local service routes build on this foundation to improve access to local, neighbourhood destinations.

Sydney Olympic Park is located strategically along one of the 20 suburban routes - Parramatta – Burwood via Newington with over 60 new services connecting residents and workers to two of Sydney's most important centres in Western Sydney.

The Homebush Bay Bridge linking Rhodes and Wentworth Point, is designed for pedestrians, cyclists and public transport. It will connect the growing communities of Rhodes and Wentworth Point to parklands, shopping, entertainment and other facilities and will help reduce private car use. The bridge will also have the capacity to carry service infrastructure but will not be open to private vehicles.

A key component of the Homebush Bay Bridge proposal is to provide the future capacity for public transport. Establishing a bus connection between Rhodes and Wentworth Point, via the bridge would integrate Wentworth Point into the existing public transport network and provide a direct link to Rhodes railway station and Sydney Olympic Park.

The map below shows the potential bus links, connecting communities to Homebush Bay Ferry Wharf, and Rhodes and Sydney Olympic Park railway stations. Buses could also provide access to Rhodes shopping Centre, the neighbourhood centres at Wentworth Point and the potential site of a future school, as well as sporting and entertainment facilities at Sydney Olympic Park. The delivery of this piece of infrastructure will open up significant opportunities to improve bus connectivity and accessibility between Sydney Olympic Park to other existing and emerging centres in Rhodes and Macquarie Park, reducing the need for future residents in the Sydney Olympic park to travel by car.

Source: www. homebushbaybridge.com.au

2.3.5 Sydney's Ferry Future

Sydney's ferry services will play an expanded role in our integrated transport system, enhancing Sydney's attractiveness as a place to live and visit. New services will be introduced to meet customer needs and demand. Modernisation and expansion of the ferry fleet and wharf infrastructure will support service delivery and enhance customer comfort.

Key Parramatta River service integration and improvements include:

- Sydney Olympic Park to King Street Wharf, as an all stop service to King Street Wharf that supports growing customer demand at this Sydney CBD location.
- Sydney Olympic Park and Balmain East wharves will be upgraded under the Transport Access Program.

These improvements will provide an attractive alternative to future residents in Sydney Olympic Park for travel to destinations to Sydney CBD as well as major centres and destinations along the Parramatta River.

2.3.6 Sydney's Light Rail Future

Sydney's Light Rail Future is focused on expanding light rail services for the CBD and inner Sydney. It represents a step change for transport in the city, significantly boosting capacity and reliability. The actions outlined in Sydney's Light Rail Future will also grow public transport capacity, enhance commuter experiences and reduce congestion, leaving more space for vital commercial traffic as well as pedestrians.

The light rail solution is about the right transport mode for the right task. One light rail vehicle has capacity to move up to 300 people – compared to a bendy bus which can move up to 100 people.

The NSW Long Term Transport Master Plan has nominated a number of strategic transit network corridors to be considered for bus rapid transit or light rail including the Western Sydney Light Rail network.

The NSW Government is working with Parramatta City Council to complete a Western Sydney Light Rail Feasibility Study. The study is looking at a transport network to serve Parramatta's growth and it will determine the best mode and alignment to encourage transport demand and urban renewal.

Part 1 of the feasibility study identified 15 strategic corridors within 15km of Parramatta and assessed them for their potential to address the challenges facing the region. A series of multi-criteria (transport, land use, economic, social & health and environment) gateway assessments were undertaken to identify a network of four lines and a first stage of two lines. The study concluded that light rail was indeed feasible.

The preferred first stage is the Macquarie Park Line and Castle Hill which are further investigated in Part 2 of the study. Both Lines have predicated patronage of 5,000 people per peak hour.

Future stages would include a Bankstown Line which will stimulate renewal along Granville, Chester Hill and Bankstown and dramatically increase regional connectivity to education and employment opportunities. The Olympic Park Line will provide access to recreational and cultural facilities and put Sydney Olympic Park on the public transport network, as well as provide employment opportunities to the rapidly growing suburb of Rhodes.

As mentioned above, the potential of connecting the Carter Street UAP with light rail to Rhodes and Parramatta will significantly improve public transport capacity and connectivity to satisfy future travel demand expected to be generated by future residents and workers, potentially reducing some of the road infrastructure needs in the local area in the long-term.

3.0 Traffic and transport submission

3.1 Introduction

AECOM has prepared this submission in response to the Carter Street Urban Activation Precinct on behalf of Goodman. This submission focuses on the **traffic and transport** component of the Planning Proposal that is currently on public exhibition.

Our review has covered the following reports within the Planning Proposal document:

- Carter Street Planning Proposal
- Carter Street Planning Report
- Appendix B – Draft DCP
- Appendix D – Transport Assessment

The Transport Assessment makes a number of recommendations on proposed infrastructure upgrades and road network performance. Based on the documentation prepared in support of the Planning Proposal the following comments are made on transport issues:

3.2 Traffic assessment methodology

Submission

It is considered that the Traffic Assessment does not provide a transparent and robust methodology for the assessment of traffic impacts associated with the Carter Street UAP as well as the cumulative impacts of the surrounding regional development. The traffic assessment has not fully considered the potential benefits of the regional infrastructure upgrades including WestConnex and public transport initiatives, before concluding that significant infrastructure is required to cater for part of the overall proposal and the capacity of the surrounding road and public transport networks will be a constraint to accommodate the full development of the Carter Street UAP.

Scope of Issue

1) SIDRA modelling was used as the modelling tool that could not properly assess the impacts of closely spaced intersections in the study area including the ones on Hill Road, Bernie Avenue and Parramatta Road.

2) Localised intersection assessment that has not considered the benefits / impacts of the regional infrastructure upgrades such as WestConnex.

Recommendation

As stated within the Transport Assessment, a wider-area traffic modelling should be undertaken to determine the capacity of the surrounding road network, which has significant implications for the operation of the localised intersections. Microsimulation modelling should be undertaken to assess the impacts of the closely spaced intersections within the study area to determine how queuing along intersections affects the road network.

A regional traffic study should be undertaken to consider the potential benefits of the regional infrastructure upgrades including WestConnex and public transport initiatives as well as the localised impacts of these regional infrastructure such as spacing of intersections from the Motorway before confirmation of the scope, cost and responsibility for the final local and regional package of traffic and transport infrastructure required to deliver the proposed development of the Goodman site within the Carter Street UAP as well as the Wentworth Point UAP and the Sydney Olympic Park (SOP) Master Plan.

3.3 Land use

Submission

The proposed B6 – Enterprise Corridor within the Carter Street UAP has been capped to 33% of its full theoretical floor space due to the commercial employment land use generating high volume of traffic and putting additional pressure on the road network. This raises the question, whether high density employment is suitable at this location.

Scope of Issue

Given the high yield employment use, it is likely that the employment zone as proposed by NSW P&I as part of the Carter Street UAP will generate significant amount of traffic to the local area. The employment zone is expected to contribute two-thirds of the total trip generation of the Carter Street UAP, double the amount of trips expected to be generated by the residential component of the UAP.

It has been demonstrated by the Transport Assessment that the employment use as proposed by NSW P&I is expected to put significant amount of pressure on the surrounding road network and will jeopardise the amenity of the road network leading to the residential area north of Carter Street and the interface between the two land uses in such proximity. Significant investment in additional public transport services and infrastructure as well as sustainable transport measures and travel demand management initiatives are required for such high yield employment use to ensure traffic impacts may be slightly reduced. The more intense employment use will also generate and attract service vehicles, which could have further impacts to the local amenity.

Recommendation

It is suggested that the NSW P&I re-consider the use of the proposed B6 – Enterprise Corridor to another use with lower trip generation as a result of its likely high traffic impacts to the surrounding road network and the difficulty to mitigate the likely traffic impacts even with additional investment in public transport services and infrastructure as well as sustainable transport measures and travel demand management initiatives. Alternative land uses to high yield employment or maintaining its existing use need to be considered to avoid significant traffic congestion in the local area.

3.4 Trip generation rate

Submission

It is considered that the trip generation rates adopted in the Transport Assessment are too high and may not have fully accounted for the mode shift away from car use as a result of public / active transport infrastructure and initiatives proposed for this UAP as well as other Government investment proposed in the wider Sydney Olympic Park area (as discussed in **Section 2** of this report).

Scope of Issue

1) Residential use - the use of 0.3 vehicle trips per residential dwelling is on the higher end of the range in the latest RMS trip generation surveys for high density residential flat dwellings that are close to public transport and greater than six storeys[1]. The rate adopted is 60% higher than the average AM rate (0.19) and 100% higher than the average PM rate (0.15) as derived from latest traffic surveys of similar sites[2]. One of the reasons why peak hour trip rates for higher density dwellings is lower because more people choose to travel outside the peak hours. The Transport Assessment did not justify why a rate that is significantly higher than the average peak hour rate is used. The significantly higher rate used in the Transport Assessment may have over-estimated the impacts of the Carter Street UAP and the extent of infrastructure required to cater for the proposal.

2) Commercial use – the actual vehicle trip generation adopted for the office development was not clear in the Transport Assessment. However, according to the Technical Direction (TDT 2013/04) Guide to Traffic Generating Developments, the surveyed site at Sydney Olympic Park generated 1.48 trips per 100m^2 of GFA during the AM peak and 1.41 trips per 100m^2 of GFA during the PM peak when the office block has a

[1] Technical Direction (TDT 2013/04) Guide to Traffic Generating Developments – updated traffic surveys, May 2013
[2] These similar sites are located in St. Leonards, Chatswood, Cronulla, Rockdale, Parramatta, Liberty Grove, Strathfield and Pyrmont.

density of approximately seven staff per 100m^2. An even lower trip generation rate could result for the proposed commercial space in the Carter Street UAP based on a density of five staff per 100m^2.

3) It is unclear how the total trip generation of the UAP was derived in the Transport Assessment.

Recommendation

The trip generation rates adopted in the Transport Assessment should be further justified when they deviate from the average of a number of surveyed sites of similar conditions in the case of residential development or specific rate of a similar development at the same location in the case of commercial development. Given the significant difference in rates adopted and therefore the total trip generation of the whole UAP, sensitivity tests should be undertaken to understand the variability of impacts to the surrounding network.

Additional information / clarifications are needed to explain how the total trip generation expected for the UAPwas derived.

3.5 Car share scheme

Submission

The Transport Assessment quoted that car share schemes are becoming an increasingly attractive option. One car share vehicle replaces the need for 9-13 private cars. It is supported that the feasibility of car share schemes in the future development as part of the Carter Street UAP be further investigated and the potential reduction in trip generation should be taken into account into the traffic impact assessment.

Scope of Issue

The reduced vehicular impacts to the surrounding road network as a result of the potential implementation of car share schemes have not been quantified in the Transport Assessment.

Recommendation

Additional research and investigation into the feasibility of car share schemes as part of the future development o the Carter Street UAP is recommended. The feasibility and benefits should also translate into a reduced trip generation to be taken into account in the updated Transport Assessment.

3.6 Trip distribution

Submission

It is considered that the trip distribution pattern adopted in the Transport Assessment may not represent changes in travel patterns in the long-term future as a result of changes in job location and other road network improvements to the north of Carter Street as a result of Wentworth Point UAP and SOP Master Plan.

Scope of Issue

The future year assessment was based on the trip distribution pattern of 2011 JTW trip destinations. With the changes in job locations in the future and other road network improvements to the north of Carter Street as a result of the Wentworth Point UAP and SOP Masterplan, the travel pattern and direction of travel could be shifted to the north and therefore put less pressure and reduce the infrastructure needs on the Parramatta Road intersections.

Recommendation

A regional traffic study should be undertaken to consider the potential changes in trip distribution as a result of changes in job locations in the future and additional capacity provided by regional infrastructure upgrades. This will provide a much better reflection of trip distribution in the future and therefore where additional infrastructure is required to cater for the additional development trips as a result of the Carter Street UAP.

3.7 M4 (WestConnex) associated infrastructure

Submission

As a result of WestConnex and the changes proposed to the eastbound off-ramp at Hill Road, the Transport Assessment has identified an issue with the right turn at Hill Road onto Carter Street and has recommended provision of a median preventing vehicles coming from the M4 Motorway from turning right onto Carter Street. This will have flow-on impacts on the surrounding road network depending on where traffic (and potentially heavy vehicle traffic) is diverted. A feasible and practical solution is required to ensure that traffic can access the Carter Street precinct at Hill Road from the M4 (WestConnex) efficiently.

Scope of Issue

1) The prevention of vehicles turning right onto Carter Street from the M4 Motorway requires vehicles to travel further north onto Old Hill Link and Edwin Flack Avenue or use the John Ian Wing Parade extension (when implemented) to access the Carter Street Precinct. The diversion onto John Ian Wing Parade would increase the number of vehicles passing through the residential area to access the employment area of the Carter Street UAP. As a result, a heavy vehicle load limit has been proposed to reduce the number of trucks through the residential area. However, the potential diversion route for heavy vehicles as a result of the load limit on John Ian Wing Parade has not been discussed in the Transport Assessment.

   The alternative solution to cater for the right turn movements from the M4 into Carter Street is to move the location of the Hill Road / Carter Street intersection further north. However, the feasibility of this solution has not been considered in detail within the Transport Assessment.

2) No westbound off-ramp at Hill Road is currently proposed as part of WestConnex. However, a direct off-ramp connection from the motorway at this location will significantly improve the accessibility to all the proposed development in the vicinity of Sydney Olympic Park including the Carter Street UAP and Wentworth Point UAP. This may negate the need for a number of local intersection upgrades required in the surrounding road network if this proves to be feasible.

Recommendation

A corridor study should be considered in particular along Hill Road to identify a preferred access strategy between the M4 (WestConnex) motorway and the Carter Street Precinct which specifies the optimal spacing of intersections along Hill Road with Parramatta Road, M4, Carter Street and John Ian Wing Parade as a minimum. A design solution to provide safe and efficient vehicle, pedestrian and cycle access to the Carter Street UAP as a result of the WestConnex project should be thoroughly investigated by the WestConnex Delivery Authority. It should be noted that this corridor study would be included as part of the regional traffic study as recommended above.

It is also suggested that the WestConnex Delivery Authority continue to investigate the feasibility and benefits / impacts of constructing a westbound off-ramp at Hill Road, which would improve accessibility to all proposed development in the vicinity of Sydney Olympic Park.

The development feasibility of the Carter Street UAP should be reviewed at the conclusion of the westbound off-ramp feasibility study.

3.8 Cumulative impacts assessment

Submission

The Transport Assessment did not clearly include the staging assumptions or feasibility of other development areas such as SOP Master Plan and Wentworth Point UAP by 2031 in the cumulative assessment.

Scope of Issue

The cumulative assessment undertaken to determine the achievable development levels for the Carter Street UAP did not clearly show the staging assumptions or feasibility of other development areas such as SOP Master Plan and Wentworth Point UAP by 2031. The worst case assumptions of 100% of all development in the region may have over-estimated the total cumulative impacts to the surrounding road network and in turn limited the development feasibility of Carter Street UAP.

Recommendation

A regional development feasibility study should be undertaken to consider the short, medium and long-term feasibility of all proposed development for SOP Master Plan, Wentworth Point UAP, Carter Street UAP and other potential development as considered in the Transport Assessment.

3.9 Recommended road improvements and achievable development levels

Submission

The recommended road improvements and achievable development levels of the Carter Street UAP need to be reviewed in light of all the issues raised above in Sections 3.2 to 3.8.

Scope of Issue

The traffic impact section of the overall study in particular the outcomes for the recommended road improvements and achievable development levels of the Carter Street UAP as currently documented in the Transport Assessment, may not be justified as a result of all the changes required in the assessment methodology and assumptions as raised in Sections 3.2 to 3.8.

Recommendation

The outcomes of the overall Transport Assessment, in particular the recommended road improvements and achievable development levels of the Carter Street UAP should be reviewed as a result of changes required in the assessment methodology and assumptions as raised in Sections 3.2 to 3.8 including the need to undertake a regional traffic modelling and assessment study.

3.10 Infrastructure apportionment

Submission

The Planning report assumes that, in delivering the package of road network upgrades required to support the Carter Street UAP, the developer is required to fully fund a number of intersections identified as part of the local traffic improvements.

Scope of Issue

Measures for local traffic improvements require a number of intersections providing access to the Carter Street Precinct to be upgraded, these include:

- Hill Road | Carter Street (signalisation, upgrade)
- Hill Road | John Ian Wing Parade (modification of signals and upgrade)
- Edwin Flack Avenue | Dawn Fraser Avenue | Uhrig Road (signalisation)
- Birnie Avenue | Carter Street (signalisation)

These intersection upgrades have been proposed to be fully funded by the developer in the Planning Report however the intersection of Hill Road | Carter Street and Birnie Avenue | Carter Street have been identified for upgrades as part of the SOP Master Plan. Intersection modelling in the Transport Assessment also indicates these two intersections currently operate at LoS F during the PM peak, requiring upgrades to address existing deficiencies.

The future base scenario (without Carter Street UAP) identified that the intersection of Edwin Flack Avenue / Dawn Fraser Avenue / Uhrig Road needs to be upgraded by 2031 as a result of increasing traffic of other developments.

Recommendation

The responsibility of funding of regional and local infrastructure items identified to support the Carter Street UAP needs to be coordinated with a number of stakeholders and should be reviewed after the regional traffic study is undertaken.

3.11 Public transport improvements

Submission

A number of regional public transport improvements have been suggested in the Transport Assessment to support the regional development in the vicinity of Sydney Olympic Park including the Carter Street UAP. Some of the proposals for higher order transit modes should be further investigated as part of a broader regional transport assessment to improve public transport accessibility to the Sydney Olympic Park specialised centre, supported by high density growth in residential and employment uses.

Scope of Issue

1) The rail section (Section 6.1) suggested that the Olympic Park Line is to remain as a shuttle service with an interchange required at Lidcombe. However, it is suggested that options to run more direct train services to Olympic Park Train Station should continue to be investigated as part of the on-going review of the Sydney's Rail Future, to improve the convenience and attractiveness of travelling to Sydney Olympic Park and the Carter Street Precinct via train.

2) The light rail section (Section 6.2) recommended that further feasibility assessments be undertaken for the Sydney Olympic Park Line of the Western Sydney Light Rail Network to the same level of detail as that undertaken for the Macquarie Park and Castle Hill alignments, in order to consider the relative merits of the proposed light rail line against other light rail proposals and its place in a broader regional transport network.

Recommendation

A regional transport assessment should be undertaken to continue to investigate the feasibility of running more direct train services to Sydney Olympic Park or connecting Sydney Olympic Park to Parramatta and Rhodes via light rail.

3.12 Access and movement

Submission

The pedestrian and cycle network proposes on-road cycle and pedestrian paths for Uhrig Road and other local streets that provide important connections to the regional cycle network. Providing on road cycle and pedestrian paths in these locations may not be appropriate

Scope of Issue

One of the key strategic directions in the Sydney's Cycling Future is that regional cycle networks within five kilometres of Sydney Olympic Park should be segregated to traffic to improve safety and attractiveness to travel by bike via off-road shared path networks. Therefore, it may not be appropriate to provide on-road cycle facilities along key connections to the wider regional cycle network.

Recommendation

The current proposal of on-road cycle route should also be reviewed to ensure safe and attractive connections are provided within the precinct to connect to the wider regional cycle network.

4.0 Implications of additional yield on site

Goodman has been undertaking a review of the potential yield within the area north of Carter Street (under Goodman ownership) required to ensure the development within the Goodman site is financially viable.

The Carter Street UAP currently proposes an average Floor Space Ratio (FSR) of 2:1 which yields approximately 5,445 residential dwellings. The feasibility review undertaken by Goodman however suggests that an average FSR of 2.75:1 is required to have a financially viable development. An average FSR of 2.75:1 on the Goodman site is expected to yield approximately 7,525 residential dwellings, an additional 2,080 dwellings compared to NSW P&I's proposal within the Goodman site.

A comparison of the trip generation under the two development scenarios is provided below:

Scenario	Residential dwellings	FSR assumption	Trip generation rate	Total trips generated
Current UAP proposal	5,445	2:1	0.3 trips per dwelling	1,630
Additional yield on site	7,525	2.75:1	0.19 trips per dwelling in AM peak 0.15 tips per dwelling in the PM peak	1,430 in AM peak 1,130 in the PM peak

As discussed in **Section 3.4**, it is considered that the Transport Assessment undertaken for the Carter Street UAP has adopted significantly higher trip generation rates for residential use, given that the proposed development in the Carter Street UAP is accessible to a good public transport network. Evidence has also shown that high density developments with the support of good public transport infrastructure and services will help to reduce car usage.

Therefore, even with the potential higher development yield proposed by Goodman, it is likely that there will be fewer trips generated by the development, assuming that the average trip generation rate is adopted when compared to the Transport Assessment prepared for the Carter Street UAP.