

23 December 2020

218316

Ms Prity Cleary  
Senior Planning Officer  
Social and Other Infrastructure Assessments  
Department of Planning, Industry and Environment  
4 Parramatta Square  
Parramatta NSW 2150

Dear Prity,

## **RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION – TRAFFIC PEER REVIEW WESTMEAD CATHOLIC COMMUNITY SSD-10383**

We write in response to the letter received from the Department of Planning, Industry and Environment (DPIE) dated 24 November 2020, requesting additional information following the independent peer review of the Traffic Impact Report for the Westmead Catholic Community (WCC). In addition to DPIE's RFI letter, detailed comments have been provided by the peer reviewer, Bitzios Consulting. A meeting was held between DPIE, Bitzios Consulting and the Applicant on Friday 4 December 2020 to discuss the concerns that have been raised. At this meeting, DPIE questioned whether the site is suitable for the proposed school expansion.

We note that a response has also been provided by City of Parramatta Council, however DPIE has advised that Council's letter was provided for information only.

On this basis, this response addresses the questions raised by DPIE and Bitzios Consulting. This cover letter reiterates why the site is suitable for the proposed school expansion and details the solutions that will, or could be, implemented to ease traffic congestion in the Westmead Precinct. Specifically, we draw DPIE's attention to the Department's recently released Westmead 2036 Draft Place Strategy. As outlined in **Section 1.2**, the Strategy reinforces Westmead's role as a world-class innovation, education and health precinct. The expansion of the WCC is directly aligned with the Strategy.

The letter prepared by TTPP (refer **Attached**) should be referenced for a detailed, technical response to each of the issues raised by DPIE and Bitzios Consulting.

Finally, as requested by DPIE via email on 24 November 2020, this letter considers the implications of the proposed amendments to *State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017*.

## **1.0 Suitability of the Site for the Proposed Development**

This section reiterates why the site is suitable for the proposed development.

### **1.1 Expansion and Growth in the Westmead Precinct**

The Westmead Innovation Precinct is the largest health and education precinct in Greater Sydney, with hospitals, universities, research institutions and allied health services.

The WCC site is located within the Innovation Precinct, presenting a unique opportunity to collaborate with existing institutions as the precinct is developed. The Central City District Plan outlines that **growth in the Westmead Innovation Precinct is a priority**, noting that:

- Westmead is one of the largest integrated health, research, education and training precincts in Australia and provides health services to almost 10 per cent of Australia's population.
- Westmead is already a major contributor to the Australian Government's National Innovation and Science Agenda through its training of world-leading scientists, analysis and successful collaborations.
- The \$900 million project and expansion of the University of Sydney and Western Sydney University Westmead campuses will increase Westmead's workforce from 18,000 to 32,000 by 2036. With additional investment, Westmead has the potential to provide 50,000 jobs. The number of university students is expected to grow from 2,000 to 9,000 by 2036.

Furthermore, growth in the Westmead precinct is forecast to bring **4,400 new dwellings into the area**.

**To support this predicted growth, additional infrastructure, such as improved schools, will be required to service the growing worker and resident population.** Specifically, demographic modelling undertaken by DPIE shows that:

- The number of school-aged children is projected to increase over the next 20 years. In the Central City District, an extra 89,360 students will need to be accommodated in both government and non-government schools by 2036.
- **32% of this predicted growth in school students is predicted to occur in Parramatta, whilst 34% of the anticipated growth of children four years and younger in the Central City District will also occur in Parramatta.**
- The Central City District Plan identifies that this will require planning early education and school facilities, which should encourage innovative approaches to the use of land and floor-space, including co-locating with compatible uses such as primary schools and office buildings, and close to transport facilities.

**The WCC is ideally situated to assist in supporting this demand.** The WCC schools accept students from all backgrounds and denominations, ensuring that the diverse population can benefit from high quality schools in an accessible location.

## 1.2 Alignment with the Westmead 2036 Draft Place Strategy

The role of Westmead as a world-class innovation, education and health precinct has been further reinforced by the release of the Department's Westmead 2036 Draft Place Strategy on 14 December 2020. The Strategy outlines the vision for the district over the next 20 years.

The WCC is located within Sub-precinct 2 – the Health and Innovation precinct. This area is described as Westmead's 'engine room', defined by its world-class health, research, education and innovation facilities. It sits just north of Sub-precinct 1 – the Westmead South precinct which is proposed to be a walkable residential neighbourhood, which will offer housing choice and diversity.

The proposal will clearly support the objectives of these precincts, providing facilities to meet growing demand for education, within walking distances of an identified residential precinct. The potential for improved connections between North and South Westmead (via a rail underpass and green link) would enhance connectivity and support non-car travel between these precincts.

**It is evident that the WCC proposal will support, and is supported by, the 'Big Moves' and Place Strategy Directions outlined in the Strategy.** In particular.

- Big Move 5 – Capitalise on connectivity from Parramatta Light Rail and Sydney Metro to reduce car dependency and make walking and cycling the mode share of choice for short trips.
- Direction 1, Objective 3 - Improve the road network to increase connectivity and effective movement of vehicles. DPIE has acknowledged the need to improve connectivity and to develop the street network and hierarchy.

- Direction 2, Objective 1 - Allow for better precinct permeability, wayfinding and personal mobility by improving connections between North and South Westmead, and improving active transport links.
- Direction 7 - Deliver a range of social infrastructure and services that support community diversity and wellbeing to enhance the appeal and competitiveness of Westmead, including Action D7. A2 which seeks to **investigate opportunities for primary and secondary school needs, noting projected residential growth in Westmead South and Parramatta North.**

Further, the Strategy recognises the importance of Hawkesbury Road as a key activity spine and transport connection. The Strategy seeks to create vibrant activity nodes that are co-located with the Metro, Parramatta Light Rail and T-way stations, and to establish a centralised pedestrian experience on Hawkesbury Road connecting north and south Westmead.

It is also noted that the Strategy is silent on road improvements which suggests that these initiatives will be achieved by public transport enhancement rather than by providing additional road capacity. However, the Strategy does refer to the need to *'explore a ring road for vehicle movement within the Health Enterprise sub-precinct'*. This may, depending on how this is delivered, reduce traffic flows on Darcy Street.

Notably, the Strategy does not identify any connections into or through the WCC campus. As DPIE is aware, the WCC Masterplan includes north-south and east-west connections, including the east-west connection that has been envisaged by Council in the draft Westmead Innovation District Master Plan. CEDP remains committed to delivering these connections as part of future stages of the Masterplan.

### 1.3 Meeting Existing and Future Demand for Education Facilities

As detailed above, Westmead is experiencing exponential population growth and investment from both the local and State government. The population of the catchment area is expected to increase to 1.875 million people by 2036, an increase from 1.25 million in 2016.

**This will result in a shortfall of 9,530 primary places and 11,738 secondary places in the Catholic and Government school systems by 2036.**

At the same time, the demand for Catholic education in the area continues to grow, and each year the four WCC schools turn away enrolments. This is primarily due to capacity limits, and this number will only increase with the projected population growth in the area. The WCC presents an opportunity for increased student capacity in a highly accessible location.

### 1.4 Providing Social Infrastructure in Proximity to Public Transport

The existing site benefits from a high level of accessibility, close to rail, bus and road connections, as well as the future Parramatta Light Rail and Metro station. Specifically:

- There are a number of bus services that connect Westmead with Parramatta and the Hills District, with bus stops located along Darcy Road.
- Westmead Train Station, which is served by the T1 Western Line and T5 Cumberland Line, is located 300m to the east. These services connect to Parramatta, Liverpool and the Sydney CBD.
- In the future, the site will be serviced by additional public transport infrastructure including the Parramatta Light Rail (under construction) and Sydney Metro West (proposed). The connectivity improvements suggested by the Westmead 2036 Draft Place Strategy would facilitate pedestrian access between these services and the WCC.

### 1.5 Summary of Site Suitability

Whilst it is acknowledged that there is traffic congestion within the precinct, this is an existing, precinct-wide issue and is not solely a result of the proposed development. If the Government's vision for the Westmead Precinct is to be realised, a precinct-wide response will need to be established. Based on the Westmead 2036 Draft Place Strategy, it is expected that this will be achieved through public transport enhancements rather than by creating

additional road capacity. The opportunities for Catholic Education Diocese Parramatta (CEDP) to assist in alleviating existing congestion issues are addressed at **Section 2.0**.

Despite this, there is an acknowledged and growing demand for schools in the area. The 2036 Draft Place Strategy identifies the need to investigate opportunities for primary and secondary school needs. The WCC is an existing school campus, located within walking distance of significant public transport infrastructure and an identified housing growth area. The site is capable of accommodating additional students, and will reduce the burden on School Infrastructure NSW and other education providers to accommodate demand for schools in the area. It is evident that the site is suitable for the proposed school expansion, as outlined below:

- **Continuation of education uses on the site and ability to accommodate growing demand** – The proposal seeks to continue the use of the existing schools on the WCC site. The development has been designed to integrate with the existing school facilities and will allow for increased capacity in an identified growth precinct which is set to accommodate 4,400 new dwellings and 50,000 new jobs.
- **Supports Strategic Planning Policy and Demand for Schools** - The expansion of the WCC is directly aligned with the strategic intent for the Westmead Precinct, including many of the actions and objectives contained in the Department's Westmead 2036 Draft Place Strategy. Further, the proposal will assist in supporting the existing and future demand for school places resulting from the expansion of the Westmead Precinct.
- **Supports Government Investment in Public Transport Infrastructure** - WCC benefits from access to a range of public transport services, being within walking distance of heavy rail, future light rail and bus options. This supports opportunities for increased non-car mode share to minimise impacts on traffic and parking, and aligns with the intent of the Westmead 2036 Draft Place Strategy to capitalise on transport connectivity and reduce car dependency.
- **Consistency with site zoning and relationship with surrounding uses** – The proposed land use is permissible within the zone, being the SP2 Educational Establishment and is consistent with the objectives of the zone. The proposal responds to the site's context within the Westmead Innovation Precinct, and will promote integration with the surrounding health and education uses.
- **Ability to manage environmental impacts, including traffic impacts** – As detailed in the submitted EIS, environmental impacts associated with the proposed development are capable of being managed and mitigated. This response provides further details around how traffic impacts associated with the proposal can be mitigated and managed.

Based on the above, the site is clearly suitable for expansion of the existing school facilities.

## 2.0 Proposed and Potential Solutions to Existing Traffic Congestion

As noted above, traffic congestion is a precinct-wide issue and is not solely a result of the proposed development. If the Government's vision for the Westmead Precinct is to be realised, a precinct-wide response will need to be established. Based on the Westmead 2036 Draft Place Strategy, it is expected that this will be achieved primarily through public transport enhancements rather than by creating additional road capacity. CEDP's proposal to increase non-car mode share supports this approach.

This section summarises the measures that CEDP is proposing to implement as part of the SSD DA, as well as opportunities for additional measures that could be implemented on-site, as part of a precinct-wide solution.



## 2.1 Measures proposed as part of the SSD DA

As DPIE is aware, a number of measures have been incorporated into the proposal to assist in easing traffic congestion in the precinct. These include:

- Improvements to pick-up and drop-off arrangements on the campus, including construction of the separate high school car park and pick-up and drop-off area (subject to approved Early Works DA), and improvements that are currently underway to improve capacity at the primary school pick-up and drop-off area;
- Improved pedestrian amenity and safety at the campus' main entry points – including at the Darcy Road entry and the new high school car park;
- Implementation of a Green Travel Plan targeting a 10% mode share shift (refer to discussion below); and
- Provision of OOSH facilities on the campus (refer to further discussion below).

Given the proposed growth on the campus, CEDP acknowledges that it would be appropriate to pay Development Contributions in this instance and would accept a 1% levy. It is suggested that the contribution be directed towards infrastructure and green travel initiatives that would improve access within the Westmead Precinct.

### Green Travel Plan

Concerns have been raised about the viability of the proposed 10% modal shift.

The Applicant has been working with Frank Turquoise, who advises the Department of Education about travel plans for their schools. It was agreed that with a concerted effort from the schools, and with the introduction of light rail adjacent to the school and discussions with bus companies about more targeted services, a 10% modal shift would be achievable.

TfNSW also suggested that a 10% should be the targeted in their submission.

Achieving the 10% mode share shift is considered achievable and modest, noting the following:

1. 160 students live within walking distance of the site and 184 live along an existing public bus route.
2. The 10% mode shift for the primary students requires only 66 students to change travel mode over the next two years (33 students a year). As growth occurs, only 5-10 students will need to change mode each year to achieve the 10% shift.
3. A Travel Coordinator is being employed and will conduct personalised trip-planning sessions with students.

Residential density within walking distance of the WCC is going to increase, noting that the Draft Strategy identifies the need for 4,400 additional dwellings within the Westmead Precinct, including in Westmead South directly south of the site. This growth will be supported by improved connectivity and permeability for pedestrians and cyclists. On this basis, it is considered that the 10% mode share target is modest, and the schools will eventually look to target a 20% mode share shift. In addition, strategies and programs will be implemented to reduce staff travel to the site.

Finally, CEDP is noticing that primary school children are increasingly environmentally aware, and actively want to participate in green travel initiatives. Together with programs to promote active travel and safety initiatives such as bag trackers which notify parents when children have arrived at school, the proposed mode share shift is considered eminently achievable.

### Out of School Hours Care

Concerns have been raised regarding the number of students that are anticipated to use the proposed OOSH facilities. In response, CEDP has undertaken a review of OOSH usage rates. In summary:

- Average uptake across CEDP schools is approximately 20%, with 15% growth being seen year-on-year across their schools, for example:
  - St Monica's 28%

- Mother Teresa 18%
- Government schools in western Sydney are showing OOSH usage rates in the order of 20 – 30%, for example:
  - Rosehill Public School 21%
  - Burnside Public School 24%
  - Oatlands Public School 29%

Based on the above, and acknowledging the employment growth expected in the Westmead Precinct and the site's proximity to Westmead Hospital, the project assumes a higher uptake to support the 24 hour workforce in the precinct. CEDP has looked for examples of other primary schools adjacent to growth precincts and hospitals. Schools in the Ryde area are considered comparable given the growth in the area and the presence of Macquarie Hospital. The following OOSH usage rates were identified:

- Truscott Street Primary 29%
- North Ryde Public School 33%

Based on these figures, the projected growth for the Westmead Precinct and the proximity of the site to Westmead Hospital, the proposals assumes that 40% of students will attend OOSH.

## **2.2 Additional measures that could be implemented on-site**

In addition to the measures that have already been incorporated into the proposal, CEDP is willing to explore the following additional solutions to improve connectivity into and through the site. It is noted that these cannot be completed without the cooperation of other landowners in the precinct, however CEDP can provide connections within the boundaries of the WCC. These connections include:

- A pedestrian connection to Farmhouse Road, within the site.
- An on-grade pedestrian footpath connection within the site to the future Sydney Metro Tunnel (to be delivered by others).
- An on-grade pedestrian footpath connection within the site to the future rail crossing/tunnel (to be delivered by others).
- Connection to the future Bridge Road link, within site.

The implementation of these measures would support improved connections to public transport and improved permeability, particularly for pedestrians and cyclists. This is consistent with the intent of the Draft Place Strategy.

## **3.0 Proposed Amendments to State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017**

The Department is currently undertaking a review of the Education SEPP aimed at improving the operation, efficiency and usability of the SEPP and supporting documents. Public exhibition of the proposed amendments finished on 17 December 2020.

The proposed amendments include:

- Providing changes to CIV thresholds to ensure planning assessment pathway is commensurate with scale and impacts of proposed project;
- Enabling two storey facilities to be constructed as development without consent; and
- Proposed amendments to the Child Care Planning Guideline.

The proposed amendments would have very limited implications to the proposed development.

It is proposed to amend Subclause 15(2), Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) to increase the capital investment value for alterations and additions to existing schools from \$20 million to \$50 million. The proposed development has a CIV of approximately \$80 million, and so would continue to be SSD.

With respect to other key changes proposed to the Education SEPP, the scale of the development exceeds two storeys and could not be carried out as development without consent.

Several changes are proposed to the Child Care Planning Guideline. Many of the changes would not impact the proposed Catholic Early Learning Centre. The proposal complies, or is capable of complying with, the proposed changes to the Guidelines as far as relevant to the proposed development.

## 4.0 Conclusion

We trust this information will enable DPIE to finalise their assessment of the application, and schedule a hearing date for the Independent Planning Commission. Please do not hesitate to contact me on the details below if you have any questions.

Yours sincerely,



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*Associate Director, Planning*  
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Our Ref: 18173

23 December 2020

WINIM Developments Pty Ltd  
Suite 214, 40 Yeo Street  
NEUTRAL BAY NSW 2089

**Attention: Ry Stephen**

Dear Ry,

**RE: WESTMEAD CATHOLIC COMMUNITY  
RESPONSE TO DEPARTMENT OF PLANNING LETTER DATED 24<sup>TH</sup> NOVEMBER 2020**

## Background

A formal response from the Department of Planning, Industry and Environment (DPIE) was received on 24<sup>th</sup> November 2020 which included related referral letters from City of Parramatta Council dated 1<sup>st</sup> October 2020 and a peer review undertaken by Bitzios dated 2<sup>nd</sup> November 2020.

We note that the issues raised in the Bitzios report, and City of Parramatta Council and Transport for NSW submissions have been broadly summarised in the DPIE letter and these more general topics have been addressed later in this letter. The detailed response to the "High Priority" items raised in the Bitzios peer review is included in Attachment One. It is noted that this letter which responds to DPIE's queries specifically should be read in conjunction with the responses to Bitzios' comments as well for further substantiating evidence.

Throughout

## Context

Notably, the Westmead Catholic Community Education Precinct ("the Proposal") sits within an area of planned growth.

The NSW Government Westmead precinct is one of the largest health, education, research and training precincts in Australia and a key provider of jobs for the greater Parramatta and western Sydney region. More than \$3 billion has been committed by government, universities

and the private sector to upgrade and expand the precinct's health services, education and medical research facilities over the coming years.

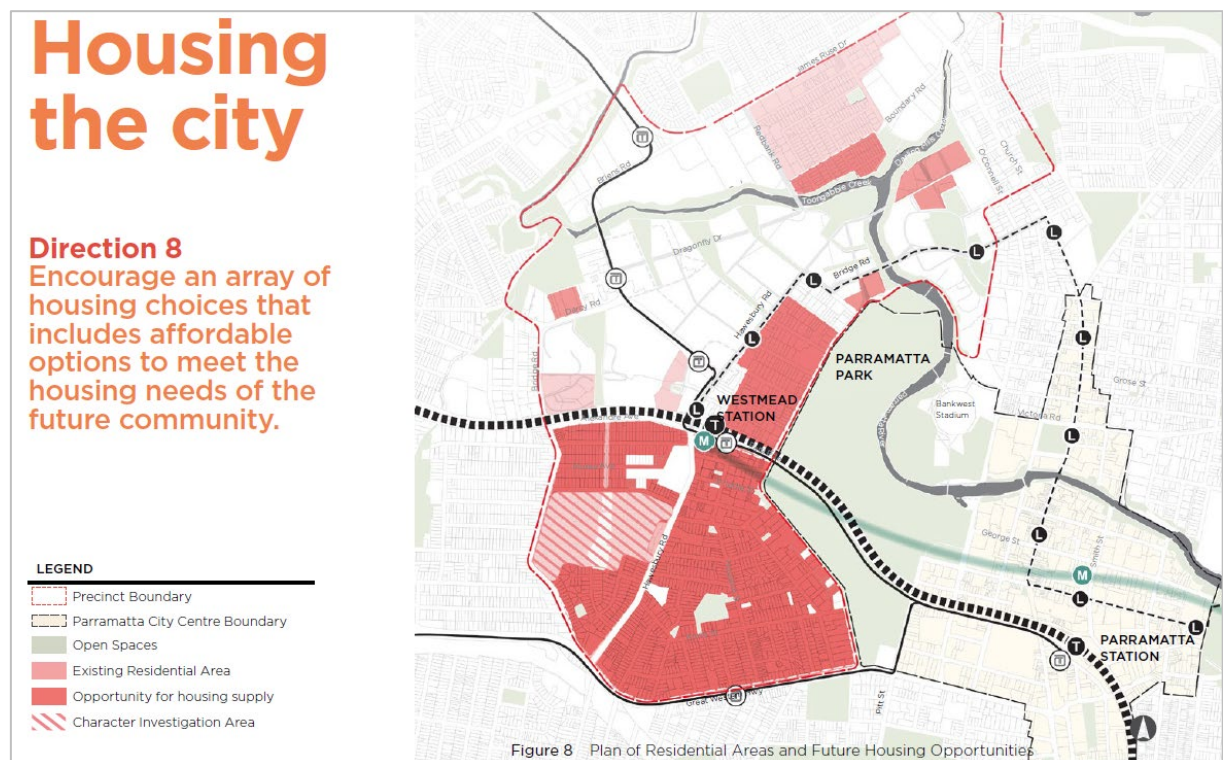
As stated at the meeting held with Transport for NSW (TfNSW) on 4 December 2020, it was reinforced that the whole precinct is in a state of flux and that the transport situation in 2036 is likely to be significantly different to what it is currently. The transformation of Westmead plays an important role in delivering the vision of Greater Parramatta as Sydney's Central River City.

Indeed, it is of note that the *Westmead 2036 Draft Place Strategy* (issued for comment in December 2020) aligns with many of the strategies of the Proposal.

For example, Action D7.A2 identifies the need to “Investigate opportunities for primary and secondary school needs, noting projected residential growth in Westmead South and Parramatta North”.

The Strategy also describes where increased housing stock is to be provided in the future, namely, to the immediate south of the school separated by the railway. The plan is for this to become a walkable neighbourhood providing more housing choice and diversity, with an urban village at its heart and excellent public transport connections.

**Figure 1: Direction for Future Housing in Westmead Precinct**



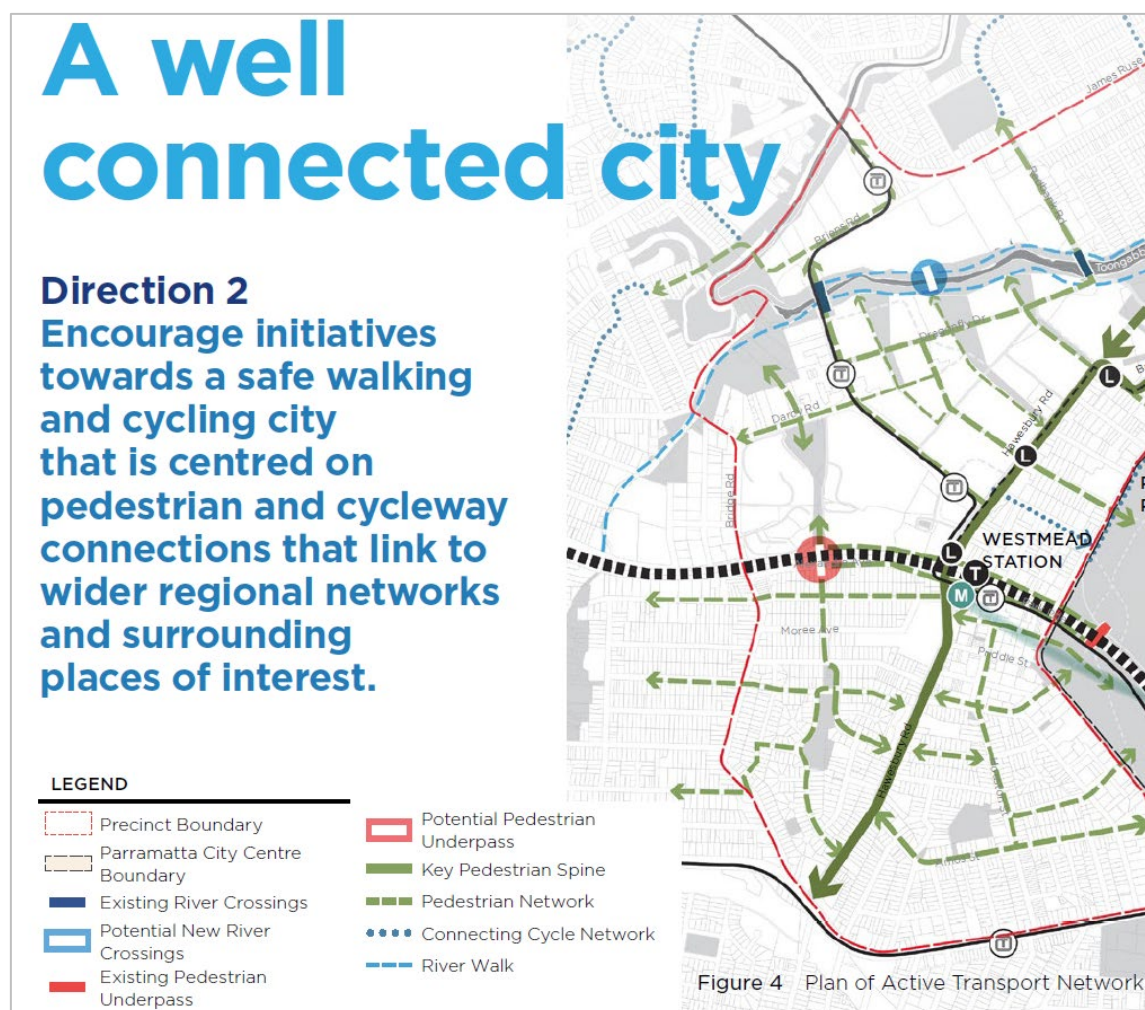
Source: *Westmead 2036 Draft Place Strategy*, December 2020



One of the proposed “Big Actions” of the Strategy is to capitalise on transport connectivity and reduce car dependency by improving “connections between North and South Westmead by enhancing existing and creating new rail crossings” and “Explore the function of these rail crossings for active transport to create one connected green grid”.

This potential underpass connection between the north and south of the site as a green connection is highlighted several times within the Strategy. Figure 2 illustrates the future pedestrian links and potential underpass connection (beneath the rail line).

**Figure 2: Direction for Walking and Cycling in Westmead Precinct**



Source: Westmead 2036 Draft Place Strategy, December 2020



Finally, and most importantly, one of the key objectives of the Strategy is reducing car dependency. Section 5 entitled *Capitalise on Transport Connectivity and reduce car dependency* identifies the need to:

- *“Capitalise on connectivity from Parramatta Light Rail and Sydney Metro to reduce car dependency.*
- *Create an integrated multimodal interchange from Sydney Metro West with Sydney Trains, T-way buses, Parramatta Light Rail and active transport thereby improving the accessibility and connectivity of Westmead.*
- *Make walking and cycling the mode of choice for short trips.*
- *Prepare integrated transport and traffic study which considers significant modal shift to public and active transport.*
- *Improve connections between North and South Westmead by enhancing existing and creating new rail crossings. Explore the function of these rail crossings for active transport to create one connected green grid.”*

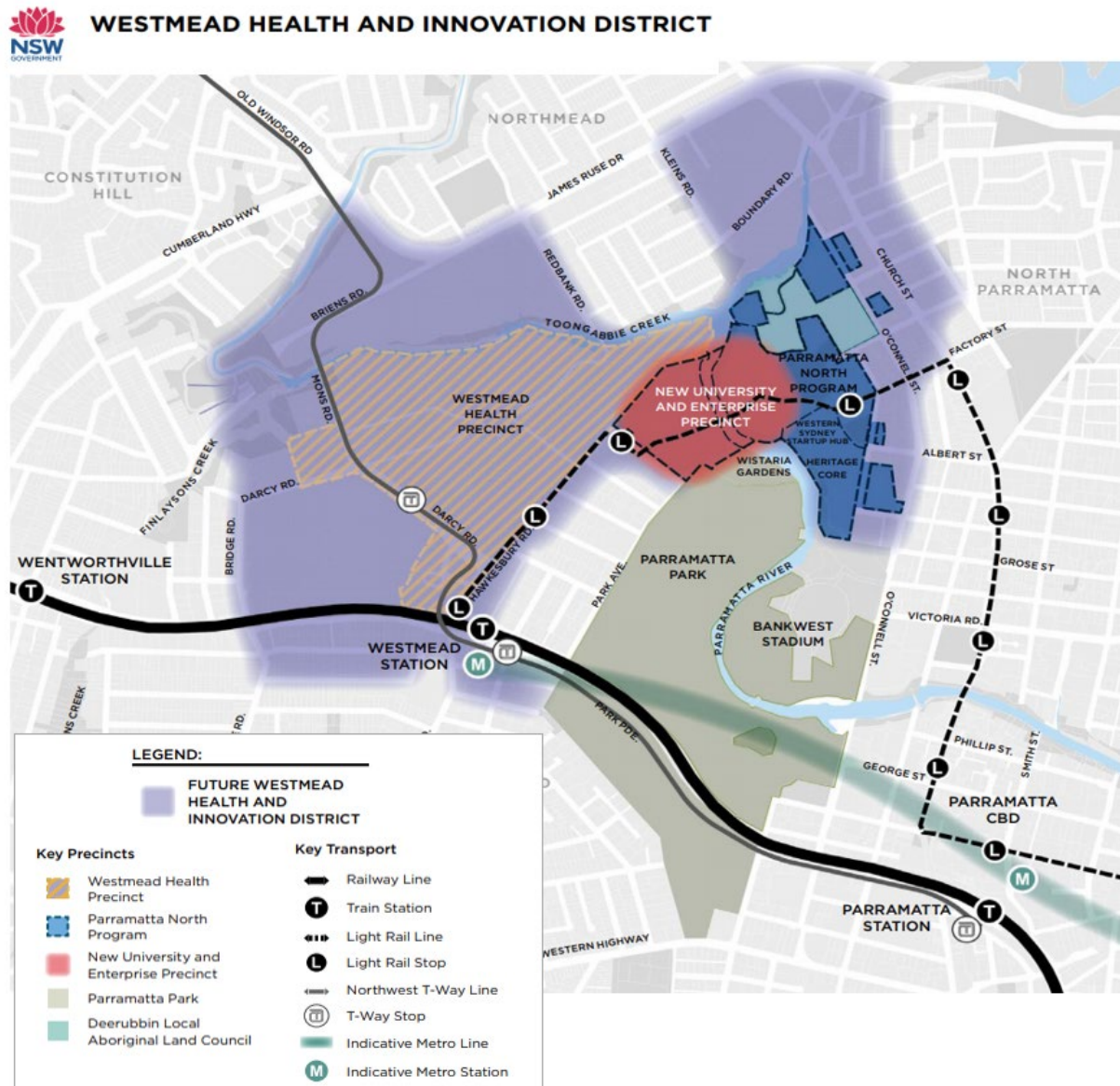
The main way to achieve this is explained by Planning Priority D6.P1 which identifies the need for *“built form intensification around future public transport stations and corridors”*.

Finally, the Strategy is silent on road improvements which suggests that such initiatives will be achieved by public transport enhancement rather than providing additional road capacity. However, the Strategy refers to the need to *“explore a ring road for vehicle movement within the Health Enterprise sub-precinct”*. Depending on how this is delivered, this may reduce traffic flows on Darcy Road.

This will result in the need for better / improved transport infrastructure. Clearly, the presence of a train station, an imminent light rail station and a future new Metro station in addition to the existing T-way and buses will mean the precinct will be served primarily by public transport. Indeed, the opportunity to provide additional traffic capacity by means of road widening and lane amplification is limited by existing land ownership and buildings. Nor is it desirable to provide additional road space and/ or significant additional car parking as this will indeed put strain on the existing road network.

Therefore, it is clear that there is a need to enhance active travel connections between the various modes of public transport to enhance walkability. Some of this will result from the introduction of Parramatta Light Rail and Sydney Metro West, and other developments within the Westmead Health Precinct. On 11 December 2020, the NSW Government and University of Sydney signed framework agreement was announced; the provision of a multi-disciplinary university campus which will create more than 20,000 new jobs and residential projects to house these employees locally. The future University precinct will be at the heart of the Westmead Health and Innovation District as shown in Figure 3.

Figure 3: Westmead Health and Innovation District



**Sources**

NSW Department of Planning, Industry and Environment, viewed online 14 December 2020, <[https://www.dpie.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0009/338976/Cumberland-agreement-explainer-Cumberland-USYD-announcement-20201211.pdf](https://www.dpie.nsw.gov.au/__data/assets/pdf_file/0009/338976/Cumberland-agreement-explainer-Cumberland-USYD-announcement-20201211.pdf)>

University of Sydney, <<https://www.sydney.edu.au/news-opinion/news/2020/12/11/world-class-new-university-campus-at-parramatta-westmead.html>>

All of these developments will create the need for improvements and the mechanism for this has not yet been finalised. For growth to be supported by infrastructure, the NSW Government website states that:

***“The Pilot Place-based Infrastructure Compact (PIC) for Greater Parramatta and the Olympic Peninsula (GPOP), is proposed to be supported by a Strategic Business Case and Strategic Plan for GPOP. This will identify regional infrastructure requirements and funding mechanisms, that will include a future Special Infrastructure Contribution (SIC). This work will continue following the public exhibition of the draft Westmead Place Strategy.***

***Both City of Parramatta and Cumberland Councils have local contributions plans that apply in Westmead. The draft Westmead Place Strategy identifies the need for further analysis to be undertaken to understand the infrastructure needs of the future population. If any planning proposals are determined before a strategy is in place, Council may need to consider available mechanisms to enable appropriate contributions towards the provision of local infrastructure that will meet the demands of the future community.”***

It should be noted that the suggested impacts upon the road network in this project were based on a “business as usual scenario” with travel mode shifts away from single-car occupancy and private car use of only 10% with the use of Out of Hours School care set to increase to 40% which would lessen the traffic impacts during the peak periods.

Notwithstanding this, other mitigation measures are being proposed as part of the Proposal including:

- Green Travel Plan targeting a minimum 10% modal shift to reduce single-car occupancy trips and private car use
- New high school car park and pick-up/ drop-off facility (which will address existing issues)
- Upgraded pedestrian access at Darcy Road
- Expansion of Out of Hours School Care (OOSH) to flatten the curve in peak periods
- New primary school pick-up/ drop-off facility being implemented on-site
- Maintenance of offset start and finish times between the primary and secondary schools
- Use of school buses and potential modification of routes to suit student addresses
- Implementation of interim drop-off/ pick-up design solution to improve traffic circulation on-site at the site access (off Darcy Road) and reduce the site's impacts on the surrounding road network.

There are also some improvements which are being planned which relate to the wider masterplan which will facilitate connections to the east, west and south. Some of these cannot be completed without other landowners in the precinct. However, the Westmead

Catholic Community can provide connections as far as their land boundaries. Improvements would include:

- Pedestrian connection to Farmhouse Road
- At-grade pedestrian footpath connection to the Sydney Metro Tunnel
- At-grade pedestrian footpath connection to future Bridge Road link (within site)
- Connection to future pedestrian connection under rail (within site).

### Response from Transport for NSW

Given that several of the queries made by DPIE and Bitzios relate to the traffic modelling component of the assessment, it is worth noting the consultation undertaken to-date with TfNSW.

TTPP reached out to TfNSW seeking traffic modelling inputs to the SIDRA modelling that was being developed for the Proposal. On 10th February 2020, TfNSW advised TTPP that *"the PLR Stage 1 EIS is the best source of forecast traffic volumes to input into your impact assessment. Once you have a model that is submitted to Transport for NSW for review."*

Having submitted the model, TfNSW responded to Prity Cleary at DPIE on 27th April 2020.

With regard to the TAIA, TfNSW queries were as follows:

- They sought guidance as to whether the multi storey car park is included in the SIDRA modelling (it was)
- They noted the TAIA did not pick up the latest bus changes
- They were concerned about parking impacts if the multi storey car park was not delivered (it would be)
- They requested information about drop-off/ pick-up zones would be impacted (new arrangements proposed for primary school and high school)
- They wanted to understand the number of service vehicles and coaches
- They wanted to understand the impact of Sydney Metro and its potential assistance to achieve better modal shifts.

In summary, TfNSW expressed no query with the traffic modelling, the outputs, nor the fact that certain intersections were experiencing capacity issues as, presumably, TfNSW appreciates that a holistic solution was necessary.

With regard to the GTP, TfNSW stated that:

- A mode shift target greater than 10% should be sought
- More analysis of staff travel should be undertaken

- Provide details of measures to achieve modal shift
- Provide better wayfinding measures
- Identify students eligible for STSS
- Provide end of trip facilities
- Consider bike share
- Introduce behaviour change program
- Details of travel co-ordinator
- Details of annual surveys
- Information of hours of operation, and availability of OOSH
- Special Events
- More detailed Transport Access Guide
- A Communications Plan
- A statement of support from the Principal.

These suggestions were taken into account in the updated Green Travel Plan.

In essence, TfNSW raised no issues that could not be conditioned or resolved via additional information and justification, furthermore TfNSW issued DPIE with a set of suggested conditions.

### Response from City of Parramatta Council

In the Response to Submissions phase, Council identified concerns about the future permeability of the subject site and the provision of new connections, mainly to the west. Council identified that the draft Westmead Innovation District Masterplan includes a link from the primary school car park direct to Bridge Road, as shown in Figure 4.

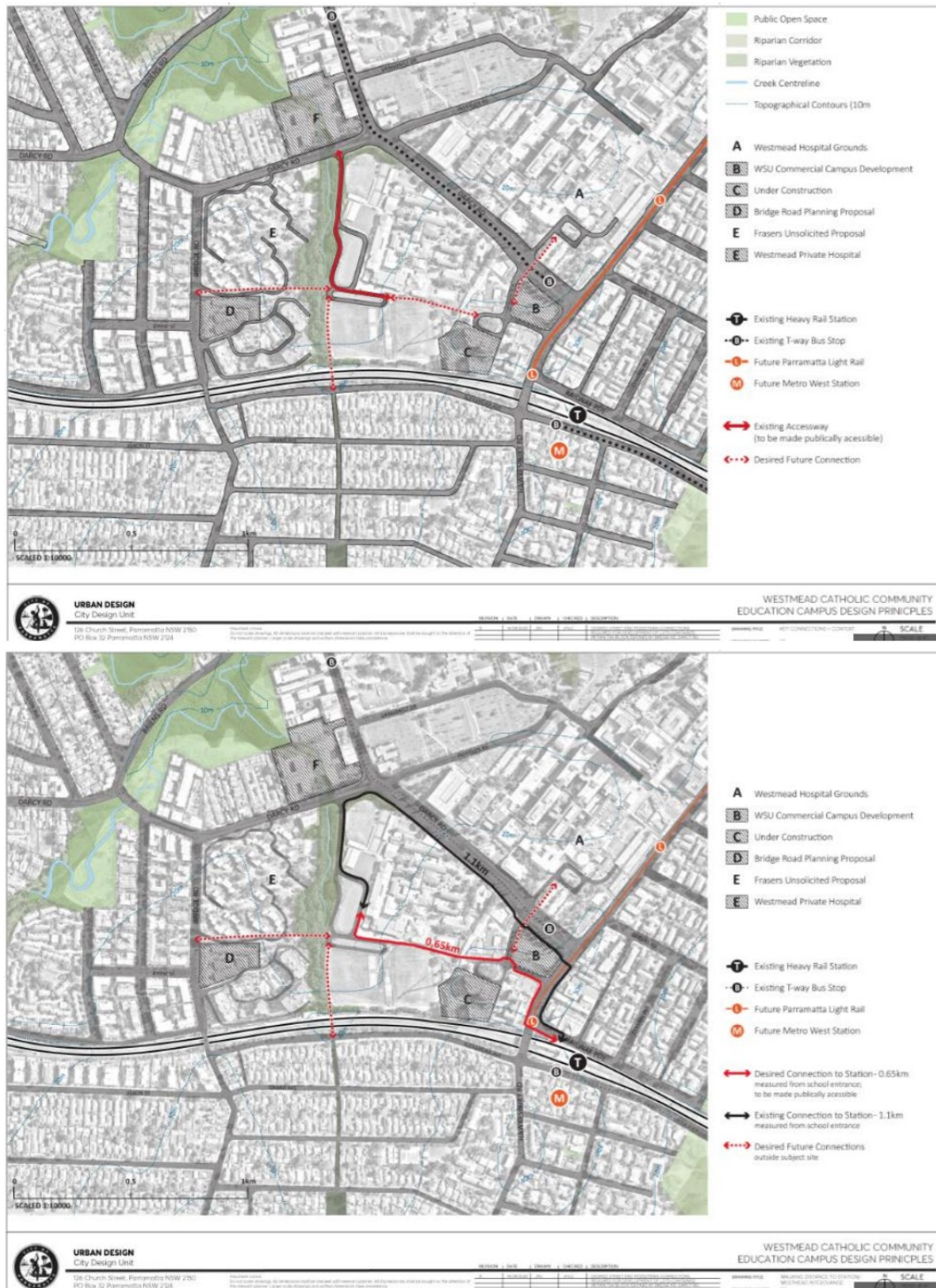
Council's stance on the Bridge Road link road is that *"This link would alleviate traffic flows at the two problem [intersection] locations..."*

Notably, the link road between the subject site and Bridge Road has not been included in the Westmead 2036 Draft Place Strategy. Rather, the Strategy shows a north-south green link (pedestrian/ cyclist connection) across the rail line (refer to Figure 2).

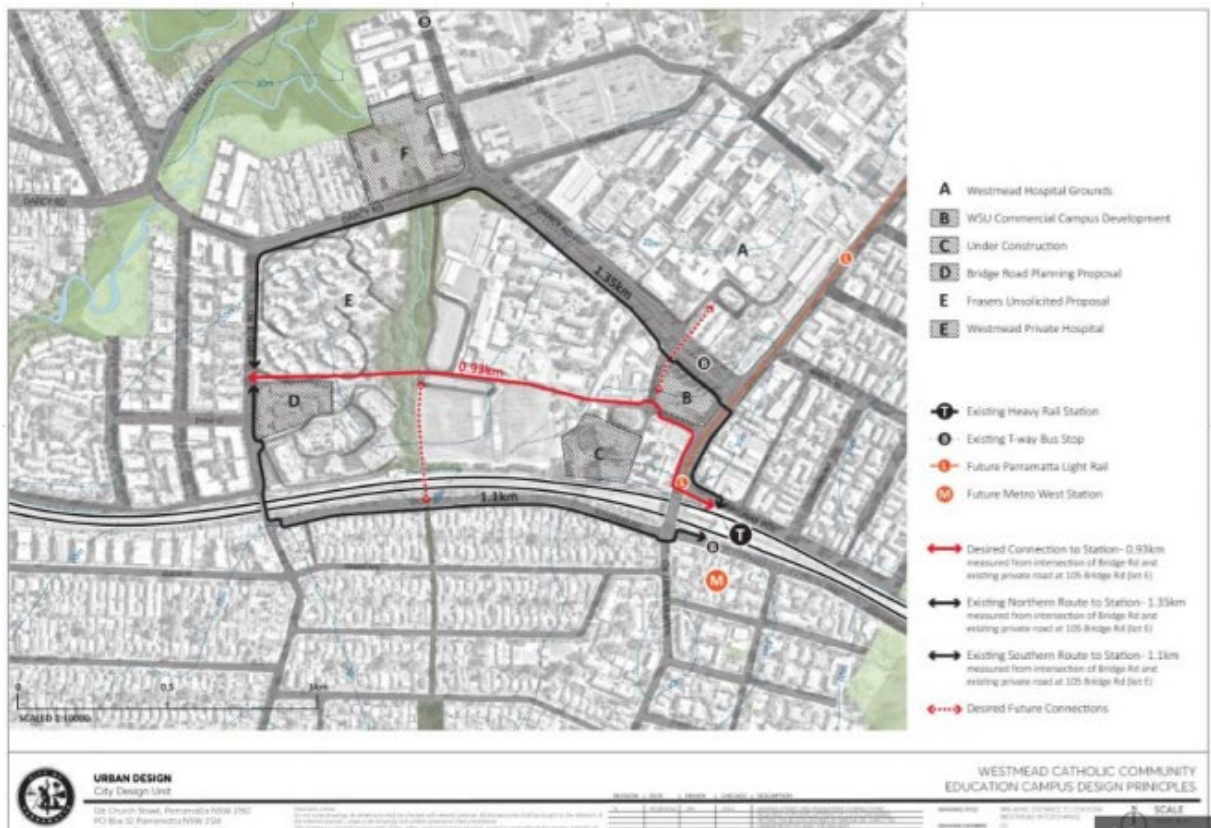
As above, the Proponent would be willing to provide for a Bridge Road connection point within and up to their site boundary. Delivery of the road connection to Bridge Road itself would be through neighbouring sites, which would be dependent on other landowners/ developers to deliver this portion of the link. This messaging has been made clear to Council at several meetings during the Response to Submissions phase.



Figure 4: Future East-West Connectivity







Source: City of Parramatta Council Submission SSD 10383 – 2 Darcy Road, Westmead Catholic Community Education Campus, letter dated 27 April 2020, <  
<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-2589%2120200427T041220.248%20GMT>>

## Response to DPIE Letter

In light of the context of the Proposal within the growing Westmead Precinct, responses to DPIE's queries in the letter dated 24th November 2020 are provided herein.

### 1. Traffic surveys and results

- a) The Department notes that questionnaire survey was undertaken to understand the mode share of journeys to and from the school (school peak hours). The survey covers only four hours discrete data (7:30am to 9am and 2.30pm to 5pm) and therefore does not show the hourly traffic flows that would determine the peak traffic hours. Some key information regarding the survey has not been mentioned in the document, including: the sample size of the survey, which primary school/s were surveyed, the methodology of the survey. Consequently, to enable a thorough review of the appropriateness and accuracy of the mode share in relation to this development, the Department requires you to:
- provide details on sample size of the survey, the names of the primary school/s surveyed and the methodology of the survey.
  - provide a breakdown of the vehicular trips generated by this development for different hours including school peak hours and regular peak hours. This is particularly important and relevant for the Out-of-Hours School Care (OOSH) facilities where a significant number of trips are expected to coincide with the regular PM peak hour (672 out 806 students).

At the time of the traffic surveys, an automatic tube count on Darcy Road was undertaken to capture 24-hour traffic flows across one week. The data indicates that the surrounding road network peak periods are between 7am-8am and 3pm-4pm. See table below.

It is important to note that tube counters can only determine peak periods rounded to the nearest whole hour whereas intersection surveys indicate the peak period to the nearest 15 minutes.

| AM Peak: | 08:00       |  | PM Peak: | 15:00       |
|----------|-------------|--|----------|-------------|
| 00:00    | 396         |  | 12:00    | 5466        |
| 01:00    | 257         |  | 13:00    | 5814        |
| 02:00    | 142         |  | 14:00    | 6525        |
| 03:00    | 169         |  | 15:00    | <b>7940</b> |
| 04:00    | 410         |  | 16:00    | 6725        |
| 05:00    | 1651        |  | 17:00    | 5896        |
| 06:00    | 4484        |  | 18:00    | 4464        |
| 07:00    | 7429        |  | 19:00    | 3311        |
| 08:00    | <b>8805</b> |  | 20:00    | 2712        |
| 09:00    | 5858        |  | 21:00    | 2439        |
| 10:00    | 5397        |  | 22:00    | 1745        |
| 11:00    | 5222        |  | 23:00    | 826         |

The network peak periods calculated for the SIDRA models were 7:45am-8:45am and 3:00pm-4:00pm, based on the intersection counts. When compared against the tube count data, the PM peak hour correlates on-point (3pm-4pm), and the AM peak is out by 15 minutes. However, the hour

before the tube count AM peak, 7am-8am, indicates a very high traffic volumes as well i.e. 7429 vehicles in 1 hour. Therefore, the peak 60-minute period will be spread across the two time brackets 7-8am and 8-9am; this spread is determined by the turning movement counts (tube counters cannot determine, as mentioned above). As per the review of turning movement counts and tube counts, the SIDRA modelled peak periods correctly reflect the surrounding road network peak periods.

Another key point is that the peak periods which have already been modelled remain as the worst-case scenarios. As mentioned in the meeting with DPIE (held on 4 December 2020), for some intersections which fail in the peak, even if it fails in either shoulder periods, it still fails. Therefore, obtaining new counts would not be helpful and would still show poor operation.

As stated, the PM peak period between 1500-1600 is more than 20% higher than the 1700-1800 period.

With regard to the questionnaire survey, the sample size is presented in the table below.

| Schools              | Students            |                  |               | Staff               |                  |                   |
|----------------------|---------------------|------------------|---------------|---------------------|------------------|-------------------|
|                      | Existing Population | Survey Responses | Response Rate | Existing Population | Survey Responses | Response Rate     |
| Sacred Heart PS      | 248                 | 195              | 79%           | 16                  | 16               | 114% <sup>b</sup> |
| Mother Teresa PS     | 420                 | 273              | 65%           | 24                  | 24               | 100%              |
| Catherine McAuley HS | 2,186 <sup>a</sup>  | 795              | 75%           | 88                  | 54               | 61%               |
| Parramatta Marist HS |                     | 847              |               | 78                  | 40               | 51%               |
| <b>Total</b>         | <b>2,854</b>        | <b>2,110</b>     | <b>74%</b>    | <b>204</b>          | <b>134</b>       | <b>67%</b>        |

Note:

(a) The existing population of both high schools

(b) Existing staff allowance is the information provided for staff, and may not necessarily equal the number of full-time equivalent staff at the schools at the time of survey. For example, the Sacred Heart Primary School Staff responses were marginally higher than the staff allowance. In this case, the data was pro-rated to reflect 100%.

## 2. Out-of-Hours School Care

- a) The existing OOSH facility in the school accommodates for an average of 11% of the primary school students. The TIA states that the target population in the OOSH facility would be 40% of the primary school population in future. However, no information/study/justifications are provided to demonstrate why and how 40% primary school students will available OOSH facility in the future.

Consequently, the Department requires you to provide:

- a justification to support that 40% of the students are likely to use the OOSH facility in the future (additional case studies of similar schools or surveys may be needed to justify this).
  - more discrete information on the arrival and departure patterns of the existing OOSH trips.
  - assess the impact of the future OOSH facility with the 40% student population, on the surrounding road network.
  - details of additional staff members that would be employed to cater for the additional student population in the OOSH and the vehicular trip likely to be generated by the additional staff.
- b) Please note that Council has reviewed the RTS and states that the 40% primary school students using the OOSH is considered unachievable particularly in the AM peak when school and work travel trends to be compressed into a shorter period than the PM peak. It is recommended that this comment should be considered and the feasibility of this should be explored.

The average uptake across CEDP schools is approximately 20%, with 15% growth being seen year-on-year across their schools, for example:

- St Monica's Primary School North Parramatta - 28%
- Mother Teresa Primary School – 18%.

Government schools in western Sydney are showing OOSH usage rates in the order of 20 - 30%, for example:

- Rosehill Public School - 21%
- Burnside Public School - 24%
- Oatlands Public School - 29%.

Based on the above, and acknowledging the employment growth expected in the Westmead Precinct and the site's proximity to Westmead Hospital, the project assumes a higher uptake to support the 24 hour workforce in the precinct. CEDP has looked for examples of other primary schools adjacent to growth precincts and hospitals. Schools in the Ryde area are considered comparable given the growth in the area and the presence of Macquarie Hospital. The following OOSH usage rates were identified:

- Truscott Street Primary - 29%
- North Ryde Public School - 33%.

Based on the above, the projected growth for the Westmead Precinct and the proximity of the site to Westmead Hospital, the proposal assumes that 40% of students will attend OOSH.

As explained earlier, the peak hours on the road network are those which have been modelled for the general school attendance. At the OOSH arrival times, the traffic generation from the school would be less than the general school attendance and the road network traffic flows would be lower than the peak hours in the SIDRA modelling.

As we have already identified deficiencies in the road network which need to be addressed, the impact of the OOSH will be less than that currently modelled for the general school. Whilst it would be possible to collect additional "out of peak" traffic data and undertake additional "out of peak" traffic modelling, there would not be any utility in undertaking such modelling other than to show the impact is lower than in the peak periods.



### 3. Intersection performance

- a) The SIDRA network modelling and the corresponding results provided in the RTS show that a number of identified intersections will reach their maximum capacities by 2023 with the design traffic volume of the proposed development. Further, two intersections would operate at unacceptable levels of service (LoS). These are Darcy Road / Hawkesbury Road and Hawkesbury Road / Alexandra Avenue (with more than 100 seconds delay).
- b) The SIDRA models and the RTS do not include any discussion on how the observed intersection LoS was determined. Furthermore, no mitigation measure is being provided in the RTS and not enough information is provided regarding need for improvements to mitigate adverse traffic impacts. According the Department requires you to:
  - clearly document the methodology and justification for determining the observed intersection LoS as the current method appears to be unconventional and subjective.
  - provide a comprehensive list of possible mitigation measures that would improve the performance of these intersections when the design traffic volume is added.
- c) The TIA and RTS do not provide any queue analysis for each access for AM and PM peaks. The RTS mentions that the SIDRA 95<sup>th</sup> percentile queue was compared against the 'average maximum' observed queues. However, it is not clear how the 'average maximum observed queues were calculated as no calibration criteria was defined and in a number of locations, the observed queues vary significantly against the SIDRA queue. Therefore, the Department requests that the following be submitted:
  - a queue analysis for each access for the AM and PM peak.
  - information on the average observed queue lengths.
  - explanations are to be provided why the observed queues vary significantly.
  - any mitigation measures to address the identified impacts.

Please note that Council has reviewed the RTS and states that the proposed development would have significant impact to surrounding intersections and continues to be unacceptable and no suitable mitigations have been explored to offset the overall impact of the proposal including the potential for a direct connection from Bridge Road to the school. Council is of the strong view that this is a critical matter and must be addressed and provided as part of this application.

The suggestion that traffic capacity mitigation measures are provided does not seem to accord with the Westmead Precinct Plan which appears to be promoted by modes other than car. There will need to be physical works done to the road and its intersections to facilitate PLR. However, it is not expected that these would provide additional significant traffic capacity. Other non-car modes are being promoted in the precinct. Also, we are aware that WCC provided submissions to Metro to enhance connections between public transport and the subject site and it is suggested that any contributions required for "traffic improvements" would be better spent providing for better active travel connections.



Mitigation measures which are being proposed as part of the Proposal are discussed in the letter to DPIE's queries. These include:

- Green Travel Plan targeting a minimum 10% modal shift to reduce single-car occupancy trips and private car use
- New high school car park and pick-up/ drop-off facility (which will address existing issues)
- Upgraded pedestrian access at Darcy Road
- Expansion of Out of Hours School Care (OOSH) to flatten the curve in peak periods
- New primary school pick-up/ drop-off facility being implemented on-site
- Maintenance of offset start and finish times of primary school and high schools to minimise effects during peak periods
- Use of school buses and potential modification of routes to suit student addresses
- Implementation of interim drop-off/ pick-up design solution to improve traffic circulation on-site at the site access (off Darcy Road) and reduce the site's impacts on the surrounding road network.

There are also some improvements which are being planned which relate to the wider masterplan which will facilitate connections to the east, west and south. Some of these cannot be completed without other landowners in the precinct. However, the Westmead Catholic Community can provide connections as far as their land boundaries. Improvements would include:

- Pedestrian connection to Farmhouse Road
- At-grade pedestrian footpath connection to the Sydney Metro Tunnel
- At-grade pedestrian footpath connection to future Bridge Road link (within site)
- Connection to future pedestrian connection under rail (within site).

Therefore, proposing traffic capacity mitigation measures at these junctions, which will ultimately change with the provision of PLR and SMW, would be superfluous. The PLR and SMW intersection upgrades and modelling would identify this which, at the time of the assessment, were not publicly available. As such, provision of the abovementioned measures would be much more aligned with the Westmead Precinct Plan.

To determine the average maximum queue lengths, the queue lengths per cycle was recorded based on on-site observations (at the start of each green phase for the practical movement). The distance and/or number of vehicles per lane were recorded, and a range was established for the average maximum queue which was used to calibrate against in the SIDRA modelling. The observed queue lengths are provided in the SIDRA modelling calibration and validation report. The queues may vary for some lanes and/or approaches in order to have calibrated in accordance with the overall intersection level of performance as had been observed on-site.

#### 4. SIDRA Modelling

a) The independent peer review of the submitted traffic related information and the submitted SIDRA files raises a number of concerns. The concerns and the information required to address these issues are provided below.

- SCATS history data was not collated from Transport for NSW (TfNSW) SCATS data and the corresponding '.LX' file containing traffic signal cycle time, phase time, phase sequence and signal co-ordination information including offsets does not appear to have been used.

As an example, the Department notes that SIDRA modelling has applied co-ordination at signalised sites 8, 6, and 4 with 'offset' set as 0 second. However, the Department cannot verify the offset as no '.LX' file data is available. These should be provided so that the Department can verify the signal timings and calibrate or validate the SIDRA model.

- the base models used for the SIDRA modelling do not appropriately match with the model network settings and parameters. This includes (but is not limited to) the use of inaccurate approach distances. The Department considers that this may have resulted in inaccurate key modelling results and network analysis. You are requested to revisit these parameters and use correct base models / model network settings.

b) The future intersection performance within the study area will be substantially impacted by the introduction of Parramatta Light Rail (PLR). As part of PLR project, the operation of a number of intersections including the Darcy Road / Hawkesbury Road intersection will be substantially impacted. It is not clear how the PLR operations are considered in the future SIDRA models. The Department requires you to provide additional information or SIDRA models considering the impacts due to PLR in the future.

c) The SIDRA models assume three signalised intersections to be coordinated. However, no information is provided about the source of this assumption. Other intersections on Hawkesbury Road are also likely to be coordinated due to their proximity. The Department requires you to address the above concern and provide appropriate background information to justify these assumptions.

The RMS Traffic Modelling guidelines states:

*"Acquisition of average timings [identified for the modelled period] is either via site observation or through tools such as SCATS IDM, SCATS Reporter or SCATS History."*

Furthermore, site observation and measurements are acceptable methods of data collection for the purpose of model calibration.

At the time of the traffic surveys, site observations were carried out at the junctions to record signal cycle times, phase times, phase sequence, signal coordination, driver behaviour and queue lengths. This information has been provided in the SIDRA modelling calibration and validation report, and throughout the detailed responses to Bitzios' peer review provided in Attachment A.

Following review of the Bitzios' peer review comments, TTPP revised the base case model. The findings of the updated base case model indicates no change to the Level of Service at each intersection,

with the exception of the Darcy Road – Mons Road – Institute Road signalised intersection for reasons being:

- At the time that the SIDRA modelling was being undertaken, the intersection geometry was being upgraded to include a left-turn slip lane from Darcy Road west approach towards Mons Road north approach. Knowing that the slip lane was going to be operational in the near future, the base case model adopted the new layout.
- The new layout was accompanied by changes to the pre-existing signal phasing, phase times and cycle times. Therefore, these were key changes which had not been adopted into the base model given that the phase sequencing and timings were not running yet in order to be captured and input into the SIDRA model. Also, pedestrian red arrow hold times were adjusted with the signal phase changes.
- Furthermore, there were certain turning movements which had become restricted – no right turn from Darcy Road south approach to Institute Road east approach and T-way no left turn from Darcy Road south approach to Darcy Road west approach.

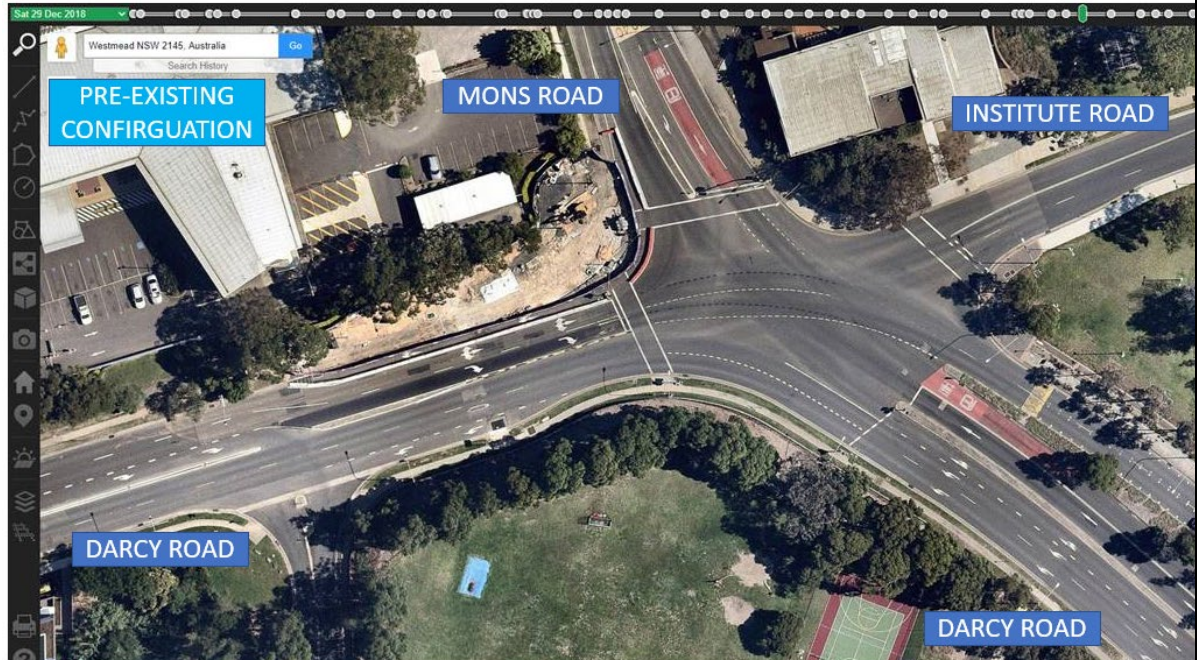
In summary, the base case model had attempted to capture the upcoming intersection upgrades based on the known variables at the time.

In responding to DPIE's and Bitzios' queries, the base case configuration and signal phase timings have been reverted in accordance with the pre-existing intersection. Due to the reduced capacity at this junction under the pre-existing configuration, which presumably the new left-turn slip lane and other upgrades were implemented to overcome, the intersection operates at a reduced level of service in the revised base case.

| Intersections  | Intersection Type     | Existing AM Peak                             |          | Existing PM Peak                             |          |
|--|-----------------------|--|----------|--|----------|
|  |                       | Average Delay                                | LOS      | Average Delay                                | LOS      |
| Darcy Rd – Site Access (Mother Teresa)                         | Priority (Stop)       | No Change or minor change                    | A        | No Change or minor change                    | A        |
| <b>Darcy Rd – Institute Rd – Mons Rd</b>                       | <b>Signalised</b>     | <b>LoS C to E, increase in average delay</b> | <b>E</b> | <b>LoS D to F, increase in average delay</b> | <b>F</b> |
| Darcy Rd – Site Access (Catherine McAuley)                     | Priority (Give Way)   | No Change or minor change                    | A        | No Change or minor change                    | A        |
| Darcy Rd – Site Access (Catherine McAuley) – Westmead Hospital | Signalised            | No Change or minor change                    | B        | No Change or minor change                    | A        |
| Darcy Rd – Site Access (Proposed Car Park Entry)               | Priority (Give Way)   | No Change or minor change                    | A        | No Change or minor change                    | B        |
| Darcy Rd – UWS – Westmead Hospital                             | Signalised            | No Change or minor change                    | C        | No Change or minor change                    | B        |
| Darcy Rd – Hawkesbury Rd                                       | Signalised            | No Change or minor change                    | C        | No Change or minor change                    | C        |
| Hawkesbury Rd – Railway Pde                                    | Signalised            | No Change or minor change                    | B        | No Change or minor change                    | C        |
| Hawkesbury Rd – Alexandra Ave                                  | Signalised            | No Change or minor change                    | F        | No Change or minor change                    | C        |
| Alexandra Ave – Bridge Rd                                      | Priority (Roundabout) | No Change or minor change                    | A        | No Change or minor change                    | A        |
| Darcy Rd – Bridge Rd – Coles Car Park                          | Signalised            | No Change or minor change                    | C        | No Change or minor change                    | B        |



Aerial images of the pre-existing and current intersection layout at the subject intersection are illustrated below.



Based on the revised base case model for the subject intersection, the future 2023 and 2033 cases have also been revised to determine the future impacts at this junction. The SIDRA modelling results for these scenarios are summarised below.

| Intersections  | TAIA Addendum | Revised Model<br>(following review of<br>Bitzios' Peer review) | Resultant Change                           |
|--|---------------|--|--|
| Base Case  | AM – LoS C    | AM – LoS E   | LoS C to E, for reasons as explained above |
|  | PM – LoS D    | PM – LoS F   | LoS D to F, for reasons as explained above |
| Future 2023 (with Background growth and Development incl. OOSH 40%)                    | AM – LoS C    | AM – LoS C   | No change                                  |
|  | PM – LoS D    | PM – LoS D   | No change                                  |
| Future 2033 (with Background growth and Development incl. OOSH 40% and 10% Mode Shift) | AM – LoS C    | AM – LoS C   | No change                                  |
|  | PM – LoS D    | PM – LoS D   | No change                                  |

Whilst the base case modelling results have changed, the future 2023 and 2033 scenarios would continue to operate similar to as previously assessed; that is, operating at a Level of Service C in both AM and PM peak periods. This would be as a result of the recent intersection improvements which were taken into consideration for future models at the time preparation of the TAIA Addendum and in response to DPIE's queries (this letter).

## 5. Pedestrian safety

- a) The proposed multi-deck carpark's entry and exit locations currently has low demands. However, this is expected to change once the carpark is operational. This in turn will affect the pedestrian activity and requires more information and consideration of the pedestrian safety measures.

The multi-deck car park has now been approved. TPPP appeared at the Planning Panel and it was made very clear that this car park was designed safely to accommodate short-term demands and any future increases in pedestrians. Council was also very supportive of this car park.

As addressed in the TAIA, the pedestrian access point into the subject site would be relocated to the east of the car park ingress driveway; this will massively reduce the number of pedestrian-vehicle interactions at this driveway.

At the time of the traffic surveys, pedestrian movements across the driveway were surveyed. A summary of peak period pedestrian movements, broken down into school students and members of the public, is provided in the table below.

|                   | Public    | Students    | Total       |
|-------------------|-----------|-------------|-------------|
| 7:45              | 12        | 133         | <b>145</b>  |
| 8:00              | 6         | 204         | <b>210</b>  |
| 8:15              | 12        | 350         | <b>362</b>  |
| 8:30              | 17        | 135         | <b>152</b>  |
| <b>Peak Total</b> | <b>47</b> | <b>822</b>  | <b>869</b>  |
| %                 | 5%        | 95%         |             |
| 3:00              | 8         | 289         | <b>297</b>  |
| 3:15              | 7         | 734         | <b>741</b>  |
| 3:30              | 12        | 36          | <b>48</b>   |
| 3:45              | 2         | 3           | <b>5</b>    |
| <b>Peak Total</b> | <b>29</b> | <b>1062</b> | <b>1091</b> |
| %                 | 3%        | 97%         |             |

Under the new scheme, the 822 students (AM peak) and 1062 students (PM peak) would no longer cross the ingress driveway since the access point is to be relocated east of the driveway.

Comparatively, the number of pedestrians (members of the public) crossing the driveway at this location are low and would generate minimal delay and safety concerns at the driveway.

Furthermore, the Strategy proposes greater north-south and east-west connectivity through the area. As permeability through the area is enhanced, particularly with the provision of an under rail connection, pedestrian movements would be dispersed across the network.



## 6. Construction traffic and pedestrian management plan

- a) The TIA has not assessed the cumulative impacts associated with other construction activities, including but not limited to the impacts of the PLR construction. The Department requests assessment of the key cumulative impacts of the construction of the development and PLR.
- b) The Department requests an assessment of road safety at key intersection and locations where it is subject to heavy vehicle construction traffic movements and high pedestrian activity.
- c) The Department requests that details should be provided on how pedestrian and cycle rider movements along footways and cycleways are maintained at all times during construction activities. If the development requires closure of either facility, provide details of adequate safety and diversion measures in place to limit time delay and detour distances.

The provision of a detailed CTMP is generally a condition of consent which needs to be agreed before construction can commence. However, TPPP are working on Parramatta Square and liaising with the section of PLR currently being built in Parramatta city centre. The detailed CTMP for that project was a condition of consent as when the construction is nearer to commencement, it is much easier to look at cumulative impacts.

The CTMP for PLR states that the peak construction workforce is estimated at 500 personnel plus management (assumed across all sites including Westmead, Parramatta North, Parramatta CBD, Rosehill, Camellia, and Carlingford). The construction works in the Westmead Precinct were reported to generate heavy vehicle movements as follows:

- A daily average of 27 heavy vehicles
- Peak daily average of 147 vehicles, and
- Peak hourly of 12 heavy vehicles.

The PLR construction "preferred" haul routes to/from the aerial network were identified to utilise Darcy Road and Hawkesbury Road. Also, the CTMP identified that a number of local road network changes would be required along local streets, including Hawkesbury Road and Bridge Road, to facilitate construction works. However, *"the details for street and intersection treatments, including the likely utility works would be subject to detailed design and stakeholder consultation with Roads and Maritime Services and City of Parramatta Council."* Furthermore, it is stated that *"Temporary and permanent would include the reconstruction and modification of existing signalised intersections and introduction of new signalised intersections. The staging arrangement for the reconstruction of the intersections within the Westmead precinct are being developed and would be refined as the design progresses."*

The CTMP for SMW estimates between 5 and 75 light vehicle trips per hour, and 8 and 50 heavy vehicle trips per hour, depending on the phase of the construction works. With the SMW site located off Hawkesbury Road, the construction haul route was proposed via Hawkesbury Road.

For both major infrastructure projects, the overall impact to the pedestrian network has been reported as minimal.

Construction of PLR (Stage 1) commenced in late 2018 and is scheduled for completion in 2023. The construction program indicates that main construction works would be completed in Q1 of 2022, with testing and commissioning to be completed in Q1 of 2023. An overview of the PLR construction program is shown below.

| ACTIVITY                  | 2018 |    |    |    | 2019 |    |    |    | 2020 |    |    |    | 2021 |    |    |    | 2022 |    |    |    | 2023 |    |    |    |
|---------------------------|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
|                           | Q1   | Q2 | Q3 | Q4 | Q1   | Q2 | Q3 | Q4 | Q1   | Q2 | Q3 | Q4 | Q1   | Q2 | Q3 | Q4 | Q1   | Q2 | Q3 | Q4 | Q1   | Q2 | Q3 | Q4 |
| Enabling works            |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Main construction works   |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
| Testing and commissioning |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |

For SMW, initial works were expected to begin in 2020, with tunnelling and excavation works commencing in 2022. The line is expected to open to the public by 2030.

As detailed in Chapter 9 of the TAIA, the core construction works for the Proposal are planned for Q3 of 2021 to Q4 of 2022. Therefore, construction works at the site are expected to overlap with the tail-end of the main construction works for PLR. The works are planned to coincide with SMW construction, however, sufficient details on the construction phasing for SMW is not yet known to cumulatively assess the construction traffic impacts given the large range for construction vehicle trip estimates. Irrespective of the PLR construction overlap it is anticipated that the development will have minimal impact during construction. Details of how footways and cycleways will be managed is again a matter for the detailed CTMP would be prepared closer to construction.

## 7. Vehicle Occupancy

a) The Department has reviewed the proposed vehicle occupancy rates (In Appendix C of the RTS) and raises a number of concerns such as the following

- no justification or reason for assuming the vehicle occupancy rate (whether journey to school surveys were used).
- no distinction between primary and high school students (given that different occupancy rates are provided for the two school groups).
- no consideration whether the students are in the same campus or from different schools.
- different occupancy rate for AM and PM.

The Department requires you to address the above and provide a clear justification regarding the assumed vehicle occupancy rates.

As stated in TAIA, a car occupancy rate (i.e. person to car ratio) has been calculated using questionnaire and traffic survey data collected at the schools at the subject site. This rate is based on the number of cars surveyed transporting students/ staff and the number of students/ staff dropped-off and picked-up by car. An average car occupancy rate for primary school students has been calculated at 2.12 students per car while a rate of 1.85 students per car applies to high school students.

For further information, the surveyed car occupancy rates in AM and PM are as follows:

|   | To School | Form School |
|---|-----------|-------------|
| Car Occupancy for HS (Students per veh)<br>(McAuley and Marist)             | 1.85      | 2.12        |
| Car Occupancy for PS (Students per veh)<br>(Mother Teresa and Sacred Heart) | 2.12      | 2.12        |

To be conservative, the rate for high schools was taken as the lesser amount (i.e. 1.85 students per vehicle) and applied in both peak periods. for primary schools, the rate of 2.12 students per vehicle was adopted in both peak periods.

## 8. Catholic Early Learning Centre (CELC)

- a) It is noted that the CELC will operate between 6am and 6pm and therefore the AM peak hour for this development will be between 5:30am and 6:30am and PM peak hour will be between 5:30pm and 6:30pm, which is outside the school peak hour.

It is not a realistic assumption that all the CELC students will arrive/leave at these times. Please provide a justification to demonstrate why these times have been adopted and whether any surveys etc have been conducted in this regard.

- b) Based on the above peak hours, the Department notes that the CELC PM peak hour will coincide with the regular PM peak and therefore this should be assessed by including the regular PM peak traffic scenario in any modelling.

- a) In a similar manner to the OOSH, deficiencies in the road network have been identified which need to be addressed, the impact of the CELC will be less than that currently modelled for the general school. Whilst it would be possible to collect additional "out of peak" traffic data and undertake additional "out of peak" traffic modelling, there would not be any utility in undertaking such modelling other than to show the impact is lower than in the peak periods.
- b) There appears to be a perception that there is an alternative PM peak to that considered in the TAIA. As explained above, the period which has been already modelled is the appropriate peak period to be considered.

## 9. Green Travel Plan

- a) The Department considers that the assumption of 10% modal shift seem to be too high, where 3-5% is considered as achievable. The primary school is far from the nearby residential zones, therefore, 90% of the primary students are using private cars. Additionally, considering higher modal shift is somewhat "best-case" scenario, whereas in traffic impact analysis the convention is to analyse the worst-case scenario. Therefore, the Department requires justification as to how the 10% modal shift would be achieved.

Frank Turquoise Group, who advise the Department of Education about travel plans at their schools, agreed with TPPP that with a concerted effort from the schools and with the advent of the light rail scheme adjacent to the school, and scissions with bus companies about more targeted services that 10% was achievable. Certainly, discussions on the Green Travel Plan with TfNSW/ SCO suggested that a 10% should be the target. Further to this, The Framework Travel Plan which has been prepared by Franke Turquoise for the Proposal, suggests that an eventual target of 20% in the future would be achievable.

Achieving the 10% mode share shift is considered realistic and modest, noting the following:

1. 160 students live within walking distance of the site and 184 live along an existing public bus route.
2. The 10% mode shift for the primary students requires only 66 students to change travel mode over the next two years (33 students a year). As growth occurs, only 5-10 students will need to change mode each year to achieve the 10% shift.
3. A Travel Coordinator is being employed and will conduct personalised trip-planning sessions with students.

Furthermore, it is noted that other school developments are also targeting 10% mode shift which has been agreed by TfNSW/ SCO, for example St Patrick's College at Strathfield. St Patrick's College is located much further away from heavy rail, T-way bus services, future light rail etc. in comparison with the subject site. Therefore, given its proximity to existing and upcoming major transport infrastructure and future pedestrian connections as per the Strategy, the subject site would be able to considerably leverage mode shift to achieve the set targets.



## Summary

The proposed development aligns with the recently issued Westmead 2036 Draft Place Strategy by way of providing *“opportunities for primary and secondary school needs, noting projected residential growth in Westmead South and Parramatta North”*.

The site intends to promote sustainable travel goals through implementation of its Green Travel Plan. This is in line with the Strategy which seeks to capitalise on transport connectivity and reduce car dependency by improving *“connections between North and South Westmead by enhancing existing and creating new rail crossings...to create one connected green grid”*. As above, the Proponent would be willing to provide green connections within their site boundary.

Whilst there will be an increase in cars dropping-off and picking-up students as a result of the enrolment uplift, the school is about to construct improvements internally within the site to aid traffic flows such that the existing issues at the site are addressed. The traditional method of providing road improvements using *“predict and provide”* traffic modelling is now outdated and the Precinct Plan is silent on the provision of road improvements, presumably noting that there is little space to provide traffic capacity improvements.

Whilst financial contributions would traditionally be provided towards road improvements, in this locality such monies would be better directed towards infrastructure and green travel initiatives that would improve access within the Westmead Precinct.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'K Hollyoak', written over a light grey rectangular background.

**Ken Hollyoak**  
**Director**

# Attachment One

## Response to Bitzios' Comments

#### Issue History

| File Name  | Prepared | Reviewed | Issued by | Date       | Issued to                        |
|--|----------|----------|-----------|------------|----------------------------------|
| P4803.001T 2 Darcy Road Westmead EIS Peer Review | M.Hassan | SP.Power | SP.Power  | 02/11/2020 | Prity.Cleary@planning.nsw.gov.au |

## 2 Darcy Road Westmead

### EIS Peer Review

#### 1. Introduction

##### 1.1 Background

A State Significant Development application (SSD-10352) for the redevelopment of 2 Darcy Road in the City of Parramatta LGA is currently being assessed by the Department of Planning, Industry and Environment (the Department). The SSD proposal covers only the first stage of the redevelopment. Future stages of the development will be subject to separate planning approvals. The SSD application seeks approval for:

- A primary school with capacity for approximately 1,680 students, to provide expanded facilities for the existing Mother Teresa Primary School on the site and to replace the existing Sacred Heart Primary School at Ralph Street
- A new parish church
- A catholic early learning centre (CELC) (fit-out within an existing building)
- New landscaping

The proposed works comprise of:

- Removal of existing demountable structures, with minimal demolition
- Removal of 24 trees
- Construction over a period of 16 months, targeted completion date of January 2023
  - Construction of a six-storey primary school building within the western portion of the site (52 weeks)
  - Alterations and additions to the ground floor of block B of Mother Teresa Primary School for the CELC (14 weeks)
  - Construction of a new parish church on the north-western corner of the site (40 weeks)

- Landscaping around the church, primary school building and CELC
- Provision of bicycle parking within the site
- Provision of new accessible pedestrian entry from Darcy Road

## 1.2 Review Scope

Bitzios Consulting (Bitzios) was engaged by the Department to undertake an independent peer review of the following documents and background information:

- the Secretary's Environmental Assessment Requirements (SEARS) relating to transport and access.
- the Applicant's EIS and TIA reports.
- relevant supplementary material/reports.
- review submissions by Council and other relevant public authorities (such as Transport for NSW).
- review Applicant's Response to Submissions (RtS).

Provide advice relating to the following:

- whether the EIS and RtS adequately assesses the traffic impacts on the locality due to the existing school and proposed development including the increase in student numbers.
- the broader impacts / implications of Parramatta Light Rail / Sydney Metro West projects (and any other relevant projects) on the proposal based on the documents submitted by the Applicant
- the existing / future pedestrian environment and the impacts of the additional development on pedestrian safety.
- any additional pedestrian safety measures.
- the impacts of the existing uses surrounding the site and the proposed multi-story car park on site (under a separate Development Application to Council) on the proposal.
- appropriateness of the methodology of the SIDRA model assessment.
- assess the underlying assumptions used to model the traffic impacts and whether they are reasonable and appropriate, including the demand for queuing spaces within the drop-off / pick- up lanes and outside of the site.
- assess the conclusions and recommendations provided in the Traffic and Transport assessment report and whether they are sound and acceptable.
- specifying any additional information required from the Applicant or any other recommendations if issues are not adequately addressed.

## 2. Review

### 2.1 SEARs

SEARs relating to Transport and Accessibility are discussed broadly in the Traffic and Accessibility Impact Assessment (TAIA), provided in the Appendix G in the EIS report. Other documents and responses to submissions were also reviewed to assess the SEARs provisions. The review comments are summarised below:

| Item     | SEARs   | Bitzios Comments   | Priority | Applicant response and action   |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
|----------|---|--|----------|---|----------|-------|--|----------|-------|-------|-----|--|-------|------|-------|-----|--|-------|------|-------|-----|--|-------|------|-------|-----|--|-------|------|-------|-----|--|-------|------|-------|------|--|-------|------|-------|------|--|-------|------|-------|------|--|-------|------|-------|------|--|-------|------|-------|------|--|-------|------|-------|------|--|-------|------|-------|------|--|-------|-----|
| 1        | Accurate details of the current daily and peak hour vehicle, existing and future public transport networks and pedestrian and cycle movement provided on the road network adjacent to the proposed development. | <p>Current daily number of vehicles is not presented. The traffic survey was limited to the school peak hours only. The survey covers only 4 hours discrete data (7:30 to 9.00am and 2.30 to 5.00pm) and failed to show the hourly traffic flow and determination of peak traffic hours.</p> <p>Information on existing and future public transport network is provided adequately.</p> <p>No pedestrian and cyclist count for present and estimated future year are provided.</p> | High     | <p>At the time of the traffic surveys, an automatic tube count on Darcy Road was undertaken to capture 24-hour traffic flows across one week. The data indicates that the surrounding road network peak periods are between 7am-8am and 3pm-4pm. See table below.</p> <table><tr><th>AM Peak:</th><th>08:00</th><th></th><th>PM Peak:</th><th>15:00</th></tr><tr><td>00:00</td><td>396</td><td></td><td>12:00</td><td>5466</td></tr><tr><td>01:00</td><td>257</td><td></td><td>13:00</td><td>5814</td></tr><tr><td>02:00</td><td>142</td><td></td><td>14:00</td><td>6525</td></tr><tr><td>03:00</td><td>169</td><td></td><td>15:00</td><td>7940</td></tr><tr><td>04:00</td><td>410</td><td></td><td>16:00</td><td>6725</td></tr><tr><td>05:00</td><td>1651</td><td></td><td>17:00</td><td>5896</td></tr><tr><td>06:00</td><td>4484</td><td></td><td>18:00</td><td>4464</td></tr><tr><td>07:00</td><td>7429</td><td></td><td>19:00</td><td>3311</td></tr><tr><td>08:00</td><td>8805</td><td></td><td>20:00</td><td>2712</td></tr><tr><td>09:00</td><td>5858</td><td></td><td>21:00</td><td>2439</td></tr><tr><td>10:00</td><td>5397</td><td></td><td>22:00</td><td>1745</td></tr><tr><td>11:00</td><td>5222</td><td></td><td>23:00</td><td>826</td></tr></table> <p>It is important to note that tube counters can only determine peak periods rounded to the nearest whole hour whereas intersection surveys indicate the peak period to the nearest 15 minutes.</p> <p>The network peak periods calculated for our SIDRA models were 7:45am-8:45am and 3:00pm-4:00pm, based on the intersection counts.</p> <p>When compared against the tube count data, the PM peak hour correlates on-point (3pm-4pm), yet the AM peak is out by 15 minutes. However, if you look at the hour before the tube count peak, 7am-8am, you can see that it is very high as well. Therefore, the peak 60 minutes will be across the two time brackets 7-8am and 8-9am (which the tube counters cannot determine, as mentioned above). Therefore, the SIDRA modelled peak periods correlate with the tube count data.</p> | AM Peak: | 08:00 |  | PM Peak: | 15:00 | 00:00 | 396 |  | 12:00 | 5466 | 01:00 | 257 |  | 13:00 | 5814 | 02:00 | 142 |  | 14:00 | 6525 | 03:00 | 169 |  | 15:00 | 7940 | 04:00 | 410 |  | 16:00 | 6725 | 05:00 | 1651 |  | 17:00 | 5896 | 06:00 | 4484 |  | 18:00 | 4464 | 07:00 | 7429 |  | 19:00 | 3311 | 08:00 | 8805 |  | 20:00 | 2712 | 09:00 | 5858 |  | 21:00 | 2439 | 10:00 | 5397 |  | 22:00 | 1745 | 11:00 | 5222 |  | 23:00 | 826 |
| AM Peak: | 08:00   |  | PM Peak: | 15:00   |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 00:00    | 396   |  | 12:00    | 5466  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 01:00    | 257   |  | 13:00    | 5814  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 02:00    | 142   |  | 14:00    | 6525  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 03:00    | 169   |  | 15:00    | 7940  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 04:00    | 410   |  | 16:00    | 6725  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 05:00    | 1651  |  | 17:00    | 5896  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 06:00    | 4484  |  | 18:00    | 4464  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 07:00    | 7429  |  | 19:00    | 3311  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 08:00    | 8805  |  | 20:00    | 2712  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 09:00    | 5858  |  | 21:00    | 2439  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 10:00    | 5397  |  | 22:00    | 1745  |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |
| 11:00    | 5222  |  | 23:00    | 826   |          |       |  |          |       |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |     |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |      |       |      |  |       |     |



|   |   |   |        |  |
|---|---|---|--------|--|
|   |   |   |        | The updated SIDRA base case model includes existing pedestrian volumes. Modelling/ forecasts for future pedestrian volumes has not been carried out (not even publicly available for the Parramatta Light Rail and Sydney Metro West). In the context of SIDRA modelling, an average 2% growth in pedestrian volumes for example, would not have any noticeable impact to the intersection performance. Therefore, in the absence of such data, the existing volumes have been maintained in future scenarios.   |
| 2 | Details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips.  | Adequate information is not provided. Particularly, breakdown of the vehicular trips for different hours including school peak hours and regular peak hours should be provided. This is particularly important for the OOSH facilities where a significant number of trips are expected to coincide with the regular PM peak hour.  | High   | As per response to Item 1 (above), the TAIA has assessed the 'worst-case' scenario on the basis that the peak periods have been modelled.<br>The number of vehicles trips in the AM and PM peak periods have been provided in Chapter 7 of the TAIA.<br><br>As shown by the Darcy Road tube count data, the "regular PM peak hour" occurs at 3pm-4pm.  |
| 3 | The adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development.  | Sufficient discussion was not found regarding the adequacy of the existing or future public transport, pedestrian and bicycle network to meet the likely future demand.   | Medium |  |
| 4 | Measures to integrate the development with the existing/future public transport network.  | Adequately addressed.   |        |  |
| 5 | The impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for, and details of, upgrades or road improvement works, if required (traffic modelling is to be undertaken using SIDRA network modelling for current and future years). The key intersections to be modelled / examined should include: Darcy Road / Mons Road / Institute Road | The traffic impacts were assessed using SIDRA network modelling as indicated in SEARs. However, the following deficiencies are noted: <ul style="list-style-type: none"> <li>▪ SIDRA modelling has major flaws (details are discussed in Section 2.3)</li> <li>▪ Future traffic growth scenarios were not discussed sufficiently (details are discussed in item 30)</li> <li>▪ The study has identified unacceptable level of service for some intersections. However, no mitigation measure is being discussed and not enough information is provided regarding need for improvements or funding.</li> </ul> | High   | Responses to detailed SIDRA modelling findings have been addressed the responses to Bitzios peer review comments.<br><br>Notably, the majority of findings for the SIDRA modelling were rated "HIGH" however would have a minor impact/ consequence to the modelling and analysis. Thus, a key finding following review of Bitzios comments is that "HIGH" rated items do not always truly represent items with a high priority or high impact.<br><br>Many of the intersections which are shown as overcapacity in the future are already overcapacity. Fairly, CEDP is prepared to pay contributions in accordance with Council's existing Contributions Plan. |

|   |  |   |                    |  |
|---|--|---|--------------------|--|
| 6 | <p>The identification of infrastructure required to ameliorate any impacts on traffic efficiency and road safety impacts associated with the proposed development, including details on improvements required to affected intersections, additional school bus routes along bus capable roads (i.e. minimum 3.5m wide travel lanes), additional bus stops or bus bays.</p> | <p>No details of the required improvements are provided in the TAIA report.</p> | <p><b>High</b></p> | <p>As mentioned in the TAIA and previous meeting with DPIE, Parramatta Light Rail (PLR) and Sydney Metro West (SMW) will already have transport models which propose to re-arrange certain intersections along Darcy Road and Hawkesbury Road.</p> <p>Whilst developing the TAIA, Transport for NSW and Parramatta City Council were contacted for information on the PLR modelling and intersection designs so that this information could be captured in the SIDRA modelling for the subject site. At the time of consultation, the SMW modelling had not yet been progressed. The agencies referred us to the Environmental Impact Statement (EIS) for these projects which do not contain final intersection layouts which will be constructed as part of these major infrastructure projects. Furthermore, the EIS does not account for any mode shifts away from car to public transport and walking/cycling. Yet, a light rail and high-speed underground railway will be constructed, nonetheless, the PLR EIS states:</p> <p><i>“The un-constrained high traffic demand modelling results indicate substantial impact associated with the 2026 traffic forecasts (without the project). However, this scenario does not reflect the most likely (average case) travel outcomes for future years, noting that the introduction of the project and other public transport infrastructure, combined with changing travel behaviour, are all expected to have a beneficial impact on reducing the peak period travel demand”.</i></p> <p>In consultation with TfNSW/ SCO, a Framework Travel Plan has been developed by Frank Turquoise Group. Frank Turquoise Group regularly works with the Department of Education advising on travel plans for schools and determining mode shift targets. The Framework Travel Plan indicates that a mode shift target of 10% would be achievable for the site, and an eventual target of 20% in the future.</p> <p>Achieving the 10% mode share shift is considered realistic and modest, noting the following:</p> <ol style="list-style-type: none"> <li>1. 160 students live within walking distance of the site and 184 live along an existing public bus route.</li> <li>2. The 10% mode shift for the primary students requires only 66 students to change travel mode over the next two years (33 students a year). As growth occurs, only 5-10 students will need to change mode each year to achieve the 10% shift.</li> <li>3. A Travel Coordinator is being employed and will conduct personalised trip-planning sessions with students.</li> </ol> <p>This number of students could be adequately accommodated on the existing bus network (for private buses, school buses and public buses), train network, and footpath network.</p> |
|---|--|---|--------------------|--|

|            |  |  |       |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
|------------|--|--|-------|---|--|--------|----------|-------|------|----|-----|-----|------|---|-----|-----|------|----|-----|-----|------|----|-----|-----|------------|----|-----|-----|---|----|-----|--|--|--|--|--|------|---|-----|-----|------|---|-----|-----|------|----|----|----|------|---|---|---|------------|----|------|------|---|----|-----|--|
| 7          | Details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan) and the provision of facilities to increase the non- car mode share for travel to and from the site. | Adequately addressed.  | N/A   |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 8          | The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones.       | The proposed multi-deck carpark’s entry and exit locations currently has low demands. However, this is expected to change. This change will affect the pedestrian activity and requires more information on the pedestrian activity and the mitigation measures. | High  | <p>As addressed in the TAIA, the pedestrian access point into the subject site would be relocated to the east of the car park ingress driveway; this will massively reduce the number of pedestrian-vehicle interactions at this driveway.</p> <p>At the time of the traffic surveys, pedestrian movements across the driveway were surveyed. A summary of peak period pedestrian movements, broken down into school students and members of the public, is provided in the table below.</p> <table><tr><td></td><td>Public</td><td>Students</td><td>Total</td></tr><tr><td>7:45</td><td>12</td><td>133</td><td>145</td></tr><tr><td>8:00</td><td>6</td><td>204</td><td>210</td></tr><tr><td>8:15</td><td>12</td><td>350</td><td>362</td></tr><tr><td>8:30</td><td>17</td><td>135</td><td>152</td></tr><tr><td>Peak Total</td><td>47</td><td>822</td><td>869</td></tr><tr><td>%</td><td>5%</td><td>95%</td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>3:00</td><td>8</td><td>289</td><td>297</td></tr><tr><td>3:15</td><td>7</td><td>734</td><td>741</td></tr><tr><td>3:30</td><td>12</td><td>36</td><td>48</td></tr><tr><td>3:45</td><td>2</td><td>3</td><td>5</td></tr><tr><td>Peak Total</td><td>29</td><td>1062</td><td>1091</td></tr><tr><td>%</td><td>3%</td><td>97%</td><td></td></tr></table> <p>Under the new scheme, the 822 students (AM peak) and 1062 students (PM peak) would no longer cross the ingress driveway since the access point is to be relocated east of the driveway.</p> <p>Comparatively, the number of pedestrians (members of the public) crossing the driveway at this location are low and would generate minimal delay and safety concerns at the driveway.</p> |  | Public | Students | Total | 7:45 | 12 | 133 | 145 | 8:00 | 6 | 204 | 210 | 8:15 | 12 | 350 | 362 | 8:30 | 17 | 135 | 152 | Peak Total | 47 | 822 | 869 | % | 5% | 95% |  |  |  |  |  | 3:00 | 8 | 289 | 297 | 3:15 | 7 | 734 | 741 | 3:30 | 12 | 36 | 48 | 3:45 | 2 | 3 | 5 | Peak Total | 29 | 1062 | 1091 | % | 3% | 97% |  |
|            | Public   | Students   | Total |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 7:45       | 12   | 133  | 145   |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 8:00       | 6  | 204  | 210   |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 8:15       | 12   | 350  | 362   |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 8:30       | 17   | 135  | 152   |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| Peak Total | 47   | 822  | 869   |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| %          | 5%   | 95%  |       |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
|            |  |  |       |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 3:00       | 8  | 289  | 297   |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 3:15       | 7  | 734  | 741   |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 3:30       | 12   | 36   | 48    |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| 3:45       | 2  | 3  | 5     |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| Peak Total | 29   | 1062   | 1091  |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |
| %          | 3%   | 97%  |       |   |  |        |          |       |      |    |     |     |      |   |     |     |      |    |     |     |      |    |     |     |            |    |     |     |   |    |     |  |  |  |  |  |      |   |     |     |      |   |     |     |      |    |    |    |      |   |   |   |            |    |      |      |   |    |     |  |

|    |  |  |        |   |
|----|--|--|--------|---|
| 9  | Proposed number of on-site car parking spaces for teaching staff and visitors and corresponding compliance with existing parking codes and justification for the level of car parking provided on-site.  | Adequately addressed.  | N/A    |   |
| 10 | An assessment of the cumulative on-street parking impacts of cars and bus pickup/ drop-off, staff parking and any other parking demands associated with the development.   | Adequately addressed.  | N/A    |   |
| 11 | An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED.  | A list of general safety measures is presented for the development. However, no specific assessment is provided to determine which safety measure is needed for any particular location.         | Medium |   |
| 12 | Emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times).   | Adequately addressed.  | N/A    |   |
| 13 | <p>The preparation of a preliminary Construction Traffic and Pedestrian Management Plan to demonstrate the proposed management of the impact in relation to construction traffic addressing the following:</p> <ul style="list-style-type: none"> <li>Assessment of cumulative impacts associated with other construction activities, including but not limited to the impacts of the Parramatta Light Rail Construction.</li> <li>An assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity.</li> <li>Details of construction program detailing the anticipated construction duration and highlighting significant and</li> </ul> | <p>This item has not been adequately addressed.</p> <p>This item has not been adequately addressed. This item has been addressed adequately.</p> <p>This item has been addressed adequately.</p> | High   | <p>As addressed in the responses to DPIE's letter (Item 6), the provision of a detailed CTMP is generally a condition of consent which needs to be agreed before construction can commence. However, TTPP are working on Parramatta Square and liaising with the section of PLR currently being built in Parramatta city centre. The CTMP in that project was a condition of consent and when the construction is nearer to commencement, it is much easier to look at cumulative impacts.</p> <p>The CTMP for PLR states that the peak construction workforce is estimated at 500 personnel plus management (assumed across all sites including Westmead, Parramatta North, Parramatta CBD, Rosehill, Camellia, and Carlingford). The construction works in the Westmead Precinct were reported to generate heavy vehicle movements as follows:</p> <ul style="list-style-type: none"> <li>A daily average of 27 heavy vehicles</li> <li>Peak daily average of 147 vehicles, and</li> <li>Peak hourly of 12 heavy vehicles.</li> </ul> <p>The PLR construction "preferred" haul routes to/from the aerial network were identified to utilise Darcy Road and Hawkesbury Road. Also, the CTMP identified that a number of local road network changes would be required along local streets, including Hawkesbury Road and Bridge Road, to facilitate construction works. However, "the details for street and intersection treatments, including the likely utility works would be</p> |

## 2 Darcy Road Westmead: EIS Peer Review

Project:  
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Version:  
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|    | <p>milestone stages and events during the construction process.</p> <ul style="list-style-type: none"> <li>▪ Details of anticipated peak hour and daily construction vehicle movements to and from the site.</li> <li>▪ Details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle.</li> <li>▪ Details of temporary cycling and pedestrian access during construction.</li> <li>▪ Demonstrate how pedestrian and cycle rider movements along footways and cycleways are maintained at all times during construction activities. Should the development require closure to either facility, detail the adequate safety and diversion measures out in place to limit time delay and detour distances.</li> <li>▪ Details of any crane locations and road closures, and</li> </ul> <p>Details of any potential impact to the bus network and bus services.</p> | <p>This item has been addressed adequately.</p> <p>This item has been addressed adequately. This item has not been adequately addressed.</p> <p>This point is discussed. However, no particular location for any cranes has been mentioned.</p> <p>This item has been addressed adequately.</p> | <p>subject to detailed design and stakeholder consultation with Roads and Maritime Services and City of Parramatta Council.” Furthermore, it is stated that “Temporary and permanent would include the reconstruction and modification of existing signalised intersections and introduction of new signalised intersections. The staging arrangement for the reconstruction of the intersections within the Westmead precinct are being developed and would be refined as the design progresses.”</p> <p>The CTMP for SMW estimates between 5 and 75 light vehicle trips per hour, and 8 and 50 heavy vehicle trips per hour, depending on the phase of the construction works. With the SMW site located off Hawkesbury Road, the construction haul route was proposed via Hawkesbury Road.</p> <p>For both major infrastructure projects, the overall impact to the pedestrian network has been reported as minimal.</p> <p>Construction of PLR (Stage 1) commenced in late 2018 and is scheduled for completion in 2023. The construction program indicates that main construction works would be completed in Q1 of 2022, with testing and commissioning to be completed in Q1 of 2023.</p> <p>For SMW, initial works were expected to begin in 2020, with tunnelling and excavation works commencing in 2022. The line is expected to open to the public by 2030.</p> <p>As detailed in Chapter 9 of the TAIA, the core construction works for the proposal are planned for Q3 of 2021 to Q4 of 2022. Therefore, construction works at the site are expected to overlap with the tail-end of the main construction works for PLR. The works are planned to coincide with SMW construction, however, sufficient details on the construction phasing for SMW is not yet known to cumulatively assess the construction traffic impacts given the large range for construction vehicle trip estimates. Irrespective of the PLR construction overlap it is anticipated that the development will have minimal impact during construction. Details of how footways and cycleways will be managed is again a matter for the detailed CTMP would be prepared closer to construction.</p> |
| 14 | <p>Identify the potential impacts of existing and future rail infrastructure near to the site (Main Western Line and future Parramatta Light Rail) and any possible impacts of the construction and operation of the proposal on this infrastructure associated mitigation measures</p>   | <p>This item has been addressed adequately.</p>   | <p>N/A</p>   |



## 2.2 TAIA (Appendix G)

**Source Document: Westmead Catholic Community Education Campus Transport & Accessibility Impact Assessment and Green Travel Plan**

| Item                          | Section/<br>Page    | Bitzios Comments   | Bitzios Priority | Ethos Urban response and action (if any)  |                  |               |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
|-------------------------------|---------------------|--|------------------|---|------------------|---------------|--|--|-------|--|--|---------------------|------------------|---------------|---------------------|------------------|---------------|-----------------------------|-----|-----|-----|----|----|------|------------------------------|-----|-----|-----|----|----|------|-------------------------------|--------------------|-----|-----|----|----|-----|-------------------------------|-----|----|----|-----|-------|-------|-------|-----|-----|-----|-----|
| 15                            | 1.3/3               | Table 1.1 point 2 and 5, typo. Wrote as “section 0”  | Note             | -   |                  |               |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
| 16                            | 2.6                 | No mention of the pedestrian and cyclist volumes. During a site visit, large platoons of pedestrians, most being Westmead school students, were observed during the AM peak on Railway Parade and Hawkesbury Road. The footpath was blocked, and long queue of pedestrians waiting to cross Hawkesbury Road was noted. This issue was not discussed in this section or in any part of the report. This should be evaluated in the report.        | Low              | SIDRA modelling has been updated to reflect pedestrian volumes.   |                  |               |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
| 17                            | 4.1/14              | Here, the report describes two scenarios. However, in page 41, 5 scenarios are mentioned.  | Note             | -   |                  |               |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
| 18                            | 5.1.1/20            | <p>Mode Share: We appreciate the use of the questionnaire survey to understand the mode share of journeys to and from the school. However, some key information regarding the survey has not been mentioned in the document.</p> <p>These include: the sample size of the survey, which primary school/s were surveyed, the methodology of the survey. Absence of this information restricts the reviewer to comment on the survey findings.</p> | High             | <p>As provided in the response to DPIE’s letter (Item 1), the survey response rates are as follows:</p> <table><tr><th rowspan="2">Schools</th><th colspan="3">Students</th><th colspan="3">Staff</th></tr><tr><th>Existing Population</th><th>Survey Responses</th><th>Response Rate</th><th>Existing Population</th><th>Survey Responses</th><th>Response Rate</th></tr><tr><td>Sacred Heart Primary School</td><td>248</td><td>195</td><td>79%</td><td>16</td><td>16</td><td>114%</td></tr><tr><td>Mother Teresa Primary School</td><td>420</td><td>273</td><td>65%</td><td>24</td><td>24</td><td>100%</td></tr><tr><td>Catherine McAuley High School</td><td rowspan="2">2,186 <sup>a</sup></td><td>795</td><td rowspan="2">75%</td><td>88</td><td>54</td><td>61%</td></tr><tr><td>Parramatta Marist High School</td><td>847</td><td>78</td><td>40</td><td>51%</td></tr><tr><td>Total</td><td>2,854</td><td>2,110</td><td>74%</td><td>204</td><td>134</td><td>67%</td></tr></table> <p>Note:<br/>[a] The existing population of both high schools.</p> <p>All student surveys were completed by students during class-time; for primary schools the supervising teacher recorded the survey (by show of hands), and high school students completed an online questionnaire where the results were automatically tabulated.</p> <p>Staff completed an online questionnaire, which they had one week to complete.</p> | Schools          | Students      |  |  | Staff |  |  | Existing Population | Survey Responses | Response Rate | Existing Population | Survey Responses | Response Rate | Sacred Heart Primary School | 248 | 195 | 79% | 16 | 16 | 114% | Mother Teresa Primary School | 420 | 273 | 65% | 24 | 24 | 100% | Catherine McAuley High School | 2,186 <sup>a</sup> | 795 | 75% | 88 | 54 | 61% | Parramatta Marist High School | 847 | 78 | 40 | 51% | Total | 2,854 | 2,110 | 74% | 204 | 134 | 67% |
| Schools                       | Students            |  |                  | Staff   |                  |               |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
|                               | Existing Population | Survey Responses   | Response Rate    | Existing Population   | Survey Responses | Response Rate |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
| Sacred Heart Primary School   | 248                 | 195  | 79%              | 16  | 16               | 114%          |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
| Mother Teresa Primary School  | 420                 | 273  | 65%              | 24  | 24               | 100%          |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
| Catherine McAuley High School | 2,186 <sup>a</sup>  | 795  | 75%              | 88  | 54               | 61%           |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
| Parramatta Marist High School |                     | 847  |                  | 78  | 40               | 51%           |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |
| Total                         | 2,854               | 2,110  | 74%              | 204   | 134              | 67%           |  |  |       |  |  |                     |                  |               |                     |                  |               |                             |     |     |     |    |    |      |                              |     |     |     |    |    |      |                               |                    |     |     |    |    |     |                               |     |    |    |     |       |       |       |     |     |     |     |

|   |           |   |      |  |  |           |             |   |      |      |   |      |      |
|---|-----------|---|------|--|--|-----------|-------------|---|------|------|---|------|------|
| 19  | 5.1.2/22  | <p>It is not clear how the car occupancy rate has been calculated. Were the journey to school surveys (Appendix C) used to determine the occupancy rate? Absence of detailed information about the survey methodology will restrict the reviewer to comment on the survey findings.</p> <p>We note that in Appendix C there was no distinction between primary and high school students or whether the students are in the same campus or from different school. Therefore, it is not clear how the occupancy rate for two different school groups were calculated.</p> <p>Again, from Appendix C, it is seen that occupancy at AM peak and PM peak can be different. However, this differentiation is not considered in the trip generation.</p> | High | <p>As stated in TAIA, a car occupancy rate (i.e. person to car ratio) has been calculated using questionnaire and traffic survey data collected at the schools at the subject site. This rate is based on the number of cars surveyed transporting students/ staff and the number of students/ staff dropped-off and picked-up by car. An average car occupancy rate for primary school students has been calculated at 2.12 students per car while a rate of 1.85 students per car applies to high school students.</p> <p>For further information, the surveyed car occupancy rates are in AM and PM are as follows:</p> <table><tr><td></td><td>To School</td><td>Form School</td></tr><tr><td>Car Occupancy for HS (Students per veh)<br/>(McAuley and Marist)</td><td>1.85</td><td>2.12</td></tr><tr><td>Car Occupancy for PS (Students per veh)<br/>(Mother Teresa and Sacred Heart)</td><td>2.12</td><td>2.12</td></tr></table> <p>To be conservative, the rate for high schools was taken as the lesser amount (i.e. 1.85 students per vehicle) and applied in both peak periods. for primary schools, the rate of 2.12 students per vehicle was adopted in both peak periods.</p> |  | To School | Form School | Car Occupancy for HS (Students per veh)<br>(McAuley and Marist) | 1.85 | 2.12 | Car Occupancy for PS (Students per veh)<br>(Mother Teresa and Sacred Heart) | 2.12 | 2.12 |
|   | To School | Form School   |      |  |  |           |             |   |      |      |   |      |      |
| Car Occupancy for HS (Students per veh)<br>(McAuley and Marist)             | 1.85      | 2.12  |      |  |  |           |             |   |      |      |   |      |      |
| Car Occupancy for PS (Students per veh)<br>(Mother Teresa and Sacred Heart) | 2.12      | 2.12  |      |  |  |           |             |   |      |      |   |      |      |

| Item              | Section/Page               | Bitzios Comments  | Bitzios Priority | Ethos Urban response and action (if any)   |             |                            |  |  |             |             |             |            |     |     |   |               |     |     |     |                   |     |     |     |
|-------------------|----------------------------|---|------------------|--|-------------|----------------------------|--|--|-------------|-------------|-------------|------------|-----|-----|---|---------------|-----|-----|-----|-------------------|-----|-----|-----|
| 20                | 5.2/ 25                    | Trip generation rate for CELC can be obtained from RMS Guide to Traffic Generating Developments (2002) and details of the survey can be found in RMS published Land Use Traffic Generation Data and Analysis 21 Child Care Centres. As there are existing guidelines, we strongly recommend using these guidelines. | High             | <p>RMS Guide to Traffic Generating Developments stipulates rates based on surveys carried out in 1992, almost 30 years ago. The Guide provides trip generation rates as follows:</p> <p style="text-align: center;"><b>Table 3.6</b><br/><b>Traffic generation rates</b></p> <table><tr><th rowspan="2">Centre Type</th><th colspan="3">Peak Vehicle Trips / Child</th></tr><tr><th>7.00-9.00am</th><th>2.30-4.00pm</th><th>4.00-6.00pm</th></tr><tr><td>Pre-school</td><td>1.4</td><td>0.8</td><td>-</td></tr><tr><td>Long-day care</td><td>0.8</td><td>0.3</td><td>0.7</td></tr><tr><td>Before/after care</td><td>0.5</td><td>0.2</td><td>0.7</td></tr></table> <p>The 2015 RMS Trip Generation Surveys Child Care Centres provide more recent trip and parking rates from sites across Sydney. The average peak hour trip rates for a comparable pre-school centres in Sydney are calculated as follows:</p> <ul style="list-style-type: none"><li>• AM peak trip rate: 0.68 trips per licensed place</li><li>• PM peak trip rate: 0.59 trips per licensed place.</li></ul> <p>As explained in Section 5.2 of the TAIA, in 2023 there will be 100 CELC students. In this study year, it is estimated that there would be 42 car transporting these children based on the adopted mode splits (car, public transport with a parent, walking with a parent etc.). One car generates an inbound trip plus outbound trip i.e. two ‘trips’. Therefore, for 100 CELC students there would be 84 trips generated. Put more simply, the trip rate would be 0.84 trips per child.</p> <p>The same estimation method has been used to determine the number of trips in the study year 2033.</p> <p>The trip rates which were adopted in the TAIA analysis are not too dissimilar to the 2015 RMS trip rates. In fact, the TAIA provides a more conservative assessment based on the slightly higher trip rates. On this basis, the trip rates in the TAIA are sufficient.</p> | Centre Type | Peak Vehicle Trips / Child |  |  | 7.00-9.00am | 2.30-4.00pm | 4.00-6.00pm | Pre-school | 1.4 | 0.8 | - | Long-day care | 0.8 | 0.3 | 0.7 | Before/after care | 0.5 | 0.2 | 0.7 |
| Centre Type       | Peak Vehicle Trips / Child |   |                  |  |             |                            |  |  |             |             |             |            |     |     |   |               |     |     |     |                   |     |     |     |
|                   | 7.00-9.00am                | 2.30-4.00pm   | 4.00-6.00pm      |  |             |                            |  |  |             |             |             |            |     |     |   |               |     |     |     |                   |     |     |     |
| Pre-school        | 1.4                        | 0.8   | -                |  |             |                            |  |  |             |             |             |            |     |     |   |               |     |     |     |                   |     |     |     |
| Long-day care     | 0.8                        | 0.3   | 0.7              |  |             |                            |  |  |             |             |             |            |     |     |   |               |     |     |     |                   |     |     |     |
| Before/after care | 0.5                        | 0.2   | 0.7              |  |             |                            |  |  |             |             |             |            |     |     |   |               |     |     |     |                   |     |     |     |

| 21       | 5.2.1/ 26 | <p>It is noted that the CELC will operate between 6AM and 6PM and therefore the AM peak hour will fall between 5:30 AM and 6:30 AM and PM peak hour will fall between 5:30 PM and 6:30 PM, which is outside the school peak hour.</p> <p>It is not a realistic assumption that all the CELC students will arrive/leave at these times. However, for a conservative and acceptable approach, we recommend using RMS guideline for CELC trip generation.</p> <p>Again, if in PM peak CELC trips are between 5:30 PM and 6:30 PM it will coincide with the regular PM peak and therefore this should be assessed by including the regular PM peak traffic scenario in any modelling.</p> | High  | <p>The CELC facility is designed to commence early and conclude late in the day. In a similar manner to the OOSH, deficiencies in the road network occur in the road network peak periods. Therefore, the impact of CELC (and OOSH) which occur outside of peak periods, would be far less than that in the peak periods (i.e. 7.45am-8.45am and 3pm-4pm).</p> <p>Whilst it is possible to collect additional “out of peak” traffic data and undertake additional “out of peak” traffic modelling, there would not be any utility in undertaking this modelling other than to show the impact is lower than during the peak periods.</p> <p>Furthermore, as addressed in Item 2 (above), the regular PM peak period in the vicinity is identified as 3pm-4pm. As shown below, the peak hourly flow on Darcy Road is 7940 vehicles.</p> <table><tr><th>AM Peak:</th><th>08:00</th><th>PM Peak:</th><th>15:00</th></tr><tr><td>00:00</td><td>396</td><td>12:00</td><td>5466</td></tr><tr><td>01:00</td><td>257</td><td>13:00</td><td>5814</td></tr><tr><td>02:00</td><td>142</td><td>14:00</td><td>6525</td></tr><tr><td>03:00</td><td>169</td><td>15:00</td><td>7940</td></tr><tr><td>04:00</td><td>410</td><td>16:00</td><td>6725</td></tr><tr><td>05:00</td><td>1651</td><td>17:00</td><td>5896</td></tr><tr><td>06:00</td><td>4484</td><td>18:00</td><td>4464</td></tr><tr><td>07:00</td><td>7429</td><td>19:00</td><td>3311</td></tr><tr><td>08:00</td><td>8805</td><td>20:00</td><td>2712</td></tr><tr><td>09:00</td><td>5858</td><td>21:00</td><td>2439</td></tr><tr><td>10:00</td><td>5397</td><td>22:00</td><td>1745</td></tr><tr><td>11:00</td><td>5222</td><td>23:00</td><td>826</td></tr></table> <p>The perceived 5.30pm-6.30pm “regular” peak period would be far less than the 3pm-4pm period. On average, the 5.30pm-6.30pm period could carry in the order of 5180 vehicles which is 2760 vehicles less than the surveyed peak. In 2023, there will be 100 children in CELC. Conservatively, even if every single parent drove their child to CELC as a single-occupant car trip there would not be nearly enough additional vehicles to adjust the peak period.</p> <p>Therefore, the TAIA has evidently assessed the peak periods of the surrounding road network.</p> | AM Peak: | 08:00 | PM Peak: | 15:00 | 00:00 | 396 | 12:00 | 5466 | 01:00 | 257 | 13:00 | 5814 | 02:00 | 142 | 14:00 | 6525 | 03:00 | 169 | 15:00 | 7940 | 04:00 | 410 | 16:00 | 6725 | 05:00 | 1651 | 17:00 | 5896 | 06:00 | 4484 | 18:00 | 4464 | 07:00 | 7429 | 19:00 | 3311 | 08:00 | 8805 | 20:00 | 2712 | 09:00 | 5858 | 21:00 | 2439 | 10:00 | 5397 | 22:00 | 1745 | 11:00 | 5222 | 23:00 | 826 |
|----------|-----------|---|-------|---|----------|-------|----------|-------|-------|-----|-------|------|-------|-----|-------|------|-------|-----|-------|------|-------|-----|-------|------|-------|-----|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|-----|
| AM Peak: | 08:00     | PM Peak:  | 15:00 |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 00:00    | 396       | 12:00   | 5466  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 01:00    | 257       | 13:00   | 5814  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 02:00    | 142       | 14:00   | 6525  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 03:00    | 169       | 15:00   | 7940  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 04:00    | 410       | 16:00   | 6725  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 05:00    | 1651      | 17:00   | 5896  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 06:00    | 4484      | 18:00   | 4464  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 07:00    | 7429      | 19:00   | 3311  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 08:00    | 8805      | 20:00   | 2712  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 09:00    | 5858      | 21:00   | 2439  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 10:00    | 5397      | 22:00   | 1745  |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 11:00    | 5222      | 23:00   | 826   |   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 22       | 6         | Queue analysis for each access for AM and PM peak are missing.  | High  | Queue data has been previously provided in the SIDRA modelling calibration and validation report.   |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |
| 23       | 6/35-36   | <p>Detailed calculations for drop-off pick up rates are missing. Analyse scenarios where a portion of parents will stay for longer time (to meet the teacher or official enquiries) in the drop off-pick up zone.</p> <p>Scenario of AM and PM peak should analysed separately.</p>   | High  | Chapter 7 of the TAIA details the calculation inputs and assumptions and traffic generation rates (i.e. drop-off and pick-up estimates in the AM and PM peaks, respectively). Section 7.1 outlines the future population estimated to travel by car based on current car mode split; Section 7.2 contains the directional traffic splits for drop-off/ pick-up in the in the AM and PM peak periods, and vehicle trips calculated for the Primary School vs High School, students and staff, in both future years.  |          |       |          |       |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |     |

2 Darcy Road Westmead: EIS Peer Review



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|    |        |   |      | As it operates currently, the drop-off and pick-up facility will accommodate those parents who will be transporting students and leaving the site immediately. Visitor parking is provided elsewhere on-site to accommodate parents who will be visiting the school at this time.   |
| 24 | 7.1/38 | Point 6 mentioned " <i>The CELC is proposed to operate between 6:00am-6:00pm. Traffic movements associated with CELC staff and children/ parents would occur before and after the school peak periods (i.e. approximately 5:30am- 6:30am and 5:30pm-6:30pm). Therefore, trips generated by the CELC would have no impact on the local road network during school peak periods.</i> "<br>Please refer to item 21 | High | See response to Item 21 (above).  |
| 25 | 7.2/39 | What is the basis of the directional splits?<br>It is mentioned that " <i>10% would depart during the afternoon peak.</i> " Nothing is mentioned about the remaining 90% staff (about 240 car trips). It should be noted that, the regular PM peak hour, assumed from 5 PM, and it is to be clear that how many trips will be undertaken during that period.  | High | As has been identified, the peak periods are 7.45am-8.45am and 3pm-4pm. The TAIA assessment has been carried out for the peak periods on the surrounding road network, not the shoulder periods which are clearly carry less trips than the peaks.<br><br>The directional split for car trips to/from the site by staff and students (parents) are provided for the peak periods as this will directly impact the SIDRA modelling analysis which is carried out for the peak period in the morning and afternoon.<br><br>The staff directional split has been based on surveys carried out at similar schools having junior cohorts and senior cohorts co-located on one campus or within close walking distance. The surveyed schools include Chatswood Public School and Chatswood High School, and St Patrick's College in Strathfield. In these examples, approximately 18% of staff exited the site before the start of the PM peak and 72% of staff exited the site after the PM peak periods (totally approximately 90% leaving the site outside of the peak hour).<br><br>At the subject site, the remaining 90% would be equivalent to 165 and 216 trips in 2023 and 2033, respectively – not 240 trips. |

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| 26  | 7.2/40    | <p>A significant mismatch of traffic generation between the traffic survey and the interview survey is seen from Table 7.3. The survey underestimates the AM peak traffic by 27% and 31% for the two different directions (IN and OUT respectively). Again, the survey overestimates the PM peak traffic by 117% and 32% for IN and OUT direction respectively.</p> <p>Therefore, it is clear that the occupancy rate or the directional splits (or both) is not aligned with the existing traffic generation. The flaw of computing occupancy rate for two different level (primary and high) is mentioned in comment # 5.</p> <p>It may be acceptable if the occupancy rate/directional splits are calibrated or adjusted to reflect the existing situation and then apply the calibrated rate to get the future trip generation.</p> | High   | <p>Car occupancy rates have been used to calculate the future trip rates. As explained in the responses to DPIE's queries and above (Item 19) a car occupancy rate (i.e. person to car ratio) has been calculated using questionnaire and traffic survey data collected at the schools at the subject site. This rate is based on the number of cars surveyed transporting students/ staff and the number of students/ staff dropped-off and picked-up by car. An average car occupancy rate for primary school students has been calculated at 2.12 students per car while a rate of 1.85 students per car applies to high school students.</p> <p>For further information, the surveyed car occupancy rates are in AM and PM are as follows:</p> <table><tr><td></td><td>To School</td><td>Form School</td></tr><tr><td>Car Occupancy for HS (Students per veh)<br/>(McAuley and Marist)</td><td>1.85</td><td>2.12</td></tr><tr><td>Car Occupancy for PS (Students per veh)<br/>(Mother Teresa and Sacred Heart)</td><td>2.12</td><td>2.12</td></tr></table> <p>To be conservative, the rate for high schools was taken as the lesser amount (i.e. 1.85 students per vehicle) and applied in both peak periods. for primary schools, the rate of 2.12 students per vehicle was adopted in both peak periods.</p> |  | To School | Form School | Car Occupancy for HS (Students per veh)<br>(McAuley and Marist) | 1.85 | 2.12 | Car Occupancy for PS (Students per veh)<br>(Mother Teresa and Sacred Heart) | 2.12 | 2.12 |
|   | To School | Form School   |        |  |  |           |             |   |      |      |   |      |      |
| Car Occupancy for HS (Students per veh)<br>(McAuley and Marist)             | 1.85      | 2.12  |        |  |  |           |             |   |      |      |   |      |      |
| Car Occupancy for PS (Students per veh)<br>(Mother Teresa and Sacred Heart) | 2.12      | 2.12  |        |  |  |           |             |   |      |      |   |      |      |
| 27  | 7.2/40    | <p>The report mentions that "<i>The theoretical and surveyed existing traffic generation in the morning peak appears to be very similar while there is a substantial difference in the afternoon peak.</i>" We do not agree with this statement, as the theoretical estimation significantly underestimates the AM peak trips (160 less IN trips and 137 less OUT trips which is about 27% and 31% less than the actual trips). Again, it is not clear as why the future 2023 AM trip generation is lower than the existing year of 2019 trip generation.</p>   | High   | <p>Based on further clarification of car occupancy rates (as explained above), the trip generation estimates using surveyed travel mode patterns equate to those presented in the TAIA.</p>  |  |           |             |   |      |      |   |      |      |
| 28  | 7.2/40    | <p>"<i>This suggests that there may have been an extraordinary event in the traffic counts which rendered the traffic counts much lower than normal.</i>" The theoretical trip rate can also have flaws as discussed in the previous comments.</p>  | Medium |  |  |           |             |   |      |      |   |      |      |
| 29  | 7.2       | <p>What will be the trip generation and distribution from the two separate precinct accesses? The methodology and detailed analysis are required to understand the future traffic situation.</p>  | High   | <p>The trip generations estimates are presented in Section 7.2 of the TAIA. Trips generated by the Primary School staff and students (parents) would access the site via the existing site access while High School staff and student trips would occur via the new site access driveways on Darcy Road to the new car park and drop-off/ pick-up facility.</p>  |  |           |             |   |      |      |   |      |      |

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| 30 | 7.3/41 | Section 7.3 is not clear. This section is an important part of the future traffic situation, therefore more information is required. Again, the methodology should be discussed in detail. Some key information includes: Which scenario of STFM is considered? Was Sydney Metro considered in the scenario? Which PLR scenario (PLR 1 or 2 or both) was considered? What was the growth rate and for which section? How the growth rate is calculated for 2033? | High | <p>STFM linear growth forecasts for Road Traffic Growth up to the Year 2036 for the peak 2-hour periods between 7am-9am and 4pm-6pm have been used.</p> <p>The growth rates for each intersection approach is unique to the model. The STFM growth forecasts have been provided in attached.</p>  |
| 31 | 7.6/42 | The SIDRA models and modelling methodology is reviewed and detailed comments are made in section 2.3. Generally, the review found major flaws in the SIDRA modelling which questions the acceptability of the Sidra modelling results. The base models are not considered to be suitably validated and are therefore not fit for the purpose of using these as a basis for developing future modelling scenarios.  | High | <p>Responses to the detailed findings of Bitzios' peer review of the SIDRA modelling are provided in Attachment A which cover this query in detail.</p> <p>In general, the SIDRA model for the 2018 base case has been updated having consideration for Bitzios' comments in Attachment A. Comments classified as a "major" issue and "fail" assessment have been reviewed and incorporated into the SIDRA model where necessary. Key updates to the existing case scenario are as follows:</p> <ul style="list-style-type: none"> <li>• Design life parameter has been switched off.</li> <li>• Traffic signal phase times at intersections in the AM and PM peaks mentioned in Attachment A have been further reviewed and amended accordingly. The average phase times have been applied to the intersection.</li> <li>• Signal coordination and offset has been removed from the network model and all signalised intersections are operating with the updated user given phase times.</li> <li>• Pedestrian protection of 6 and 8 seconds has been implemented to turning movements into opposing ped movement.</li> <li>• Pedestrian movement volumes in the AM and PM peaks have been updated based on survey video footage.</li> <li>• The intersection layout of the Darcy Road-Mons Road-Institute Road intersection has been configured based on the layout at the which the surveys were completed (October 2018) for consistency with the existing conditions.</li> <li>• Movement speeds at School Access and Hospital Access have been amended as per posted speed limits. Otherwise, a value of 20km/h has been applied to side roads.</li> <li>• Peak flow period has been amended from 30 minutes to 60 minutes.</li> </ul> <p>The above-mentioned updates have been carried over to the future scenarios. The average cycle time for each signalised intersection has been used in order to include all potential phases that can be called during each cycle.</p> |

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| 32 | 8.3/50 | Objective1 third point " <i>Limit convenience of car access and parking within the School</i> ". In the current proposal, more parking (almost double) is provided which is contradictory to the GTP objective.   | Low  |  |
| 33 | 8.4/51 | We also anticipate a modal shift in that area. However, assumption of 10% modal shift seem to be too high, where 3-5% is considered as achievable (as mentioned in this report). Again, the primary school is far from the nearby residential zones, therefore, 90% of the primary students are using private cars. Moreover, considering higher modal shift is somewhat "best-case" scenario, whereas in traffic impact analysis the convention is to analyse the worst-case scenario. | High | <p>In consultation with TfNSW/ SCO, a Framework Travel Plan has been developed by Frank Turquoise Group. Frank Turquoise Group regularly works with the Department of Education advising on travel plans for schools and determining mode shift targets. The Framework Travel Plan indicates that a mode shift target of 10% would be achievable for the site, and an eventual target of 20% in the future.</p> <p>Achieving the 10% mode share shift is considered realistic and modest, noting the following:</p> <ol style="list-style-type: none"> <li>1. 160 students live within walking distance of the site and 184 live along an existing public bus route.</li> <li>2. The 10% mode shift for the primary students requires only 66 students to change travel mode over the next two years (33 students a year). As growth occurs, only 5-10 students will need to change mode each year to achieve the 10% shift.</li> <li>3. A Travel Coordinator is being employed and will conduct personalised trip-planning sessions with students.</li> </ol> <p>Furthermore, it is noted that other school developments are also targeting 10% mode shift which has been agreed by TfNSW/ SCO, for example St Patrick's College at Strathfield. This school is located much further away from heavy rail, frequent bus services, future light rail etc. in comparison with the subject site. Given its proximity to existing and upcoming major transport infrastructure, the subject site would be able to considerably leverage mode shift to achieve the set targets.</p> |
| 34 | 8.2/54 | It is mentioned that some intersections would operate at capacity or over capacity (those intersections with an LoS D or worse) even with the 10% modal shift. The report further mentioned that these intersections would require additional measures. However, no detail is provided about the type of measures.  | High | <p>This is summarised in the main letter to the DPIE but to paraphrase:</p> <ul style="list-style-type: none"> <li>• The Westmead precinct is planned for at least 20,000 new jobs</li> <li>• The planned growth is based upon the use of public transport and not significant increases in road capacity</li> <li>• The roadworks required for PLR, SMW and the Westmead precinct are not yet defined.</li> </ul> <p>It is reasonable for the project to contribute to such improvements (as explained in the response to DPIE's queries) but not to plan what improvements should be delivered for much more significant developments.</p> <p>Furthermore, there is currently not enough information contained in the RMS/TfNSW documentation nor is there any future road transport infrastructure described in the EIS documentation for these projects. There is no projected model shift for PLR or SMW, but since the State Government is</p>   |

## 2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001

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|    |       |  |        | planning to introduce 20,000 jobs at Westmead the effect of all of these cumulative developments is not known. The idea that upgrades have been identified and that “any further required upgrades are the proponent’s responsibility” is simplistic; it is a holistic issue, not just the impacts of the proponent.  |
| 35 | 10/63 | No discussion is provided for the historical records of the traffic accidents in the study area.   | Medium |   |
| 36 | 10    | <p>Very high pedestrian activity near the train station (majority of pedestrians are students) was evident during the site visit especially in the AM peak period. The footpath was blocked, and long queues of pedestrians were observed. This issue was not discussed in this section or in any part of the report.</p> <p>Again, the proposed multi-deck carpark’s entry and exit locations currently has low demands. However, this is expected to change. This change will affect the pedestrian activity and requires more information on the pedestrian activity and the mitigation measures.</p> | Minor  |   |
| 37 | 11/65 | <p>Second Point: The future traffic volume extracted from RMS/TfNSW should have considered the future transport infrastructure and is used in the SIDRA analysis. Therefore, the SIDRA modelling already considered the “alleviated traffic volumes” in the analysis. This means that any further required upgrades are the proponent’s responsibility.</p>  | High   | <p>Notably, the TfNSW modelling included PLS Stage 1. However, the PLR EIS states:</p> <p><i>“The un-constrained high traffic demand modelling results indicate substantial impact associated with the 2026 traffic forecasts (without the project). However, this scenario does not reflect the most likely (average case) travel outcomes for future years, noting that the introduction of the project and other public transport infrastructure, combined with changing travel behaviour, are all expected to have a beneficial impact on reducing the peak period travel demand”.</i></p> <p>Therefore, the future cases modelled as part of the TAIA presented conservative scenarios, having consideration for background traffic growth within the local road network. It is not yet known specifically what traffic rate reduction PLR, SMW, and improved bus services will induce on the Westmead locality whose purpose is to reduce the number of car trips in the future by providing public transport alternatives.</p> <p>It will not be known until the first few years of these major infrastructure projects being operational. Notwithstanding this, these major transport infrastructure projects are predicted to remove tens of thousands of cars off Sydney roads every day; namely, the SMW EIS forecasts that there will be 83,000 fewer car trips every weekday by 2036. It is expected that the Westmead precinct would experience a reduction in traffic loads once these key transport infrastructure projects become operational. Such benefits would begin to become apparent in 2023 once PLR opens, which is also the opening year for the Proposal. Furthermore, growth in the Westmead Precinct is</p> |

## 2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001



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|  |  |  |  | forecasted to bring 4,400 new dwellings within the area which will also increase the number of walking, cycling and public transport trips within the Westmead precinct as well as to/from the Westmead precinct. |
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| Item | Section/Page                  | Bitzios Comments   | Bitzios Priority | Ethos Urban response and action (if any)  |
|------|-------------------------------|--|------------------|---|
| 38   | Appendix A:<br>Page 153 (pdf) | A 485 metre queue is predicted in 2033 AM peak with development scenario for the right turn from Darcy Road eastbound approach to the site access (Mother Teresa). However, the queue storage length is 75 metres. The queue will go approximately 150 metres beyond the Darcy Road/Bridge Road intersection. This will pose a negative impact on these two intersections as queue spill and queue push back will occur. Even, with the 10% modal shift (page 169 pdf), this queue is predicted to be 250 metres. SIDRA outputs for this movement in PM peak showed some unexplained results. The 2023 with development scenario predicts 682 metre long queue (average or 85 <sup>th</sup> percentile?) with an average delay of only 12 seconds. However, the queue is predicted to be reduced to 500 metres in 2033 with development scenario and with an average delay of 433 seconds. | High             | <p>As addressed within the RtS, improvements to the future Primary School Kiss and Ride facility (which is access via this driveway) have been proposed. Namely, there are currently eight pick-up/ drop-off (PU/DO) vehicle bays on-site which are utilised by both the high schools and primary schools. As part of the SSDA, it was initially proposed to increase this number to a total of 31 PU/DO bays by utilising some of the angled parking spaces in the southern portion of the car park.</p> <p>Following discussions with Council's traffic engineers and upon further site investigations the configuration of the future primary school Kiss and Ride zone has been amended. The amended layout is a refined design of the initial proposal providing traffic manoeuvring efficiencies and improved safety since it eliminates the need for vehicles to reverse into PU/DO bays. Under the amended arrangement, all PU/DO vehicular movements will occur in a forward direction which will ensure that the pick-up/drop-off activities occur as efficiently as possible and the drop-off rate could be maintained at 30-60 seconds per vehicle. The amended layout incorporates 11 PU/DO bays in addition to the existing eight PU/DO bays,</p> |
| 39   | Appendix A:<br>Page 249 (pdf) | The left turning movement from Darcy Road west bound to the site is predicted to be 200 metres and 700 metres in AM and PM peak hours respectively. This means in the PM peak, the queue will be approximately 100 metres beyond the Darcy Road / Hawkesbury intersection, impacting the other intersections including the Darcy Road / Institute Road intersection and Darcy Road / Site Access (Catherine McCauley) intersections. However, mitigation measures have been proposed to address this impact.   | High             | <p>As detailed in the RtS, there are significant improvements which will occur for the rate of vehicle turn over within the site thereby reducing vehicle queues at the site access. It is noted that CDC approval for the proposed Kiss and Ride facility was recently granted on Tuesday 22<sup>nd</sup> December 2020.</p> <p>As a mitigation measure for impacts on the future road network, the above measure will provide significant benefits to the surrounding roads. However, it is important to note that an background traffic growth rate of 2.2% and 2.4% per annum in AM and PM peak periods has been included in the SIDRA modelling for the growing Westmead Precinct. By the year 2033. That will include approximately 2% and 24% background traffic growth alone. As detailed in earlier responses to DPIE's queries, Westmead is a growth precinct whereby a holistic solution is necessary particularly as PLR and SMW would be expected to create considerable traffic alleviate for the precinct (whilst it is not included in the EIS and presumably the STFM modelling as well).</p>  |

## 2.3 SIDRA Modelling

Source Documents: 1. Memorandum Traffic Modelling Purpose and Scope (18173-R01v01-200928 Sidra Technical Note)

### 2. SIDRA Models

| Item | Section/Page        | Bitzios Comments  | Bitzios Priority | Ethos Urban response and action (if any)  |
|------|---------------------|---|------------------|---|
| 40   | General Comments    | <ul style="list-style-type: none"> <li>SCATS history data was not collated from TfSNW SCATS data and the corresponding '.LX' file containing traffic signal cycle time, phase time, phase sequence and signal co-ordination information including offsets does not appear to have been used. These should be provided so that we can verify the signal timings.</li> <li>It is an industry wide practice to use SCATS history data to develop, calibrate and validate SIDRA models. No credible phase or cycle time data was available to compare with the SIDRA models.</li> <li>No information was provided on the average observed queue lengths.</li> <li>The base models have some issues with the model network settings and parameters which will impact key modelling results. One example is the use of inaccurate approach distances which will impact the network analysis.</li> </ul> | High             | <p>Responses to the detailed findings following Bitzios' review of the SIDRA modelling are provided in Attachment A which cover this query.</p> <p>The RMS Traffic Modelling guidelines states:<br/> <i>"Acquisition of average timings [identified for the modelled period] is either via site observation or through tools such as SCATS IDM, SCATS Reporter or SCATS History."</i></p> <p>Furthermore, site observation and measurements are acceptable methods of data collection for the purpose of model calibration.</p> <p>At the time of the traffic surveys, site observations were carried out at the junctions to record signal cycle times, phase times, phase sequence, signal coordination, driver behaviour and queue lengths. This information has been provided in the SIDRA modelling calibration and validation report.</p> |
| 41   | General Comments    | A quick comparison of some base and future models shows changes in volumes only. However, intersection layout and traffic signal settings (e.g. inclusion of PLR) do not appear to change.  | High             | Traffic flows in base case and future cases have been modified having consideration for the new car park and Kiss and Drop facility on Darcy Road.  |
| 42   | Signal Coordination | Co-ordination was applied at signalised sites 8, 6, and 4. However, with 'offset' set as 0 second. It was not possible to verify the offset as no '.LX' file data was available. However, it is highly unlikely that offsets are set as 0 seconds in this corridor.   | High             | The revised base case modelling addresses queries on the offset. Responses to the detailed findings following Bitzios' review of the SIDRA modelling are provided in Attachment A which cover this query.   |
| 43   | Modelling Settings  | The resulting SIDRA phase times vary substantially with the observed phase times. This is due to the selection of 'user given cycle time' option in the traffic signal settings. The use of this setting will enable SIDRA to maintain the cycle time. However, SIDRA will optimise the phase time. The resulting phase times are often very different from the observed phase times. This explains the substantial differences as reported in the technical note between the observed and modelled phase times.  | High             | Responses to the detailed findings following Bitzios' review of the SIDRA modelling are provided in Attachment A which cover this query.  |

2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001

|    |  |   |        |  |
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| 45 | Future Scenarios<br>(Page 3)                 | The future intersection performance within the study area will be substantially impacted by the introduction of Parramatta Light Rail (PLR). As part of PLR project, the operation of a number of intersections including the Darcy Road / Hawkesbury Road intersection will be substantially impacted. It is not clear how the PLR operations are considered in the future SIDRA models.   | High   | As addressed above in response to DPIE queries.  |
| 49 | Signal Coordination<br>(Page 3)              | Three signalised intersections are considered as coordinated. However, no information is provided about the source of this assumption. Again, other intersections on Hawkesbury Road are also likely to be coordinated due to there proximity.  | High   | Responses to the detailed findings following Bitzios' review of the SIDRA modelling are provided in Attachment A which cover this query. |
| 40 | Intersection LoS<br>(Page 3)                 | No discussion is provided for how the observed intersection level of service was determined. This method of should be clearly documented and justified as it appears to be unconventional and subjective.   | Medium |  |
| 41 | Model Calibration and Validation<br>(Page 3) | It is mentioned that the Sidra 95 <sup>th</sup> percentile queue was compared against the 'average maximum' observed queues. The comparison is summarised in Table 3. The key issues are: <ul style="list-style-type: none"> <li>▪ It was not defined how 'average maximum' observed queues were calculated</li> <li>▪ No calibration criteria were defined</li> <li>▪ At a number of locations the observed queues vary significantly against the Sidra queue. Some of these are highlighted in the report. However, no explanations were provided as why the observed queues vary significantly</li> </ul>  | High   | Responses to the detailed findings following Bitzios' review of the SIDRA modelling are provided in Attachment A which cover this query. |
| 42 | Page 3                                       | The comparison of observed cycle/phase time is presented in Table 1. However, no justifications are discussed between the adopted time and observed time. These includes <ul style="list-style-type: none"> <li>▪ Hawkesbury Road – Alexandra Avenue &amp; Hawkesbury Road – Railway Parade phase A, B and E AM peak, phase E PM peak</li> <li>▪ Hawkesbury Road – Darcy Road phase C AM peak, phase E PM peak</li> <li>▪ Darcy Road – UWS Car Park Access – Westmead Hospital Access a new phase C is introduced in both peaks</li> <li>▪ Darcy Road – Mons Road – Institute Road phase A, B and E in AM peak and A, B, D, E for PM peak</li> <li>▪ Darcy Road – Bridge Road the cycle time is significantly reduced.</li> </ul> | High   | Responses to the detailed findings following Bitzios' review of the SIDRA modelling are provided in Attachment A which cover this query  |

## 2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001

|    |              |   |  |  |
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| 43 | SIDRA Models | Detailed comments on SIDRA models are provided in <b>Attachment A</b> |  |  |
|----|--------------|---|--|--|



## 2.4 Response to Submission

Source Document: Response to Submission: Appendix C Memorandum (Dated 25 August)

| Item | Page             | Bitzios Comments  | Bitzios Priority | Ethos Urban response and action (if any)  |
|------|------------------|---|------------------|---|
| 50   | 6, Submission 1  | Adequately addressed  | N/A              | No response required.   |
| 51   | 7, Submission 2  | Adequately addressed  | N/A              | No response required.   |
| 52   | 7, Submission 3  | Adequately addressed  | N/A              | No response required.   |
| 53   | 8, Submission 4  | Adequately addressed  | N/A              | No response required.   |
| 54   | 9, Submission 5  | Adequately addressed  | N/A              | No response required.   |
| 55   | 10, Submission 6 | Adequately addressed  | N/A              | No response required.   |
| 56   | 11, Submission 7 | We have some concerns about OOSH facility (details are in item number 20, 21 and 82 to 88)  | High             | As addressed above in response to DPIE queries.   |
| 57   | 12, Submission 7 | We have some concerns about OOSH facility (details are in item number 20, 21 and 82 to 88).<br>Again, as mentioned in section 2.3 and comments/item 31, the SIDRA models contain critical errors.<br>We also need to see the detailed SIDRA model results.  | High             | As addressed above in response to DPIE queries.   |
| 58   | 12, paragraph 2  | Disagree with the comment. TfNSW/RMS develop and maintain different strategic models including STFM and SMPM. They also developed different scenario combinations including Sydney Metro, PLR phase 1 and 2. These models predict the future traffic flows under various land use and infrastructure assumptions. | High             | As addressed above in response to DPIE queries.<br><br>Page 12, paragraph 2 states:<br><i>"It is also noted that all future cases which were modelled as part of the TAIA presented conservative scenarios, having consideration for background traffic growth within the local road network. It is not yet known specifically what traffic rate reduction Parramatta Light Rail, Sydney Metro West, and improved bus services will induce on the Westmead locality whose purpose is to reduce the number of car trips in the future by providing public transport alternatives. Furthermore, it will not be known until the first few years of these major infrastructure projects being operational."</i><br><br>The above statement is made in accordance with the information and assumptions provided in the PLR EIS, which TfNSW directed TTPP towards at the time of consultation for further information. TfNSW advised TTPP by email correspondence that further traffic information and modelling inputs were not available, and that the best source of forecast traffic volume inputs for the TAIA assessment be the PLR Stage 1 EIS.<br><br>At the time of sourcing STFM data and correlating modelling assumptions, |

2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001

|    |                   |   |        |  |
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|    |                   |   |        | <p>there was no further information available on the specific mode shift assumptions which had been adopted. Only projects which had been considered at the time were listed in the STFM modelling information pack. This has been provided as an attachment.</p> <p>As such, the TAIA modelling analysis has been based upon information from the EIS and the STFM modelling information pack which were available at the time of consultation with TfNSW.</p>  |
| 59 | 13, Submission 8  | Adequately addressed  | N/A    | No response required.  |
| 60 | 13, Submission 9  | See comment 57  | High   | As addressed above in response to DPIE queries.  |
| 61 | 14, Submission 10 | See comment 57  | High   | As addressed above in response to DPIE queries.  |
| 62 | 15, Submission 11 | Not addressed adequately. Need to develop appropriate traffic models to study the impacts of this connectivity  | High   | <p>CEDP agrees that a fine grain network of connections would assist with accessibility and connectivity around the Westmead precinct. Future stages of the WCC Masterplan seek to address this and include new pedestrian and vehicular connections into and through the site. This includes an east-west connection as suggested by Council in the draft Westmead Innovation District Masterplan. CEDP is willing to provide support and provide these connections within the site as part of the ongoing development of the site. However, it is incumbent on Council and surrounding landowners to ensure that meaningful connections can be made.</p> <p>Furthermore, as discussed in the Background and Context of response to DPIE queries, the link road between the subject site and Bridge Road has not been included in the Westmead 2036 Draft Place Strategy. Rather, the Strategy shows a north-south green link (pedestrian/ cyclist connection) across the rail line. As above, the Proponent would be willing to provide for a Bridge Road road connection within and up to their site boundary. Delivery of the road connection to Bridge Road itself would be through neighbouring sites, which would be dependent on other landowners/ developers to deliver this portion of the link. This messaging has been made clear to Council at several meetings during the Response to Submissions phase.</p> |
| 63 | 16, Submission 12 | Not addressed adequately. A sensitivity analysis can be carried out to demonstrate the effect of increasing number of students on the studied road network. | Medium | <p>Some intersections in the surrounding road network would experience reduced levels of service due to background traffic alone.</p> <p>The viability of a reduced student enrolment option would not be possible since it would not be supporting demand in-line with forecasted growth in Parramatta and Westmead precincts.</p>  |
| 64 | 16, Submission 13 | Not addressed adequately. More information is needed regarding the SIDRA modelling including the revised SIDRA Models.                                      | Medium | The SMW EIS contains an indicative design for the future modified intersections of Hawkesbury Road - Alexandra Avenue with Grand Avenue. The plan indicates the Hawkesbury Road – Alexandra Avenue intersection to be converted from signalised to priority controlled, and the signalised intersection to re-aligned with Grand Avenue. However, without any detail of the modified intersection signal phasing arrangement and   |

## 2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001

|    |                   |  |             |   |
|----|-------------------|--|-------------|---|
|    |                   |  |             | <p>phase timings, and location of marked pedestrian crossings, it would not be possible to model the ultimate intersection design as part of this project.</p> <p>Therefore, until such time, the modelling analysis for this project considers the current arrangement with known signal phasing, phase timing, crossings etc.</p>   |
| 65 | 17, Submission 14 | Not addressed adequately. Paragraph 3 of page 17 stated, "Student travel information has been obtained to understand how students arrive and depart school based on 15-minute intervals". More information is required including the survey methodology. | <b>High</b> | <p>Student travel information of similar schools having junior cohorts and senior cohorts co-located on one campus or within close walking distance. The surveyed schools include Chatswood Public School and Chatswood High School, and St Patrick's College in Strathfield.</p> <p>An online mode share and travel behaviour survey completed by all students (and staff) was carried out to obtain information of arrival and departure times broken down into 15-minute periods.</p> <p>The data which has been used in the analysis for this project has been presented in the response to Submission 14 in the RtS.</p> <p>These schools were selected on the basis that the before and after school activities, and start/end times aligned with that of the project, thus, the information would be transferable.</p>   |
| 66 | 18, Submission 15 | Not addressed adequately. There was no comments/discussion provided to nullify the two points (small catchment and accessibility by walking) raised by the council.  | <b>High</b> | <p>As discussed in the Background and Context of response to DPIE queries, the Westmead 2036 Draft Place Strategy describes where increased housing stock is to be provided in the future, namely, to the immediate south of the school separated by the railway. A large focus of the Strategy is for this area to become a walkable neighbourhood providing more housing choice and diversity, with an urban village at its heart and excellent public transport connections. This would primarily support the 4,400 new dwellings within the area which will increase the number of walking and public transport trips within the Westmead precinct for all ages.</p> <p>As mentioned, the link road between the subject site and Bridge Road has not been included in the Westmead 2036 Draft Place Strategy. Rather, the Strategy shows a north-south green link (pedestrian/ cyclist connection) across the rail line. As above, the Proponent would be willing to provide for a Bridge Road road connection within and up to their site boundary. Delivery of the road connection to Bridge Road itself would be through neighbouring sites, which would be dependent on other landowners/ developers to deliver this portion of the link. This messaging has been made clear to Council at several meetings during the Response to Submissions phase.</p> |

| Item | Page              | Bitzios Comments  | Bitzios Priority | Ethos Urban response and action (if any)   |
|------|-------------------|---|------------------|--|
| 67   | 19, Submission 16 | Not addressed adequately.   | High             | <p>As address in response to DPIE's queries on the Green Travel Plan, development of a Framework Travel Plan and Green Travel Plan have been developed in consultation with TfNSW, and that the projected 10% mode shift target for the site as a whole would be achievable.</p> <p>Frank Turquoise Group, who advise the Department of Education about travel plans at their schools, agreed with TTPP that with a concerted effort from the schools and with the advent of the light rail scheme adjacent to the school, and scissions with bus companies about more targeted services that 10% was achievable. Certainly, discussions on the Green Travel Plan with TfNSW/ SCO suggested that a 10% should be the target. Further to this, The Framework Travel Plan which has been prepared by Franke Turquoise for the Proposal, suggests that an eventual target of 20% in the future would be achievable.</p> <p>Achieving the 10% mode share shift is considered realistic and modest, noting the following:</p> <ol style="list-style-type: none"> <li>1. 160 students live within walking distance of the site and 184 live along an existing public bus route.</li> <li>2. The 10% mode shift for the primary students requires only 66 students to change travel mode over the next two years (33 students a year). As growth occurs, only 5-10 students will need to change mode each year to achieve the 10% shift.</li> <li>3. A Travel Coordinator is being employed and will conduct personalised trip-planning sessions with students.</li> </ol> <p>Furthermore, it is noted that other school developments are also targeting 10% mode shift which has been agreed by TfNSW/ SCO, for example St Patrick's College at Strathfield. St Patrick's College is located much further away from heavy rail, T-way bus services, future light rail etc. in comparison with the subject site. Therefore, given its proximity to existing and upcoming major transport infrastructure and future pedestrian connections as per the Strategy, the subject site would be able to considerably leverage mode shift to achieve the set targets.</p> |
| 68   | 20, Submission 17 | The concern regarding the OOSH facility (details are in item number 20, 21 and 82 to 88) needs to be addressed further.   | High             | As responded to above.   |
| 69   | 20, Submission 18 | The main point is that a large primary school is unlikely to benefit from public transport as primary school students are unlikely to use public transport. The response is not convincing. | High             | Improved public transport within the precinct is perceived to directly affected those who can make independent travel choices (e.g. adults, teenagers and elderly). However, through the education system students are making more conscience decisions from a younger age to reduce their climate footprint. This is encouraging more parents and students to seek mode sustainable travel modes than what they were previously using.  |

## 2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001

|    |                      |  |      |   |
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|    |                      |  |      | <p>For parents, the economic incentives can be a significant driver in the travel mode choices of younger school children. Inevitably, this is related to the availability of public transport; if there is limited public transport services, no amount of financial incentive will encourage one to leave their car at home. With this in mind, accessibility of the Westmead Precinct will only be enhanced in the future once PLR and SMW begin operating in an area which is already very well served by heavy rail and buses. Initiatives such as TfNSW's SSTS scheme offer free and discounted travel on public transport for students which also influences parents to shift travel mode for young students, and possibly their own travel behaviour if travelling with their child to the precinct (student travels for free or at a discounted rate).</p> <p>In addition, the site is positioned within the growing Westmead Heath and Innovation Precinct. Parents and siblings working and/or studying in this area, with many more to come in the near future, will make travel behaviour decisions based on the proximity of work, school, and university destinations. This will be further aided by the future OOSH facility at the subject site which will support parents working in the Westmead Health and Innovation Precinct.</p> |
| 70 | 21, Submission 19    | Not addressed adequately.  | High | As discussed above.   |
| 71 | 21, Submission 20    | Addressed adequately   | N/A  | No response required.   |
| 72 | 23, Submission 21    | Addressed adequately   | N/A  | No response required.   |
| 73 | 23, Submission 22    | Addressed adequately   | N/A  | No response required.   |
| 74 | 23, Submission 23    | Addressed adequately   | N/A  | No response required.   |
| 75 | 24, Submission 24    | Addressed adequately   | N/A  | No response required.   |
| 76 | 24, Submission 25    | Addressed adequately   | N/A  | No response required.   |
| 77 | 24, Submission 26    | Addressed adequately   | N/A  | No response required.   |
| 78 | 25, Submission 27    | Addressed adequately   | N/A  | No response required.   |
| 79 | 25, Submission 28    | Addressed adequately   | N/A  | No response required.   |
| 80 | 26, Submission 29    | Addressed adequately   | N/A  | No response required.   |
| 81 | 28, Submission 30    | Addressed adequately   | N/A  | No response required.   |
| 82 | Attachment 3, page 2 | Existing OOSH facility accommodates for an average of 11% of the primary school students. The target population for the OOSH facility is considered to be 40% of the primary school population in future. However, no information/study/justifications are provided why and how 40% primary school students will avail OOSH facility. Again, more information on the arrival and departure patterns of the existing OOSH trips are needed to | High | As discussed above and in response to DPIE's queries.   |

## 2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001



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|  |  | understand the impact of the OOSH facility on the existing road network. |  |  |
|--|--|--|--|--|

| Item | Page                 | Bitzios Comments   | Bitzios Priority | Ethos Urban response and action (if any)   |
|------|----------------------|--|------------------|--|
| 83   | Attachment 3, page 2 | It is mentioned that “ <i>The arrival and departure times of OOSH attendees fall outside of the school peak periods and surrounding road network peak periods, namely 7:45am to 8:45am and 3:00pm to 4:00pm.</i> ” However, there is no analysis/profiling presented to determine the existing school peak and the surrounding network peak. In fact, the traffic survey conducted in this study was limited to 2.30 to 4.30PM for the PM peak. However, normally, the PM peak occurs between 4.00 pm and 6.00 pm.   | High             | As discussed above and in responses to DPIE’s queries.   |
| 84   | Attachment 3, page 2 | It is mentioned that 672 to 806 students attending the OOSH facility during each of the before-school and after-school periods. This means a significant portion of this traffic will coincide with the network PM peak. Therefore, the network PM peak must be assessed accordingly.  | High             | As discussed above and in response to DPIE’s queries.  |
| 85   | Attachment 3, page 2 | As an OOSH facility is proposed to expand for 40%-48% of the primary school students, it is anticipated that more staff will be needed. However, nothing is mentioned about this in the memorandum.  | High             | OOSH staff would arrive in the 60 minutes before and after the start/ end times of the OOSH facility. Therefore, prior to 6am and after 6pm. There will be shift change over periods, however, these would likely occur during the inter-school peak periods (i.e. during teaching times). Overall, travel by OOSH staff would occur outside of the peak network periods.  |
| 86   | Attachment 3, page 2 | Two additional scenarios (40% OOSH and 48%) were modelled. As it is highly unlikely that this high percentage will be achieved, we propose that two additional sensitivity analysis are done; one with 20% OOSH and the other with 30% OOSH.   | High             | As discussed above and in response to DPIE’s queries.  |
| 87   | Attachment 3, page 7 | <p>It is difficult to make comprehensive comments without investigating the models and detailed modelling results. These should be presented in the modelling report.</p> <p>Table 4 and 5 shows that a number of intersections will reach at capacity by 2023 with the proposed development and one intersection (Hawkesbury Rd – Alexandra Ave) will show unacceptable LoS with more than 100 seconds of delay.</p> <p>Additionally, Table 6 and 7 show that the following two intersections will provide unacceptable LoS:</p> <ul style="list-style-type: none"> <li>▪ Darcy Road /Hawkesbury Road</li> <li>▪ Hawkesbury Road - Alexandra Avenue (with more than 100 seconds delay)</li> </ul> <p>Again, no measures are proposed to mitigate these adverse impacts.</p> | High             | <p>The suggestion that traffic capacity mitigation measures are provided does not seem to accord with the Westmead Precinct Plan which appears to be promoted by modes other than car. There will need to be physical works done to the road and its intersections to facilitate PLR. However, it is not expected that these would provide additional significant traffic capacity. Other non-car modes are being promoted in the precinct. Also, we are aware that WCC provided submissions to PLR to enhance connections between public transport and the subject site and it is suggested that any contributions required for “traffic improvements” would be better spent providing for better active travel connections.</p> <p>Mitigation measures which are being proposed as part of the Proposal are discussed in the letter to DPIE’s queries. These include:</p> <ul style="list-style-type: none"> <li>• Green Travel Plan targeting a minimum 10% modal shift to reduce single-car occupancy trips and private car use</li> <li>• New high school car park and pick-up/ drop-off facility (which will address existing issues)</li> <li>• Upgraded pedestrian access at Darcy Road</li> </ul> |

## 2 Darcy Road Westmead: EIS Peer Review

Project:  
P4803

Version:  
001

|    |                       |  |             |  |
|----|-----------------------|--|-------------|--|
|    |                       |  |             | <ul style="list-style-type: none"> <li>• Expansion of Out of Hours School Care (OOSH) to flatten the curve in peak periods</li> <li>• New primary school pick-up/ drop-off facility being implemented on-site</li> <li>• Maintain offset start and finish times of primary school and high schools to minimise effects during peak periods</li> <li>• Use of school buses and potential modification of routes to suit student addresses</li> <li>• Implementation of interim drop-off/ pick-up design solution to improve traffic circulation on-site at the site access (off Darcy Road) and reduce the site's impacts on the surrounding road network.</li> </ul> <p>There are also some improvements which are being planned which relate to the wider masterplan which will facilitate connections to the east, west and south. Some of these cannot be completed without other landowners in the precinct. However, the Westmead Catholic Community can provide connections as far as their land boundaries. Improvements would include:</p> <ul style="list-style-type: none"> <li>• Pedestrian connection to Farmhouse Road</li> <li>• At-grade pedestrian footpath connection to the Sydney Metro Tunnel</li> <li>• At-grade pedestrian footpath connection to future Bridge Road link (within site)</li> <li>• Connection to future pedestrian connection under rail (within site).</li> </ul> <p>Therefore, proposing traffic capacity mitigation measures at these junctions, which will ultimately change with the provision of PLR and SMW, would be superfluous. The PLR and SMW intersection upgrades and modelling would identify this which, at the time of the assessment, were not publicly available. As such, provision of the abovementioned measures would be much more aligned with the Westmead Precinct Plan.</p> |
| 88 | Attachment 3, page 14 | The queue analysis provided is not appropriate or acceptable. The analysis from the SIDRA models should be provided. | <b>High</b> | Traffic queues were observed on-site and documented as site observation notes. Accordingly, the SIDRA models have been calibrated against these observations.  |

**Source Document:** *City of Parramatta (COP) Response to Submission (Dated 01 October)*

| Item | Page, Heading                                 | Bitzios Comments   | Bitzios Priority | Ethos Urban response and action (if any) |
|------|---|--|------------------|--|
| 89   | 3, Traffic Volumes / Modelling                | The CoP comments are valid.<br>Please refer to our detailed comments in item 20, 21 and 82 to 88.  | High             | See above.                               |
| 90   | 3, Intersection of Bridge Road and Darcy Road | The CoP comments are valid.<br>However, as mentioned in item 62, this requires appropriate traffic models to study the impacts of this connectivity. | High             | See above.                               |
| 91   | 3, Connectivity – Urban Design                | We also agree with the comment regarding connectivity.   | High             | See above.                               |

**Source Document:** *TfNSW Response to Submission (Dated 06 October)*

| Item | Page, Heading | Bitzios Comments  | Bitzios Priority | Ethos Urban response and action (if any)   |
|------|---------------|---|------------------|--|
| 92   | 1             | TfNSW comments on the SIDRA modelling was anticipated and is valid. | High             | TfNSW's query pertaining to any SIDRA modelling was to seek clarification on whether the multi-storey car park development was including in the overall TAIA SIDRA modelling. This was clarified in the RtS; namely, yes, the proposed car park has been included. |

## **ATTACHMENT A: COMMENTS ON SIDRA MODELS**



P4803 2 Darcy Road Westmead EIS Review  
SIDRA Model Review Register

GY12/10/2020

Intersection 9 - Darcy Road / M Theresa Access

| AM Model                               |  |        |                           | PM Model                  |       |            | Response  |
|--|--|--------|---------------------------|---------------------------|-------|------------|---|
| Item                                   | Comment  | Issue  | Assessment                | Comment                   | Issue | Assessment |   |
| General parameters                     |  |        |                           | As per AM model           |       |            |   |
| Delay setting                          | RTA NSW setting used   |        | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Reported Outputs                       | As reported (modelled outputs)   |        | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Target LOS                             | Minimum LOS specified LOS C - no justification provided  | Minor  | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Validation                             | no information given on 'observed' LOS and how this was determined – or queue lengths  | Major  | Fail                      |                           |       |            | Provided in SIDRA modelling calibration and validation report.  |
| Design Life                            | Design life (period 4 years) has been switched on - this is a base model?? - no justification has been given                 | Major  | Fail                      |                           |       |            | Removed in revised model  |
|  |  |        |                           |                           |       |            |   |
| Intersection Configuration             |  |        |                           |                           |       |            |   |
| Intersection layout / lane arrangement | As on site   | -      | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Vehicle Movements                      | As on site   | Major  | Fail                      |                           |       |            | Volumes input as surveyed.  |
|  |  |        |                           |                           |       |            |   |
| Lane Geometry                          |  |        |                           |                           |       |            |   |
| Median Widths                          | median widths left as default (2m)   | minor  | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Lane Width                             | lane widths left as default (3.3m)   | Minor  | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Lane Lengths                           | Lane lengths ok  | Major  | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Grade                                  | no grades input - all default values (0%)  | minor  | Fail                      |                           |       |            | Grades are relatively flat. Notwithstanding, grades as per Traffic Control Signal plans have been input into revised model. |
| Approach distance                      | West Approach - longer than actual - 300m input, 285m actual   | medium | Fail                      |                           |       |            | Updated in revised model.   |
| Intersection Control                   |  |        |                           |                           |       |            |   |
| Phase Sequence                         | N/A  | Major  |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Phase Times                            | N/A  | Major  |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Cycle Time                             | N/A  | Major  |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Offset / co-ordination                 | N/A  | Major  |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Phase timing                           | N/A  | Medium |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Intergreen Time                        | N/A  | medium |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Pedestrian Protection                  | N/A  | medium |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Priorities                             | Stop control coded, vehicle priorities ok  | minor  | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Networking                             |  |        |                           |                           |       |            |   |
| Cycle time and phasing                 | N/A  | major  |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Offset/ Co-Ordination                  | N/A  | major  |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Common control Groups                  | N/A  |        |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Extra Bunching                         | Extra bunching not manually applied - automatically calculated by SIDRA in network model Mons Road Intersection 50m upstream | Medium | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Movement Data                          |  |        |                           |                           |       |            |   |
| Approach and Exit speeds               | Speeds OK  | medium | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Signal co-ordination / arrival         | N/A  |        |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| Gap Acceptance                         | entered as per RMS modelling Guidelines (reported)   | Medium | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Capacity adjustment                    | -28% applied on southern approach - no justification   | Medium | More information required |                           |       |            | Calibration used to reflect internal queuing as per site observations.  |
| Pedestrian Data                        |  |        |                           |                           |       |            |   |
| Pedestrian Volumes                     | No crossings present   | medium | OK                        |                           |       |            | NO RESPONSE REQUIRED.   |
| Vehicle volumes                        |  |        |                           |                           |       |            |   |
| vehicle volumes                        | Volumes input as surveyed  | major  | OK                        | Volumes input as surveyed | OK    |            | NO RESPONSE REQUIRED.   |
| flow balancing                         |  |        |                           |                           |       |            | NO RESPONSE REQUIRED.   |
| peak flow factor                       | default pff (95%) used<br>analyse count data to determine the site specific pff  |        |                           |                           |       |            | Set to 60 minutes.  |
| Bus volumes                            |  | Medium |                           |                           |       |            | NO RESPONSE REQUIRED.   |

P4803 2 Darcy Road Westmead EIS Review  
SIDRA Model Review Register

GY12/10/202

Intersection 8 - Darcy Road / Mons Road / Institute Road

| AM Model                             |   |        |                           | PM Model  |       |            | Response   |
|--------------------------------------|---|--------|---------------------------|---|-------|------------|--|
| Item                                 | Comment   | Issue  | Assessment                | Comment   | Issue | Assessment |  |
| General parameters                   |   |        |                           |   |       |            |  |
| Delay settin                         | RTA NSW setting use   |        | OK                        | as per AM   |       |            | NO RESPONSE REQUIRED.  |
| Reported Output                      |   |        |                           |   |       |            | NO RESPONSE REQUIRED.  |
| Target LOS                           | Minimum LOS specified LOS C - no justification provi  | Minor  | OK                        |   |       |            | NO RESPONSE REQUIRED.  |
| Validation                           | New intersection layout would negate any validation underta resulting/observed queues may have changed witht eh ne a intersection rangemnet - particualrly with changes to turnin movements (west and south approaches) | Major  | Fail                      |   |       |            | - At the time that the SIDRA modelling was being undertaken, the intersection geometry was being upgraded to include a left-turn slip lane from Darcy Road west approach towards Mons Road north approach. Knowing that the slip lane was going to be operational in the near future, the base case model adopted the new layout.<br>- The new layout was accompanied by changes to the pre-existing signal phasing, phase times and cycle times. Therefore, these were key changes which had not been adopted into the base model given that the phase sequencing and timings were not running yet in order to be captured and input into the SIDRA model. Also, pedestrian red arrow hold times were adjusted with the signal phase changes.<br><br>based on the known variables at the time.<br>In responding to DPIE's and Bitzios' queries, the base case configuration and signal phase timings have been reverted in accordance with the pre-existing intersection.<br><br>This intersection has been reassessed as detailed in the letter that responds to DPIE's queries. |
| Design Life                          | Design life (period 4 years) has been switched on - this is a base model?? - no justification has been given  | Major  | Fail                      |   |       |            | As above.  |
| Intersection Configuration           |   |        |                           |   |       |            |  |
| Intersection layout / lane arrangeme | as on site (Nearmap 202   | -      | OK                        | as per AM   |       |            | NO RESPONSE REQUIRED.  |
| Vehicle Movements                    | Movement - RT from Darcy to Institute is included - on site NRT – implications on phasing   | Major  | Fail                      |   |       |            | As per 'Validation' response above.  |
|                                      | Movement - LT from Darcy rd (south) bus lane to Darcy Rd is include on site NLT - phasing implications  | Major  | Fail                      |   |       |            | As per 'Validation' response above.  |
| Lane Geometry                        |   |        |                           |   |       |            |  |
| Median Widths                        | South approach - median widths not adjsuteds to on site - default used (2.0m)   | minor  |                           | as per AM   |       |            |  |
| Lane Wdit                            | All lanes not adjsuteds to on site - default widths used (3   | Minor  |                           |   |       |            |  |
| Grade                                | no grades input - all default values (0%)   | minor  |                           |   |       |            |  |
| Approach distance                    | South leg approach distance - 160m to next signals, but not school access (60m) - over estimation of capacity   | medium | Fail                      |   |       |            | Adjusted in revised model accordingly.   |
| Intersection Control                 |   |        |                           |   |       |            |  |
| Phase Sequence                       | cannot verify sequence - more information required - refer to new TCS plan on new arrangement<br>Suspect Phase B no longer used (with NRT from south approach)  | Major  | Fail                      | as per AM   |       |            | Review of survey video footage has been undertaken to further clarify the average signal phasing sequences in the AM and PM peaks. Signal phasing and average user given phase times has been updated following further review. At the time of the survey, the NRT restriction on the south approach was not present. The intersection arrangement has been reverted to the layout that was observed at the time of the survey (i.e. October 2018).  |
| Phase Times                          | No SCATS use observed times entered - but not used (see below)  | Major  | Fail                      | phase times entered do not correspond to act observed or reported values in tech note                                   |       | Fail       | Review of signal phasing and timing undertaken in accordance with traffic survey video footage. User given cycle time updated to phase times in revised model.   |
| Cycle Time                           | User defined cycle time enabled - 136 seconds<br>disregards input phase times - optimum phase times produced and presented in technical note - not representative of actual conditions                                  | Major  | Fail                      | user given phase time set to 131 seconds - doe not correspond to actual cycle times or reported cycle time in tech note |       | Fail       | Review of signal phasing and timing undertaken in accordance with traffic survey video footage. User given cycle time updated to phase times in revised model.   |
| Offset / co-ordination               | See networking notes  | Major  | Fail                      | as per AM   |       |            | The off-set signal coordination along Darcy Road between Mons Road and Hawkesbury Road cannot be confirmed through the survey video footage and hence has been removed in the network input. All signalised intersections now operate based on the user given phase times of each individual site.   |
| Phase timing - detailed              | Bus lane (north aproach), delayed start in C phase - un explained - impciations on buses getting through (slower)   | Medium | more information required |   |       |            |  |
| Intergreen Time                      | Default 4 + 2 used, cannot verify - no LX available   | medium | more information required |   |       |            |  |
| Pedestrian Protection                | no pedestrian protection observed to be coded   | medium | more information required |   |       |            | Four seconds late start has been input to revised model for movements into opposing pedestrian movement.   |
| Priorities                           | Priorities ok   | minor  | OK                        |   |       |            | NO RESPONSE REQUIRED.  |

|                              | AM Model  |        |                           | PM Model  |       |            | Response   |
|------------------------------|---|--------|---------------------------|-----------|-------|------------|--|
| Item                         | Comment   | Issue  | Assessment                | Comment   | Issue | Assessment |  |
| <b>Networking</b>            |   |        |                           |           |       |            |  |
| Cycle time and phasing       | network cycle time set to 135 seconds - over rides user given phase t as observed on site and entered   | major  | Fail                      | as per AM |       |            | Changed setting to Network Cycle Time with site phase times.   |
| Offset/ Co-Ordination        | 0 second user offset co-ordination entered - highly unli cannot be verified - no LX provided  | major  | Fail                      |           |       |            | The off-set signal coordination along Darcy Road between Mons Road and Hawkesbury Road cannot be confirmed through the survey video footage and hence has been removed in the network input. All signalised intersections now operate based on the user given phase times of each individual site. |
| Common control Group         | N/A   |        |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Extra Bunching               | Extra bunching not manually applied as reported - upstream signal south approach (160m). Auto calculation under network model would be incorrect based on incorrect south approach length. RMS guidelines suggest only applying to sign control or roundabout adjacent to signals | major  | Fail                      |           |       |            | Distance updated in revised model accordingly. However, extra bunching has not been applied.   |
| <b>Movement Data</b>         |   |        |                           |           |       |            |  |
| Approach and Exit speeds     | 60km/h aon RT from Darcy Rd (turn should be banend anyway)  | medium | Fail                      | as per AM |       |            | Updated in revised model.  |
| Signal co-ordination / arriv | default use   |        |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Gap Acceptanc                | entered as per RMS modelling Guidelines (reporte  | Medium | OK                        |           |       |            | NO RESPONSE REQUIRED.  |
| <b>Pedestrian Data</b>       |   |        |                           |           |       |            |  |
| Pedestrian Volumes           | default volumes used - may be too low for hospital pedestrian surveys should have been undertaken - particualrly with hospital and high school nearby   | medium |                           | as per AM |       |            |  |
| <b>Vehicle volumes</b>       |   |        |                           |           |       |            |  |
| vehicle volumes              | no volume calculation/summary sheet provided<br>North approach - through - entered volumes higher than surveys  | major  | Fail                      |           |       |            | Traffic volumes have been checked against traffic survey data, and are consistent.   |
| flow balancin                |   |        |                           | as per AM |       |            | NO RESPONSE REQUIRED.  |
| peak flow factor             | default pff (95%) use<br>analyse count data to determine the site speciifc pff  |        |                           |           |       |            | Set to 60 minutes.   |
| Bus volumes                  | unsure where bus volumes have been calculated or gathered – survey is unclear bus volumes entered on t-way  | Medium | more information required |           |       |            |  |

P4803 2 Darcy Road Westmead EIS Review  
SIDRA Model Review Register

GY13/10/202

Intersection 7 - Darcy Road / Staff Car Park

| AM Model                             |   |               |                           | PM Model  |       |            | Response   |
|--------------------------------------|---|---------------|---------------------------|-----------|-------|------------|--|
| Item                                 | Comment   | Issue         | Assessment                | Comment   | Issue | Assessment |  |
| General parameters                   |   |               |                           |           |       |            |  |
| Delay settin                         | RTA NSW setting use   |               | OK                        | as per AM |       |            | NO RESPONSE REQUIRED.  |
| Reported Output                      |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Target LOS                           | Minimum LOS specified LOS C - no justification provided   | Minor         | more information required |           |       |            |  |
| Validation                           |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Design Life                          | Design life (period 4 years) has been switched on - this is a base model?? - no jsutificaiton has been given  | Major         | more information required |           |       |            | As above.  |
| Intersection Configuration           |   |               |                           |           |       |            |  |
| Intersection layout / lane arrangeme | as on site (Nearmap 202   | -             | OK                        | as per AM |       |            | NO RESPONSE REQUIRED.  |
| Vehicle Movements                    | as per on sit   | Major         | OK                        |           |       |            | NO RESPONSE REQUIRED.  |
| Lane Geometry                        |   |               |                           |           |       |            |  |
| Median Widths                        | median widths not adjusted to on site - default widths used (2.0m)  | minor         |                           | as per AM |       |            |  |
| Lane Wdit                            | All lanes not adjsuted to on site - default widths used (3  | Minor         |                           |           |       |            |  |
| Grade                                | no grades input - all default values (0%)   | minor         |                           |           |       |            |  |
| Approach distance                    | North Approach - distance incorrect, 160m input (60m onsi<br>implicaitons on distance between signalised intersections<br>along Darcy Road in network   | medium        | Fail                      |           |       |            | As above.  |
|                                      | West approach - left as default 50  | Minor         |                           |           |       |            |  |
| Intersection Control                 |   |               |                           |           |       |            |  |
| Phase Sequence                       | N/A   |               |                           | as per AM |       |            | NO RESPONSE REQUIRED.  |
| Phase Times                          |   |               |                           |           |       | Fail       | This intersection is an unsignalised intersection and hence no phase times have been inputted.         |
| Cycle Time                           |   |               |                           |           |       | Fail       | As per the comment above.  |
| Offset / co-ordinatio                |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Phase timin                          |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Intergreen Tim                       |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Pedestrian Protectio                 |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Priorities                           |   | Give way code | minor                     |           |       |            |  |
|                                      | pedestrians not given priority over vehicles entering - Road Rule 75  | medium        |                           |           |       |            |  |
| Networking                           |   |               |                           |           |       |            |  |
| Cycle time and phasin                | N/A   |               |                           | as per AM |       |            | NO RESPONSE REQUIRED.  |
| Offset/ Co-Ordinatio                 |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Common control Group                 |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Extra Bunching                       | Extra bunching not manually applied as reported - upstream signals on south approach (100m) - calculation under network model would be incorrect based on incorrect north approach length<br>RMS guidelines suggest only applying to sign control or roundabout adjacent to signals | major         | Fail                      |           |       |            | Extra bunching manually applied (25%) in revised model.  |
| Movement Data                        |   |               |                           |           |       |            |  |
| Approach and Exit speeds             | 40km/h on west approach too high to simulate car park   | medium        | Fail                      | as per AM |       |            | 20 km/h speed applied to approach in revised model.  |
| Signal co-ordination / arriv         | default use   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| Gap Acceptanc                        | entered as per RMS modelling Guidelines (reporte  | Medium        | OK                        |           |       |            | NO RESPONSE REQUIRED.  |
| Pedestrian Data                      |   |               |                           |           |       |            |  |
| Pedestrian Volumes                   | no pedestrians modelled - pedestrians should have priority over veh entering driveway   | medium        | Fail                      | as per AM |       |            | Updated to include pedestrian flows based on survey video footage (count = 110 in modelled peak hour). |
| Vehicle volumes                      |   |               |                           |           |       |            |  |
| vehicle volumes                      | entered as surveyed - north approach volumes taken from upstream intersection (Mons Road, Institute Road)   | major         | OK                        | as per AM |       |            | NO RESPONSE REQUIRED.  |
| flow balancin                        |   |               |                           |           |       |            | NO RESPONSE REQUIRED.  |
| peak flow factor                     | default pff (95%) use<br>analyse count data to determine the site speciifc pff  |               |                           |           |       |            | Set to 60 minutes.   |
| Bus volumes                          | bus volumes entered on t-way - from survey data up stream   | Medium        | OK                        |           |       |            | NO RESPONSE REQUIRED.  |

P4803 2 Darcy Road Westmead EIS Review  
SIDRA Model Review Register

GY13/10/202

Intersection 6 - Darcy Road / Cath MacCauley CP / Westmead Access

| AM Model                             |  |           |                           | PM Model  |       |                           | Response   |
|--------------------------------------|--|-----------|---------------------------|---|-------|---------------------------|--|
| Item                                 | Comment  | Issue     | Assessment                | Comment   | Issue | Assessment                |  |
| General parameters                   |  |           |                           |   |       |                           |  |
| Delay settin                         | RTA NSW setting use  |           | OK                        | as per AM   |       |                           | NO RESPONSE REQUIRED.  |
| Reported Output                      |  |           |                           |   |       |                           | NO RESPONSE REQUIRED.  |
| Target LOS                           | Minimum LOS specified LOS C - no justification provided  | Minor     | more information required |   |       |                           |  |
| Validation                           |  |           |                           |   |       |                           | NO RESPONSE REQUIRED.  |
| Design Life                          | Design life (period 4 years) has been switched on - this is a base model?? - no jsutificaiton has been given                     | Major     | more information required |   |       |                           | As above.  |
| Intersection Configuration           |  |           |                           |   |       |                           |  |
| Intersection layout / lane arrangeme | as per on sit  | -         | OK                        | as per AM   |       |                           | NO RESPONSE REQUIRED.  |
| Vehicle Movements                    | as per on sit  | Major     | OK                        |   |       |                           | NO RESPONSE REQUIRED.  |
| Lane Geometry                        |  |           |                           |   |       |                           |  |
| Median Widths                        | median widths not adjstuted to on site - default widths used (2.0m)  | minor     |                           | as per AM   |       |                           |  |
| Lane Wdit                            | All lanes not adjstuted to on site - default widths used (3  | Minor     |                           |   |       |                           |  |
| Grade                                | no grades input - all default values (0  | minor     |                           |   |       |                           |  |
| Approach distance                    | West and east approach - left as default 50  | Minor     |                           |   |       |                           |  |
| Intersection Control                 |  |           |                           |   |       |                           |  |
| Phase Sequence                       | cannot verify sequence - more information requiri<br>Includes Left Turn on Red from Westmead access approach                     | Major     | more information required | E phase introduced - diamond phase - no SB variable phase<br>cannot verify sequence during PM   | E1    | more information required |  |
|                                      | Filter RT from south approach during E1 - doesn't make sense variable phase  | Medium    | Fail                      |   |       |                           | The phase times have been revised following further review of signal timings via survey video footage.   |
| Phase Times                          | No SCATS use<br>phase times entered do not correspond to actual observed or reported values in tech note                         | Major     | Fail                      | No SCATS use<br>phase times entered do not correspond to actual observed or reported values in tech note  |       | Fail                      | Following further review of survey video footage, phase times have been adjusted to better reflect the existing conditions. Further to this, the phase times have been slightly adjusted to a 139 seconds cycle time for future scenarios. |
| Cycle Time                           | User defined cycle time enabled <b>139 seconds</b> disregards input phase times - not representative of actual conditions, close | But major | Fail                      | User defined cycle time enabled <b>160</b> seconds disregards input phase times - not representative of actual conditions or reproted phase times |       | Fail                      |  |
| Offset / co-ordination               | See networking notes   | Major     | Fail                      | See networking notes  |       |                           |  |
| Phase timing informatio              |  |           |                           |   |       |                           | NO RESPONSE REQUIRED.  |
| Intergreen Time                      | Default 4 + 2 used, cannot verify - no LX available  | medium    | more information required | As per AM   |       |                           |  |
| Pedestrian Protection                | no pedestrian protection observed to be coded  | medium    | more information required | As per AM   |       |                           | Pedestrian protection time of 6 seconds and 8 seconds has been applied to turning movements at signalised intersections.   |
| Priorities                           | no priorities set for LT from Westmead access - major implications on modelling of 'Left turn on Red'.                           | major     | Fail                      | no priorities set for LT from Westmead access - major implications on modelling of 'Left turn on Red'.  | major | Fail                      | Priorities for the LT on Westmead Hospital access have been set as per comment.  |
|                                      | all RTs (south, east and north approaches) do not give way to pedestrian crossings   | minor     |                           | all RTs (south, east and north approaches) do not give way to pedestrian crossing   | minor |                           |  |

|                              | AM Model  |        |            | PM Model   |       |            | Response   |
|------------------------------|---|--------|------------|--|-------|------------|--|
| Item                         | Comment   | Issue  | Assessment | Comment  | Issue | Assessment |  |
| Networking                   |   |        |            |  |       |            |  |
| Cycle time and phasing       | network cycle time set <del>tt35 seconds</del> over rides user given cycle and phase times  | major  | Fail       | network cycle time set <del>tt60 seconds</del> over rides user given cycle and phase times |       |            | Signal coordination and offset along Darcy Road has been removed and as such all signalised intersections within the modelled network. As mentioned in previous comment, signal phasing sequencing and phase times have been revised upon further review of survey video footage.  |
| Offset/ Co-Ordination        | 0 second user offset co-ordination entered - highly unli cannot be verified - no LX provided  | major  | Fail       | As per AM  |       |            | As per comment above.  |
| Common control Group         | N/A   |        |            |  |       |            |  |
| Extra Bunching               | Extra bunching not manually applied as repor RMS guidelines suggest only applying to sign control or roundabout adjacent to signals | major  | Fail       | As per AM  |       |            | Extra bunching is typically applied for unsignalised intersections and hence has not been applied to this intersection.  |
| Movement Data                |   |        |            |  |       |            |  |
| Approach and Exit speeds     | 40km/h on west and east approaches too high to simulate car par school access   | medium | Fail       | as per AM  |       |            | 20 km/h speed adopted, as per other similar comments.  |
| Signal co-ordination / arriv | default use   |        |            |  |       |            |  |
| Gap Acceptance               | RT from south approach across more than 3 lanes (incl. T-Way) – m seconds (4 sec input)   | Medium | Fail       |  |       |            | Gap acceptance for filtered RT at signalised intersections is default 4.5 seconds (critical gap) and 2.6 seconds (follow up). The RT from Darcy Road south approach is a filtered RT and hence would not be opposed to any traffic from the north approach. The RT from south approach would not be required to find gaps in opposing traffic and hence the gap acceptance has been maintained as per SIDRA default. |
| Pedestrian Data              |   |        |            |  |       |            |  |
| Pedestrian Volumes           | pedestrian volumes as default (50 pedestrians/hr) - too low for pedestrian activity area (hospital and school)                      | medium | Fail       | as per AM  |       |            | Pedestrian volumes at intersections as per survey are relatively consistent with default values. Based on pedestrian flows during survey period, the majority of pedestrians approach from south-east direction (Westmead Station) and enter school site via gates which are located east of this intersection.  |
| Vehicle volumes              |   |        |            |  |       |            |  |
| vehicle volumes              | no volume calculation/summary sheet provi volumes input as surveyed   | major  | OK         | light vehicle volumes entered as heavy vehicles on west approach (school access)           |       |            | NO RESPONSE REQUIRED.  |
| flow balancin                |   |        |            |  |       |            | NO RESPONSE REQUIRED.  |
| peak flow factor             | default pff (95%) use<br>analyse count data to determine the site speciifc pff  |        |            | as per AM  |       |            | Set to 60 minutes.   |
| Bus volumes                  | bus volumes entered on t-way  | Medium | OK         | as per AM  |       |            | NO RESPONSE REQUIRED.  |



# P4803 2 Darcy Road Westmead EIS Review

## SIDRA Model Review Register

GY

14/10/202

### Intersection 5 - Darcy Road / Marist Access

|                                      | AM Model   |        |                           | PM Model                |       |                           | Response  |
|--------------------------------------|--|--------|---------------------------|-------------------------|-------|---------------------------|---|
| Item                                 | Comment  | Issue  | Assessment                | Comment                 | Issue | Assessment                |   |
| General parameters                   |  |        |                           |                         |       |                           |   |
| Delay settin                         | RTA NSW setting use  |        | OK                        | as per AM               |       |                           | NO RESPONSE REQUIRED.   |
| Reported Output                      |  |        |                           |                         |       |                           | NO RESPONSE REQUIRED.   |
| Target LOS                           | Minimum LOS specified LOS C - no justification provided  | Minor  | more information required |                         |       |                           |   |
| Validation                           |  |        |                           |                         |       |                           |   |
| Design Life                          | Design life (period 4 years) has been switched on - this is a base model?? - no jsutificaiton has been given                           | Major  | more information required |                         |       |                           | As above.   |
| Intersection Configuration           |  |        |                           |                         |       |                           |   |
| Intersection layout / lane arrangeme | as per on sit  | -      | OK                        | as per AM               |       |                           | NO RESPONSE REQUIRED.   |
| Vehicle Movements                    | as per on sit  | Major  | OK                        |                         |       |                           | NO RESPONSE REQUIRED.   |
| Lane Geometry                        |  |        |                           |                         |       |                           |   |
| Median Widths                        | median widths not adjsuted to on site - default widths used (2.0m)   | minor  |                           | As per AM               |       |                           |   |
| Lane Wdit                            | All lanes not adjsuted to on site - default widths used (3   | Minor  |                           |                         |       |                           |   |
|                                      | west approach (school access) is a narror driveway, not 6.6m roadway   | medium |                           |                         |       |                           |   |
| Grade                                | no grades input - all default values (0  | minor  |                           |                         |       |                           |   |
| Approach distance                    | Darcy Road south approach incorrect - 100m input (60m on sit implications on network and extra bunching                                | medium |                           |                         |       |                           |   |
|                                      | West approach (school access) - left as default 50   | Minor  |                           |                         |       |                           |   |
| Capacity Adjustmen                   | none applied to simualte short driveway/car park ac  | medium |                           |                         |       |                           |   |
| Intersection Control                 |  |        |                           |                         |       |                           |   |
| Phase Sequence                       | N/A  | Major  |                           |                         |       | more information required | This intersection is an unsignalized intersection and hence phasing is not required.  |
| Phase Times                          | N/A  | Major  |                           |                         |       | Fail                      | As per comment above.   |
| Cycle Time                           | N/A  | Major  |                           |                         |       | Fail                      | As per comment above.   |
| Offset / co-ordinatio                | N/A  | Major  |                           |                         |       |                           | NO RESPONSE REQUIRED.   |
| Phase timing informatio              | N/A  |        |                           |                         |       |                           | NO RESPONSE REQUIRED.   |
| Intergreen Tim                       | N/A  | medium |                           |                         |       |                           | NO RESPONSE REQUIRED.   |
| Pedestrian Protectio                 | N/A  | medium |                           |                         |       |                           | NO RESPONSE REQUIRED.   |
| Priorities                           | pedestrians on footpath (west aproach) not given priority over veh entering - Road Rule 75   | medium | Fail                      | As per AM               |       | Fail                      | Pedestrian priority has been applied as per comment. (Results did not change)<br><br>Review of survey video footage show that majority of pedestrians walking across the driveway stop to allow vehicles to enter/exit the site. On this basis, pedestrian priority has not been applied to this intersection to reflect existing conditions. |
| Networking                           |  |        |                           |                         |       |                           |   |
| Cycle time and phasin                | N/A  |        |                           |                         |       |                           |   |
| Offset/ Co-Ordinatio                 | N/A  |        |                           |                         |       |                           |   |
| Common control Group                 | N/A  |        |                           |                         |       |                           |   |
| Extra Bunching                       | Extra bunching not manually applied as repor<br>RMS guidelines suggest only applying to sign control or roundabout adjacent to signals | major  | Fail                      | As per AM               |       |                           | Extra bunching of 25% has been manually applied to the Darcy Road approaches based on SIDRA recommendations.  |
|                                      | calculated bunching under network model will be incorrect du incorrect approach distances.   | medium | Fail                      |                         |       |                           | Approach distances have been revised as per Bitzios' comments. Extra bunching has been manually applied as per SIDRA recommendations.   |
| Movement Data                        |  |        |                           |                         |       |                           |   |
| Approach and Exit speeds             | 40km/h on west approach too high to simulate car park/school access  | medium | Fail                      | as per AM               |       |                           | Updated to 20 km/h in revised model.  |
| Signal co-ordination / arriv         | N/A  |        |                           |                         |       |                           | NO RESPONSE REQUIRED.   |
| Gap Acceptanc                        | entered as per RMS modelling guidelin  | Medium | OK                        |                         |       |                           | NO RESPONSE REQUIRED.   |
| Pedestrian Data                      |  |        |                           |                         |       |                           |   |
| Pedestrian Volumes                   | no pedestrian crossing modelled on west approach - high pedestrian activity (high school and hospital)                                 | medium | Fail                      | as per AM               |       |                           | Input based on pedestrian follows during survey peak period (869 in AM and 110 in PM across 60 minutes)   |
| Vehicle volumes                      |  |        |                           |                         |       |                           |   |
| vehicle volumes                      | volumes input as survey  | major  | OK                        | volumes input as survey |       |                           | NO RESPONSE REQUIRED.   |
| flow balancin                        |  |        |                           |                         |       |                           | NO RESPONSE REQUIRED.   |
| peak flow factor                     | default pff (95%) use<br>analyse count data to determine the site speciifc pff   |        |                           | as per AM               |       |                           | Set to 60 minutes.  |
| Bus volumes                          | bus volumes entered on t-way   | Medium | OK                        | as per AM               |       |                           | NO RESPONSE REQUIRED.   |

P4803 2 Darcy Road Westmead EIS Review  
SIDRA Model Review Register

GY14/10/202

Intersection 4 - Darcy Road / Farm House Road / Westmead Access

| AM Model                               |   |        |                           | PM Model  |       |                           | Response  |
|--|---|--------|---------------------------|-----------|-------|---------------------------|---|
| Item                                   | Comment   | Issue  | Assessment                | Comment   | Issue | Assessment                |   |
| General parameters                     |   |        |                           |           |       |                           |   |
| Delay settin                           | RTA NSW setting use   |        | OK                        | as per AM |       |                           | NO RESPONSE REQUIRED.   |
| Reported Output                        |   |        |                           |           |       |                           | NO RESPONSE REQUIRED.   |
| Target LOS                             | Minimum LOS specified LOS C - no justification provided   | Minor  | more information required |           |       |                           |   |
| Validation                             |   |        |                           |           |       |                           | NO RESPONSE REQUIRED.   |
| Design Life                            | Design life (period 4 years) has been switched on - this is a base model?? - no jsutificaiton has been given                        | Major  | more information required |           |       |                           | Design life parameter has been removed from existing case scenarios.  |
| Intersection Configuration             |   |        |                           |           |       |                           |   |
| Intersection layout / lane arrangement | vehciles - as per on sit  | -      | OK                        | as per AM |       |                           | NO RESPONSE REQUIRED.   |
|  | pedestrian crossing on south approach input as full crossing (appears staged crossing on site) - to be verified                     | medium | more information required |           |       |                           | Pedestrian crossing has been changed from full crossing to staged crossing on the south approach. Signal phasing has been slightly amended accordingly.   |
| Vehicle Movement                       | as per on sit   | Major  | OK                        |           |       |                           | NO RESPONSE REQUIRED.   |
| Lane Geometry                          |   |        |                           |           |       |                           |   |
| Median Widths                          | median widths not adjsuted to on site - default widths used (2.0m)  | minor  |                           | As per AM |       |                           |   |
| Lane Wdit                              | All lanes not adjsuted to on site - default widths used (3  | Minor  |                           |           |       |                           |   |
| Grade                                  | no grades input - all default values (0   | minor  |                           |           |       |                           |   |
| Approach distance                      | Darcy Road north approach incorrect - 100m input (60m on sit implications on network and extra bunching                             | medium | Fail                      |           |       |                           | Approach distance for north approach has been updated as per comment.   |
|  | East approach (Westmead access) - left as default 5   | Minor  |                           |           |       |                           |   |
| Capacity Adjustmen                     |   |        |                           |           |       | NO RESPONSE REQUIRED.     |   |
| Intersection Control                   |   |        |                           |           |       |                           |   |
| Phase Sequence                         | cannot verify sequence - more information requiri three phase arrangment makes sense  | Major  | more information required |           |       | more information required | Signal phasing sequence and phase times have been revised following review of survey video footage.   |
| Phase Times                            | No phase time given to C phase (east and west approaches) observed<br>no vehicles exited UWS and Westmead in the AM? Clarify        | Major  | more information required |           |       | Fail                      | As mentioned in above, phase times have been updated based on review of survey video footage. User given phase times have been applied.   |
| Cycle Time                             | User defined cycle time enabled1-30 seconds<br>disregards input phase times - not representative of actual conditions               | Major  |                           |           |       | Fail                      | The intersection now applies the user given phase times rather than the user given cycle time.  |
| Offset / co-ordination                 | See networking notes  | Major  | Fail                      |           |       |                           | Signal coordination and offset along Darcy Road has been removed and as such all signalised intersections within the modelled network. As mentioned in previous comment, signal phasing sequencing and phase times have been revised upon further review of survey video footage. |
| Phase timing informatio                | N/A   |        |                           |           |       |                           |   |
| Intergreen Time                        | Default 4 + 2 used, cannot verify - no LX available   | medium | more information required |           |       |                           |   |
| Pedestrian Protection                  | no pedestrian protection observed to be coded   | medium | Fail                      |           |       |                           | Pedestrian protection time of 6 seconds and 8 seconds has been applied to turning movements at signalised intersections.  |
| Priorities                             | All right turns do not give way to pedestrians  | minor  | Fail                      | As per AM |       | Fail                      | Priorities to pedestrian movements have been applied to all right turns on each approach.   |
| Networking                             |   |        |                           |           |       |                           |   |
| Cycle time and phasing                 | network cycle time set <del>135 seconds</del> over rides user given cycle and phase times   | major  | Fail                      |           |       |                           | As per previous comment.  |
| Offset/ Co-Ordination                  | 0 second user offset co-ordination entered - highly unli cannot be verified - no LX provided  | Major  | Fail                      |           |       |                           | As per previous comment.  |
| Common control Group                   | N/A   |        |                           |           |       |                           | NO RESPONSE REQUIRED.   |
| Extra Bunching                         | Extra bunching not manually applied as repor RMS guidelines suggest only applying to sign control or roundabout adjacent to signals | major  | Fail                      | As per AM |       |                           | Extra bunching is typically applied for unsignalised intersections and hence has not been applied to this intersection.   |
|  | calculated bunching under network model will be incorrect du incorrect approach distances.  | medium | Fail                      |           |       |                           | As per previous comment.  |

|                              | AM Model   |        |            | PM Model   |       |            | Response  |
|------------------------------|--|--------|------------|--|-------|------------|---|
| Item                         | Comment  | Issue  | Assessment | Comment  | Issue | Assessment |   |
| Movement Data                |  |        |            |  |       |            |   |
| Approach and Exit speeds     | 40km/h on east approach too high to simulate car park access                               | medium | Fail       | as per AM  |       |            | 20 km/h speed applied to approach in revised model.                           |
| Signal co-ordination / arriv | default (program   | -      | OK         |  |       |            | NO RESPONSE REQUIRED.   |
| Gap Acceptanc                | entered as per RMS modelling guidelin  | Medium | OK         |  |       |            | NO RESPONSE REQUIRED.   |
| Pedestrian Data              |  |        |            |  |       |            |   |
| Pedestrian Volumes           | default pedestrian volumes use<br>high pedestrian activity (high school, uni and hospital) | medium | Fail       | as per AM  |       |            | Pedestrian volumes have been updated based on review of survey video footage. |
| Vehicle volumes              |  |        |            |  |       |            |   |
| vehicle volumes              | volumes input as surveyed  | -      | OK         | HV on east approach input into wrong turn (input RT, site LT - 2HVs) | minor | OK         | NO RESPONSE REQUIRED.   |
| flow balancin                |  |        |            |  |       |            | RESPONSE REQUIRED.  |
| peak flow factor             | default pff (95%) use<br>analyse count data to determine the site speciifc pff             |        |            | as per AM  |       |            | Set to 60 minutes.  |
| Bus volumes                  | bus volumes entered on t-way   | Medium | OK         | as per AM  |       |            | NO RESPONSE REQUIRED.   |

P4803 2 Darcy Road Westmead EIS Review  
SIDRA Model Review Register

GY 14/10/2020

Intersection 3 - Darcy Road/ Hawkesbury Road

| AM Model                               |   |        |                           | PM Model   |       |                           | Response   |
|--|---|--------|---------------------------|--|-------|---------------------------|--|
| Item                                   | Comment   | Issue  | Assessment                | Comment  | Issue | Assessment                |  |
| General parameters                     |   |        |                           |  |       |                           |  |
| Delay setting                          | RTA NSW setting used  |        | OK                        | as per AM  |       |                           | NO RESPONSE REQUIRED.  |
| Reported Outputs                       |   |        |                           |  |       |                           | NO RESPONSE REQUIRED.  |
| Target LOS                             | Minimum LOS specified LOS C - no justification provided   | Minor  | more information required |  |       |                           |  |
| Validation                             |   |        |                           |  |       |                           | NO RESPONSE REQUIRED.  |
| Design Life                            | Design life (period 4 years) has been switched on - this is a base model?? - no jsutificaiton has been given  | Major  | more information required |  |       |                           | As above.  |
| Intersection Configuration             |   |        |                           |  |       |                           |  |
| Intersection layout / lane arrangement | vehciles - as per on site   | -      | OK                        | as per AM  |       |                           | NO RESPONSE REQUIRED.  |
|  | pedestrian crossing on north approach input as full crossing (appears staged crossing on site) - to be verified                                     | medium | more information required |  |       |                           | Pedestrian crossing on north approach has been updated from full crossing to staged crossing.  |
| Vehicle Movements                      | as per on site  | Major  | OK                        |  |       |                           | NO RESPONSE REQUIRED.  |
| Lane Geometry                          |   |        |                           |  |       |                           |  |
| Median Widths                          | western approach - median is significantly wider than onsite  | minor  |                           | As per AM  |       |                           |  |
| Lane Wdith                             | All lanes not adjstuted to on site - default widths used (3.3m)   | Minor  |                           |  |       |                           |  |
| Grade                                  | no grades input - all default values (0%)   | minor  |                           |  |       |                           |  |
| Approach distance                      | east approach left as default (500m) - 115m to car park access on site  | medium | Fail                      |  |       |                           | Approach distance on east approach has been updated as per comment.  |
| Capacity Adjustment                    | -   |        |                           |  |       |                           | NO RESPONSE REQUIRED.  |
| Intersection Control                   |   |        |                           |  |       |                           |  |
| Phase Sequence                         | cannot verify sequence - more information required  | Major  | more information required | as per AM  |       | more information required | Following further review of survey video footage, phase times have been adjusted to better reflect the existing conditions. Further to this, the cycle time of the revised phase times has been applied for future scenarios.  |
| Phase Times                            | phase times entered as observed   |        | Fail (see below)          | phase times entered as observed  |       | Fail                      | As per previous comment.   |
| Cycle Time                             | User defined cycle time enabled - <b>152 seconds</b><br>disregards input phase times - not representative of actual conditions                      | Major  | Fail                      | User defined cycle time enabled - <b>140 seconds</b><br>disregards input phase times - not representative of actual conditions |       | Fail                      | As per previous comment.   |
| Offset / co-ordination                 | LX data does not apear to be consulted to determine co-ordination and offsets along Darcy Road and if this intersection is included. To be verified | Major  | more information required | as per AM  |       |                           | The off-set signal coordination along Darcy Road between Mons Road and Hawkesbury Road cannot be confirmed through the survey video footage and hence has been removed in the network input. All signalised intersections now operate based on the user given phase times of each individual site. |
| Phase timing information               | -   |        |                           |  |       |                           | NO RESPONSE REQUIRED.  |
| Intergreen Time                        | Default 4 + 2 used, cannot verify - no LX available   | medium | more information required | As per AM  |       |                           | Intergreen time has been maintained as default and is generally acceptable for SIDRA modelling purposes.   |
| Pedestrian Protection                  | no pedestrian protection observed to be coded   | medium | Fail                      |  |       |                           |  |
| Priorities                             | OK  | -      | OK                        |  |       | Fail                      | Priorities to pedestrian movements have been made consistent in both AM and PM peaks.  |
| Networking                             |   |        |                           |  |       |                           |  |
| Cycle time and phasing                 | N/A   | major  | Fail                      | As per AM  |       |                           | See above comment.   |
| Offset/ Co-Ordination                  | LX data does not apear to be consulted to determine co-ordination and offsets along Darcy Road and if this intersection is included. To be verified | Major  | more information required |  |       |                           | See above comment.   |
| Common control Groups                  | N/A   |        |                           |  |       |                           | NO RESPONSE REQUIRED.  |
| Extra Bunching                         | Extra bunching not manually applied as reported<br>RMS guidelines suggest only applying to sign control or roundabout adjacent to signals           | major  | Fail                      |  |       |                           | Extra bunching is typically applied for unsignalised intersections and hence has not been applied to this intersection.  |

|                                | AM Model   |        |            | PM Model                  |       |            | Response  |
|--------------------------------|--|--------|------------|---------------------------|-------|------------|---|
| Item                           | Comment  | Issue  | Assessment | Comment                   | Issue | Assessment |   |
| Movement Data                  |  |        |            |                           |       |            |   |
| Approach and Exit speeds       | approach/exit speeds not manually input  | medium | Fail       | as per AM                 |       |            | Approach and exit speed are consistent with the observed speed limit.         |
| Signal co-ordination / arrival | default (program)  | -      | OK         |                           |       |            | NO RESPONSE REQUIRED.   |
| Gap Acceptance                 | entered as per RMS modelling guidelines  | Medium | OK         |                           |       |            | NO RESPONSE REQUIRED.   |
| Pedestrian Data                |  |        |            |                           |       |            |   |
| Pedestrian Volumes             | default pedestrian volumes used -<br>high pedestrian activity (uni, hospital, shops) | medium | Fail       | as per AM                 |       |            | Pedestrian volumes have been updated based on review of survey video footage. |
| Vehicle volumes                |  |        |            |                           |       |            |   |
| vehicle volumes                | volumes input as surveyed  | -      | OK         | volumes input as surveyed |       | OK         | NO RESPONSE REQUIRED.   |
| flow balancing                 |  |        |            |                           |       |            | NO RESPONSE REQUIRED.   |
| peak flow factor               | default pff (95%) used<br>analyse count data to determine the site speciifc pff      |        |            | as per AM                 |       |            | PFP has been set to 60 minutes.   |
| Bus volumes                    | bus volumes entered on t-way   | -      | OK         | as per AM                 |       |            | NO RESPONSE REQUIRED.   |

**P4803 2 Darcy Road Westmead EIS Review**  
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14/10/2020

**Intersection 10 - Darcy Road / Bridge Road / Coles Access**

| AM Model                               |  | PM Model |                           | Response   |                           |
|--|--|----------|---------------------------|--|---------------------------|
| Item                                   | Comment  | Issue    | Assessment                | Comment  | Assessment                |
| General parameters                     |  |          |                           |  |                           |
| Delay setting                          | RTA NSW setting used   |          | OK                        |  |                           |
| Reported Outputs                       |  |          |                           |  |                           |
| Target LOS                             | Minimum LOS specified LOS C - no justification provided  | Minor    | more information required | as per AM  |                           |
| Validation                             |  |          |                           |  |                           |
| Design Life                            | Design life (period 4 years) has been switched on - this is a base model?? - no jsutificaiton has been given                                       | Major    | more information required |  |                           |
| Intersection Configuration             |  |          |                           |  |                           |
| Intersection layout / lane arrangement | RT bay on Darcy Road west approch too long (input 20m, on site 15m)  | -        | OK                        | as per AM  |                           |
| Vehicle Movements                      | as per on site   | Major    | OK                        |  |                           |
| Lane Geometry                          |  |          |                           |  |                           |
| Median Widths                          | northern median left as default (2m)   | minor    |                           |  |                           |
| Lane Wdith                             | All lanes not adjsuted to on site - default widths used (3.3m)   | Minor    |                           |  |                           |
| Grade                                  | no grades input - all default values (0%)  | minor    |                           |  |                           |
| Approach distance                      | west approach left as default (500m) - 150m to roundabout on site  | medium   | Fail                      | As per AM  |                           |
|  | east approach too long - input 300m, on site 280m - implications on network  |          |                           |  |                           |
|  | north approach left as default (500m) - car park access  | minor    |                           |  |                           |
| Capacity Adjustment                    | -  |          |                           |  |                           |
| Intersection Control                   |  |          |                           |  |                           |
| Phase Sequence                         | cannot verify sequence - more information requiered phasing arrangement makes sense  | Major    | more information required | as per AM  | more information required |
| Phase Times                            | No SCATS used<br>phase times entered do not correspond to actual observed or reported values in tech note  | Major    | Fail (see below)          | No SCATS used<br>phase times entered do not correspond to actual observed or reported values in tech note              | Major Fail                |
| Cycle Time                             | User defined cycle time enabled - 136 seconds<br>disregards input phase times - not representative of actual conditions                            | Major    | Fail                      | User defined cycle time enabled - 88 seconds<br>disregards input phase times - not representative of actual conditions | Major Fail                |
| Offset / co-ordination                 | co-ordination not applied at this intersection - sufficiently far away from Mons Road intersection - not ikely to be co-ordinated - to be verified | Major    | more information required | as per AM  |                           |
| Phase timing information               | -  |          |                           |  |                           |
| Intergreen Time                        | Default 4 + 2 used, cannot verify - no LX available  | medium   | more information required | As per AM  |                           |
| Pedestrian Protection                  | no pedestrian protection observed to be coded  | medium   | Fail                      |  |                           |
| Priorities                             | No right turns give way to pedestrians   | Minor    | Fail                      |  |                           |
| Networking                             |  |          |                           |  |                           |
| Cycle time and phasing                 | N/A  | major    | Fail                      |  |                           |
| Offset/ Co-Ordination                  | co-ordination not applied at this intersection - to be verified with LX data   | Major    | more information required | As per AM  |                           |
| Common control Groups                  | N/A  |          |                           |  |                           |
| Extra Bunching                         | Extra bunching not manually applied as reported  | major    | ok                        |  |                           |



| AM Model                       |   |        |                           | PM Model   |  |                           | Response   |
|--------------------------------|---|--------|---------------------------|--|--|---------------------------|--|
| Item                           | Comment   | Issue  | Assessment                | Comment  | Issue  | Assessment                |  |
| Movement Data                  |   |        |                           |  |  |                           |  |
| Approach and Exit speeds       | approach/exit speeds on norhtenr leg (car park) too high                                | medium | Fail                      | as per AM  |  |                           | Approach and exit speeds to the Coles car park has been changed from 50km/h to 20km/h.   |
| Signal co-ordination / arrival | default (program)   | -      | OK                        |  |  |                           | NO RESPONSE REQUIRED.  |
| Gap Acceptance                 | entered as per RMS modelling guidelines   | Medium | OK                        |  |  |                           | NO RESPONSE REQUIRED.  |
| Pedestrian Data                |   |        |                           |  |  |                           |  |
| Pedestrian Volumes             | default pedestrian volumes used - potentially higher pedestrian volumes on site (shops) | medium | Fail                      | as per AM  |  |                           |  |
| Vehicle volumes                |   |        |                           |  |  |                           |  |
| vehicle volumes                | Darcy Road / Bridge Road was not surveyed - volumes cannot be verified                  | Major  | more information required | Darcy Road / Bridge Road was not surveyed – volumes cannot be verified | Major  | more information required | Vehicle volumes are based on traffic flow surveys undertaken concurrently with other sides (17/10/2018). Survey data for this location provided in Attachment B of TAIA, specifically page 282 of 387 (location 10). Accompanying layout for turning movement counts provided below. |
|                                |   |        |                           |  | <div>Location: 10<br/>Survey: turning movements</div>  |                           |  |
| flow balancing                 |   |        |                           |  |  |                           | NO RESPONSE REQUIRED.  |
| peak flow factor               | default pff (95%) used<br>analyse count data to determine the site speciifc pff         |        |                           | as per AM  |  |                           | Set to 60 minutes.   |
| Bus volumes                    | N/A   | -      | OK                        | as per AM  |  |                           | NO RESPONSE REQUIRED.  |

# Info Sheet – Strategic Travel Model 3.3

February 2017

## Strategic Travel Model Assumptions

The Sydney Strategic Travel Model (STM) is a demand forecasting tool developed and maintained by Transport Performance and Analytics (TPA). The model is used for forecasting travel patterns for the Greater Metropolitan Area of Sydney (GMA) under different land use, transport and pricing scenarios.

Below is a summary of key assumptions and limitations of standard outputs of Version 3.3 of the model (released February 2017). Future network assumptions below are for strategic modelling purposes and have been adopted at the time of model release with the best judgements of TPA/TfNSW on the infrastructure, service and policy scenarios for future forecasting years.



## Model Version

- STM version 3.3

## Network assumptions

| Output Year | Road   | Rail/Light Rail  | Bus  |
|-------------|--|--|--|
| 2016        | <ul style="list-style-type: none"><li>• Hunter Motorway (F3-Branxton)</li><li>• M2 widening</li><li>• M5 widening</li><li>• Western Sydney Employment Hub</li><li>• Great Western Highway Widening</li></ul> | <ul style="list-style-type: none"><li>• Inner West Light Rail Extension to Dulwich Hill</li></ul>  | <ul style="list-style-type: none"><li>• CBD Bus Network changes</li></ul>  |
| 2021        | <ul style="list-style-type: none"><li>• WestConnex Stages 1 &amp; 2</li><li>• Kingsford Smith Airport Upgrades</li><li>• NorthConnex</li><li>• Southern Connector Motorway to President Avenue</li></ul>     | <ul style="list-style-type: none"><li>• 2018 Rail Timetable</li><li>• Sydney Metro - North West Rail Link to Rouse Hill</li><li>• CBD and South East Light Rail</li><li>• CBD and South East Light Rail extension to Malabar</li></ul> | <ul style="list-style-type: none"><li>• Northern Beaches B-Line</li><li>• Bus network and service changes in Western Sydney</li><li>• Bus network changes for North West Metro</li></ul> |
| 2026        | <ul style="list-style-type: none"><li>• WestConnex Stage 3</li><li>• North West Growth Centre</li></ul>  | <ul style="list-style-type: none"><li>• City and South West Metro</li><li>• Parramatta Light Rail Stage 1 - to Epping</li><li>• Parramatta Light Rail Stage 2 - to Strathfield</li></ul>   |  |
| 2031        | <ul style="list-style-type: none"><li>• South West Growth Centre</li><li>• M7 and M2 widening</li><li>• B53 upgrades</li><li>• M12</li><li>• Western Harbour Tunnel</li></ul>                                |  |  |

### Transport Performance and Analytics

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| Output Year            | Road   | Rail/Light Rail   | Bus   |
|------------------------|--|---|---|
| 2036                   |  |   |   |
| 2041                   | <ul style="list-style-type: none"> <li>Castlereagh Motorway</li> <li>Beaches Link</li> </ul> |   |   |
| 2046                   |  |   |   |
| 2051                   | <ul style="list-style-type: none"> <li>Outer Sydney Orbital Stage 1</li> </ul>               | <ul style="list-style-type: none"> <li>South West Rail Link Extension</li> </ul>        |   |
| All years travel costs | <ul style="list-style-type: none"> <li>Fuel and toll costs rise with CPI</li> </ul>          | <ul style="list-style-type: none"> <li>Opal fare system. Fares rise with CPI</li> </ul> | <ul style="list-style-type: none"> <li>Opal fare system. Fares rise with CPI</li> </ul> |

## Land Use assumptions

Future land use settings adopted in the STM are based on the Travel Zone Projections (TZP) 2016 dataset for Sydney GMA. This data set provides projections of population, workforce and employment. The major assumptions made in deriving these projections include:

- **Future population growth** - modelled using the Local Government Area (LGA) population projections prepared by the NSW Department of Planning and Environment (DPE).
- **Participation rates in workforce and employment** - projections are computed by applying workforce participation rates against Age-Sex population categories and distributed at the Travel Zone level according to Census profiles.
- **Known future developments and major growth areas** - incorporated into the projections to distribute population and employment areas (as noted below).

Key assumptions and data sources are shown in the table below. Further information about this data set is available from the [TfNSW website](#) and [Transport Open Data Hub](#)

| Assumption                                       | Population  | Employment   |
|--|---|--|
| Source data                                      | DPE 2016 LGA population and household projections (main series)<br><br>2011 Census distribution (Sydney building approvals, private dwellings by occupancy, regional population growth, age and sex, place of usual residence)  | 2016 ABS Labour Force Survey<br><br>2011 Census distribution (historical employment by industry, income, labour force status)<br><br>2015 Intergenerational Report – provides the basis for an unemployment rate of 4-6% in the forecast period  |
| Known future developments and major growth areas | Greater Sydney Commission (GSC) centres and DPE Priority growth areas and precincts adopted for population projections include: <ul style="list-style-type: none"> <li>Bankstown</li> <li>Bankstown Airport</li> <li>Blacktown</li> <li>Bondi Junction</li> <li>Brookvale - Dee Why</li> <li>Burwood</li> </ul> | The following employment centres were considered in developing employment projections: <ul style="list-style-type: none"> <li>Alex Avenue</li> <li>Area 20</li> <li>Austral/Leppington North</li> <li>Barangaroo</li> <li>Bays Precinct</li> <li>Box Hill/Box Hill Industrial</li> <li>Broader Western Sydney Employment Area</li> </ul> |

| Assumption | Population   | Employment   |
|------------|--|--|
|            | <ul style="list-style-type: none"> <li>• Campbelltown – Macarthur</li> <li>• Campsie</li> <li>• Castle Hill</li> <li>• Central Sydney</li> <li>• Chatswood</li> <li>• Eastgardens</li> <li>• Fairfield</li> <li>• Greater Parramatta</li> <li>• Greater Penrith</li> <li>• Green Square – Mascot</li> <li>• Hornsby</li> <li>• Hurstville</li> <li>• Katoomba</li> <li>• Kogarah</li> <li>• Leppington</li> <li>• Liverpool</li> <li>• Macquarie Park</li> <li>• Manly</li> <li>• Marsden Park</li> <li>• Miranda</li> <li>• Mona Vale</li> <li>• Mt Druitt</li> <li>• Narellan</li> <li>• North Sydney</li> <li>• Northern Beaches Hospital</li> <li>• Norwest</li> <li>• Port Botany</li> <li>• Randwick Health &amp; Education</li> <li>• Rhodes</li> <li>• Richmond – Windsor</li> <li>• Rouse Hill</li> <li>• St Leonards</li> <li>• St Marys</li> <li>• Sutherland</li> <li>• Sydney Airport</li> <li>• Sydney Olympic Park</li> <li>• Western Sydney Airport</li> </ul> | <ul style="list-style-type: none"> <li>• Central to Eveleigh</li> <li>• Clemton Park Village Centre/Former Sunbeam Factory Campsie</li> <li>• Defence Land Moorebank - Intermodal Terminal</li> <li>• Edmondson Park Town Centre</li> <li>• Enfield Intermodal Terminal</li> <li>• Former Hoxton Park Airport - Development</li> <li>• Freight Transport Warehouse and Distribution Centre - Huntingwood</li> <li>• Glenfield to Macarthur</li> <li>• Greater Macarthur Investigation Area</li> <li>• Horsley Drive Business Park</li> <li>• Hunter Economic Zone (HEZ)</li> <li>• Huntingwood West Precinct</li> <li>• Huntlee Development</li> <li>• Liverpool CBD</li> <li>• Macquarie Centre expansion</li> <li>• Marrickville Metro</li> <li>• Marsden Park</li> <li>• Marsden Park Industrial</li> <li>• Newcastle CBD</li> <li>• Northern Beaches Hospital</li> <li>• NWRL-Kellyville</li> <li>• NWRL-Rouse Hill</li> <li>• Oran Park</li> <li>• Other developments</li> <li>• Parramatta</li> <li>• Penrith Panthers development</li> <li>• Penrith Station Car park</li> <li>• Port Botany Expansion</li> <li>• Potts Hill Redevelopment</li> <li>• Redfern-Waterloo Development</li> <li>• Residential/commercial development at former BATA manufacturing site</li> <li>• Riverstone</li> <li>• Riverstone West</li> <li>• SICEEP Precinct</li> <li>• South West Growth Area</li> <li>• Southern Employment Lands</li> <li>• Sydney Metro - Bankstown to Sydenham</li> <li>• Sydney Metro - Northwest</li> <li>• Sydney to Parramatta</li> <li>• Tallawarra Lands</li> <li>• Town Centre and Civic Precinct of Warnervale</li> <li>• Western Sydney Airport and surrounds</li> <li>• Wolli Creek redevelopment</li> </ul> |

| Assumption | Population | Employment  |
|------------|------------|---|
|            |            | <ul style="list-style-type: none"> <li>Woollooware Bay Town Centre Development</li> </ul> |

The following table provides a summary of population and employment forecasts for the Sydney GMA contained within TZP 2016.

| Year | Population in GMA | Employment in GMA |
|------|-------------------|-------------------|
| 2016 | 6,087,920         | 3,051,700         |
| 2021 | 6,583,800         | 3,285,000         |
| 2026 | 7,084,600         | 3,515,800         |
| 2031 | 7,587,600         | 3,760,000         |
| 2036 | 8,094,900         | 4,020,900         |
| 2041 | 8,608,700         | 4,287,900         |
| 2046 | 9,123,300         | 4,547,400         |
| 2051 | 9,641,600         | 4,797,300         |
| 2056 | 10,164,300        | 5,040,400         |

## Light Commercial Vehicle Demand assumptions

Because the STM is a resident-driven (i.e. population and employment) model – based on the Household Travel Survey (HTS), there is a component/overlap in terms of Light Commercial Vehicles (LCV) and the separately derived LCV matrices. A process is implemented in the development of LCV matrices to avoid double counting, and is detailed in *BTS Light Commercial Vehicle Forecasts (February 2014 Release)*.

## Heavy Vehicle Demand assumptions

TPA Freight Movement Model (FMM) Freight Forecast, February 2017 Release.

## Behavioural assumptions

- Behavioural models were estimated using Household Travel Survey (HTS) data collected from 2009 - 2013, Journey to Work data up to and including 2011 Census, and 2016 Opal data. Assumed 1% growth in real income per annum.
- Travel behaviour responses to times, costs and modes within synthetic household classes (128 different types), were assumed not to vary over time, although the number of people within each household class will vary in response to demographic change and socio-economic change.

### Limitations

The assumptions listed above are for strategic modelling purposes and are adopted at the time of model release with the best judgements of TPA/TfNSW on the infrastructure, service and policy scenarios for future forecasting years. In addition, users should also be aware of some other limitations inherent in the STM:

- The STM is a high level strategic model. It breaks down the GMA into 2,690 travel zones, and further by 128 population segments within each travel zone. These 350,000 segments by travel zone represent over 5 million people in the GMA, and thus involve using averages and assumptions to predict behaviour and use of/access to the transport system.
- The public transport assignment in STM does not currently apply network capacity constraint. Its highway speed-flow functions are commonly used in strategic multi-modal modelling applications which are different from those used in traffic models. This approach has been found to better reflect reality and the behavioural characteristics associated with multi-modal models and the propensity to change mode of transport. This is further supported by the fact that the STM is a 24-hour tour-based model.
- The STM has been validated to ensure that it reproduces reasonable estimates of current travel behaviour at a Statistical Local Area (SLA) to SLA level. However, this does not extend to the level of route choice (or more refined level of resolution). This is typically assessed using separate, project specific forecasting models.

### Other notes

The STM is a strategic multi-modal modelling tool incorporating the latest population and employment forecasts. The STM is used to inform evidence-based policy developments and decision-making in strategic, metropolitan scale land use and transport scenario modelling projects.

For specific projects, STM results should be used as a starting point to produce estimates of overall demand in response to alternative land use and/or transport supply scenarios. However, due to its limitations as a strategic modelling tool, the STM may need to be supplemented with more detailed analyses for project evaluation purposes.

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#### Disclaimer

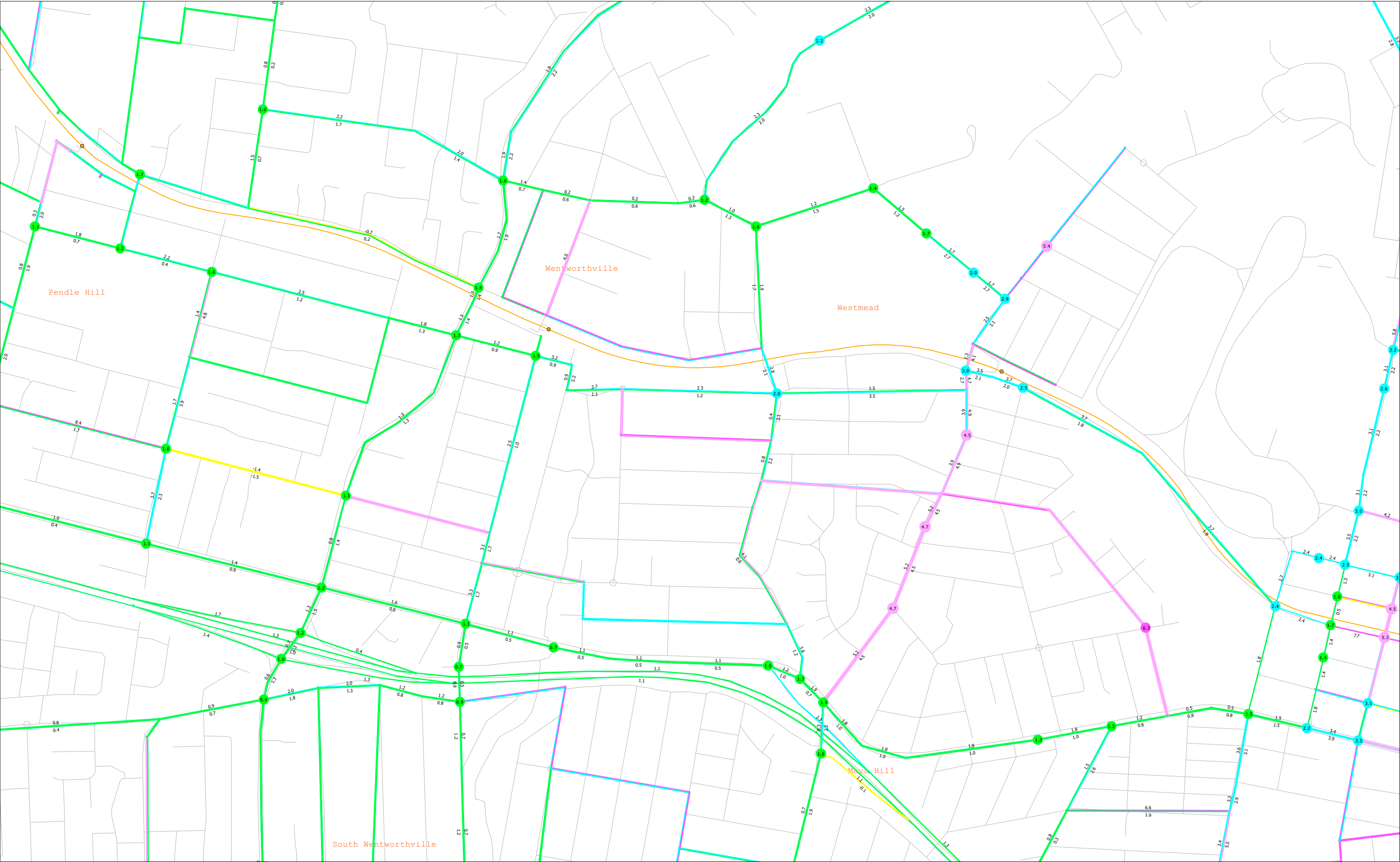
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ROAD TRAFFIC GROWTH (%YR, 2HRSPK) LINKS & INTERSECTIONS



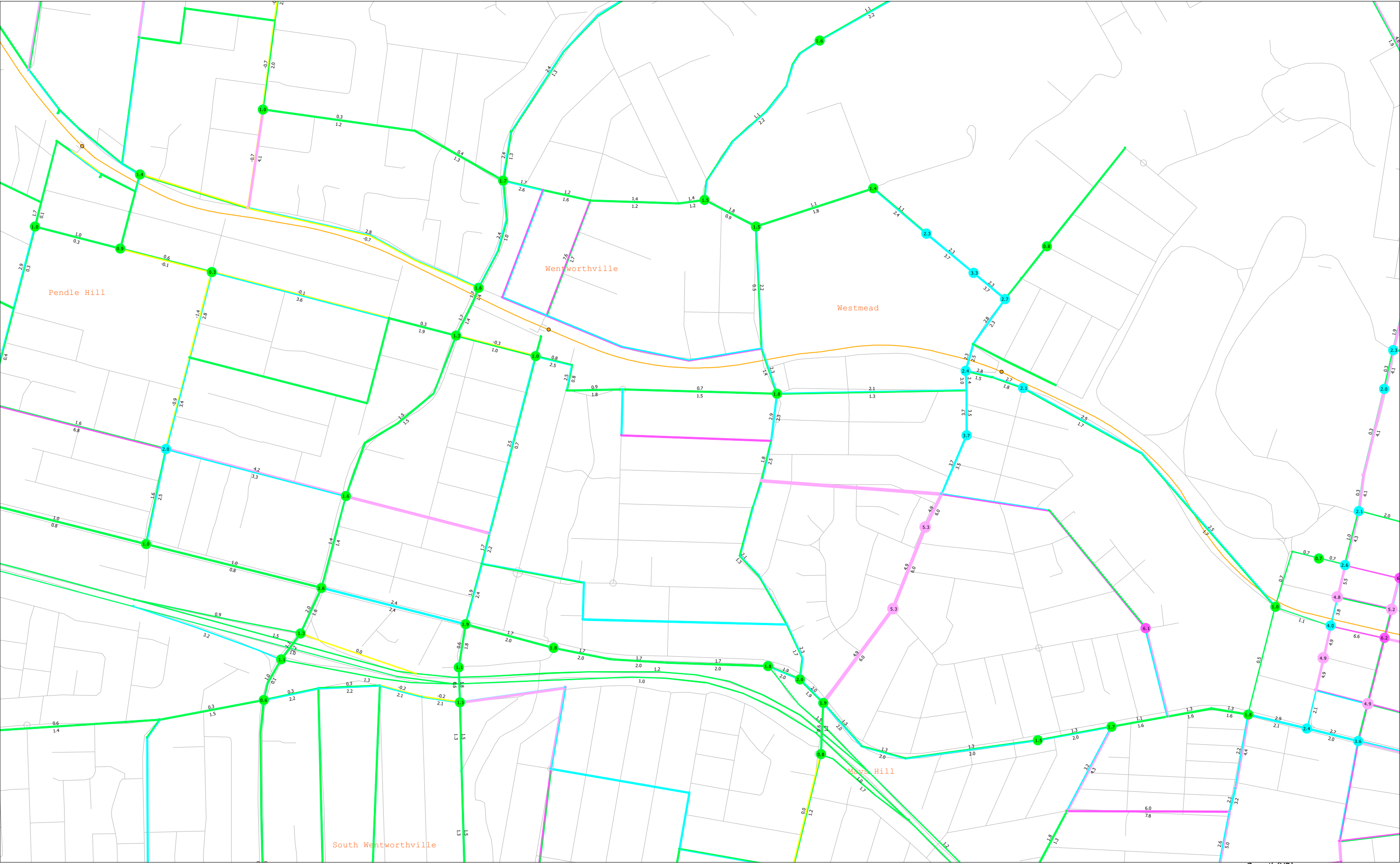
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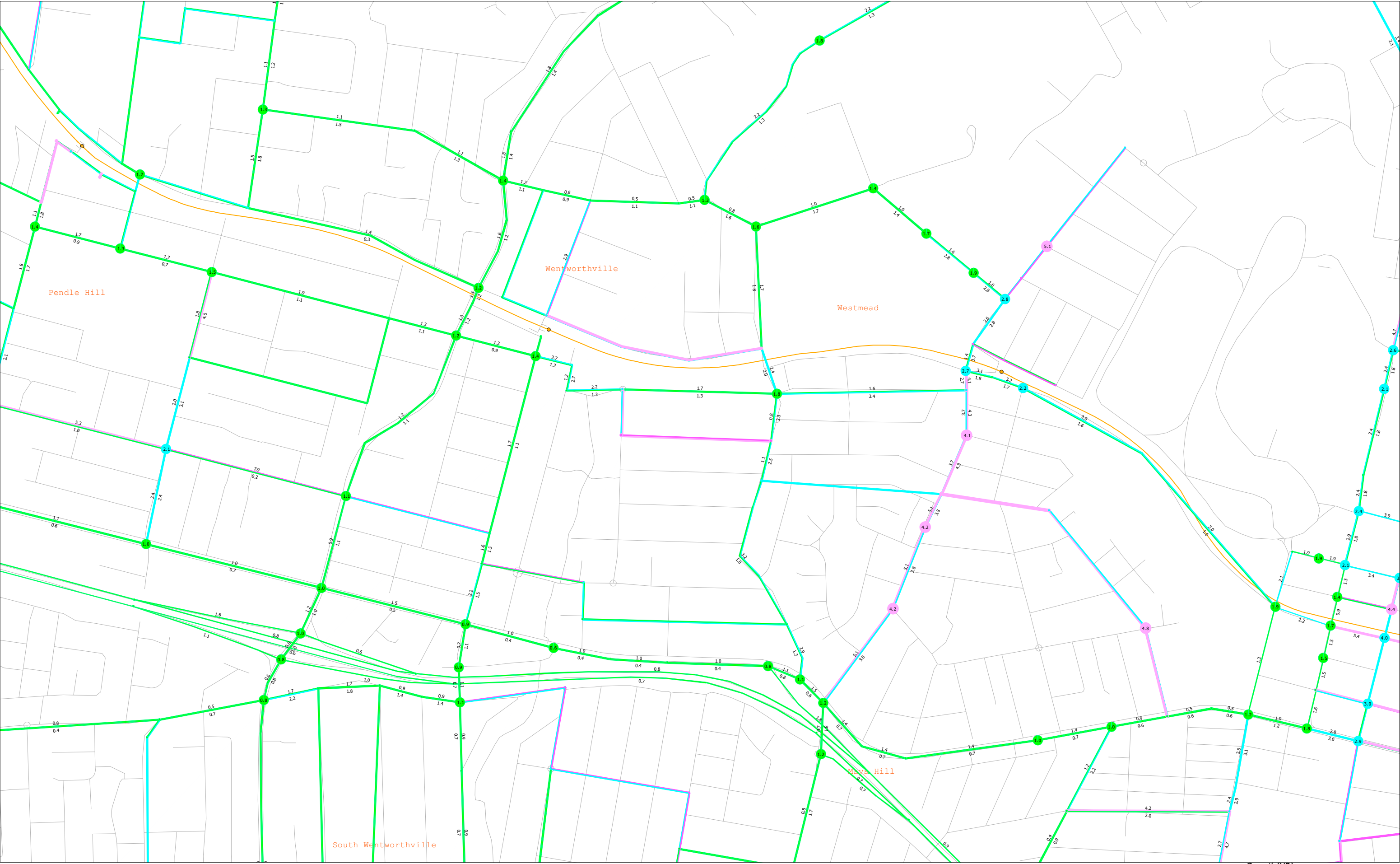
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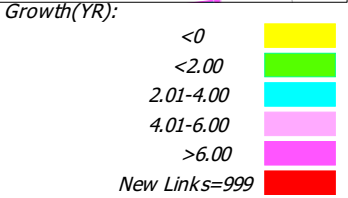
ROAD TRAFFIC GROWTH (%YR, 2HRSPK) LINKS & INTERSECTIONS



ROAD TRAFFIC GROWTH (%YR, 2HRSPK) LINKS & INTERSECTIONS

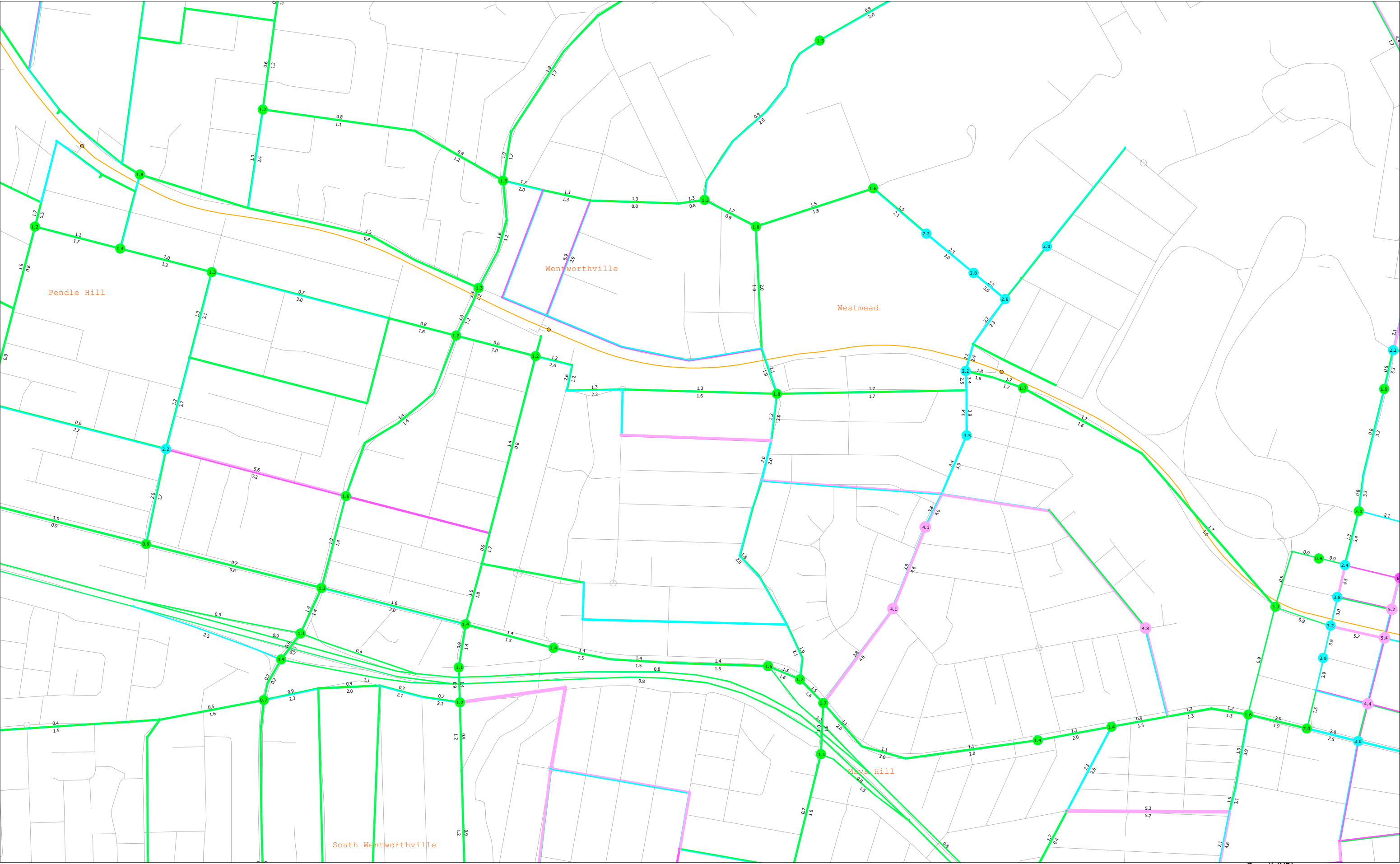


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2018-11-06 07:55





ROAD TRAFFIC GROWTH (%YR, 2HRSPK) LINKS & INTERSECTIONS



2011TZ SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL  
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2018-11-06 07:55

