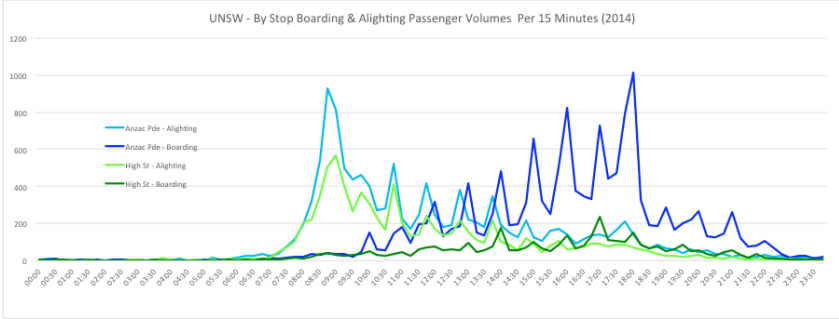
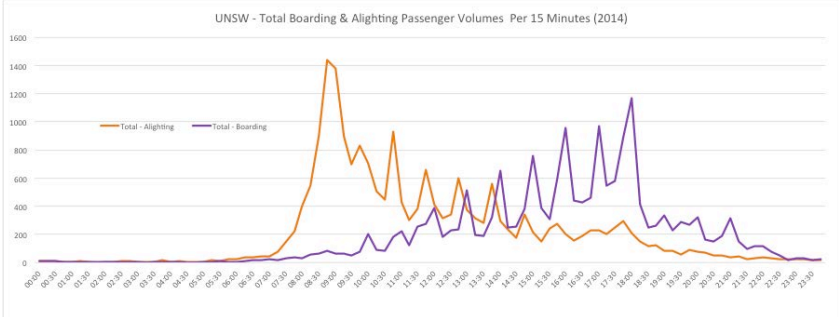
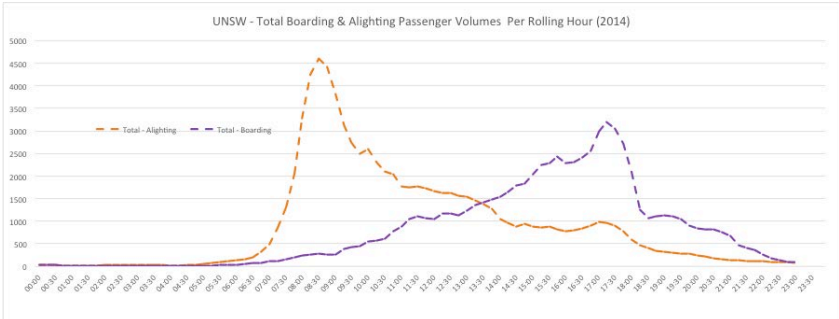


Modifications Report – December 2014
 Review of TfNSW’s Modifications Report with regards to UNSW interests.

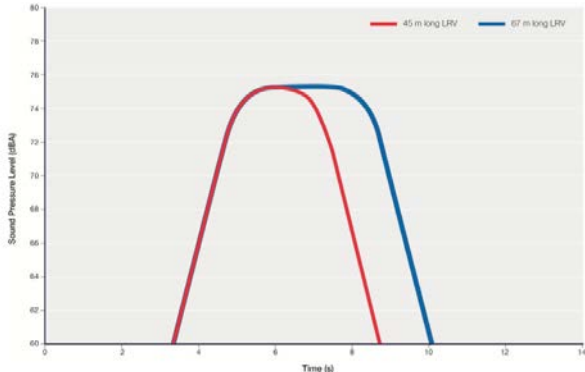
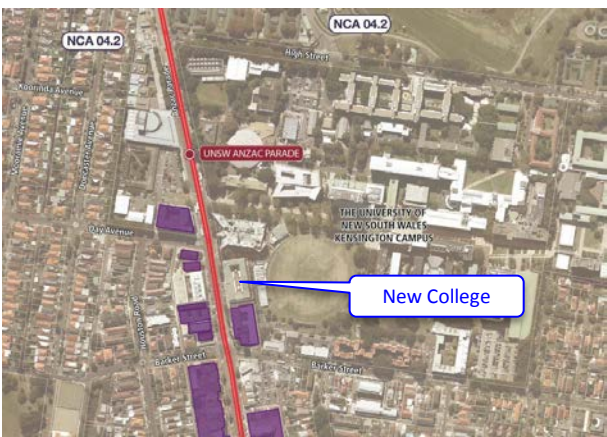

Reference Document	Page	Section	Summary of Issues	UNSW Response
			LIGHT RAIL VEHICLES	
Modifications Report (Dec 2014)	12	3.3 Grosvenor Street stop	<p>The Modifications Report states that:</p> <p><i>Pedestrian Impacts</i></p> <p><i>In combination with the longer platforms (refer to section 3.6), there would be a marginally higher risk of pedestrians not complying with the pedestrian signals or crossing directly between the platform and the footpath. Appropriate educational campaigns (as identified in section 10.10 of the CSELR Project EIS (Volume 1A) (Transport for NSW, 2013)) would be implemented to encourage higher levels of compliance and safety across the corridor, in addition to the provision of appropriate warning signage.</i></p>	<p>UNSW requires further information (i.e. plans) showing the proposed changes to the stops at High Street and Anzac Parade to be able to assess the proposed changes to the stops.</p> <p>It is noted that TfNSW has acknowledged the ‘marginally higher risk of pedestrians not complying with the pedestrian signals or crossing directly between the platform and the footpath’ associated with a longer centre island stop.</p> <p>The changes to the proposed centre island stops at High Street (UNSW prefers the side platforms) and Anzac Parade are not addressed in the Modifications Report. Without this further information, UNSW is not able to assess the proposed changes and implications.</p>
	25	3.6.2 Description of the modified design	<p>The Modifications Report states that:</p> <p><i>The modified design would provide larger LRVs approximately 67 metres in length (allowing for an increased vehicle capacity of approximately 466 people) as well as associated increases to the length of each stop. Each of the increases to approved stop lengths would be accommodated within the approved project footprint and would retain the general design of the approved stops (i.e. island stop, side platform stop etc.). All additional facilities and infrastructure associated with each of the stops (canopies, stop furniture, signage, bike parking (if proposed)) would be maintained as part of the design for the increased stop lengths.</i></p>	<p>UNSW requires further information (i.e. plans) showing the proposed changes to the stops at High Street and Anzac Parade to be able to assess the proposed changes to the stops.</p> <p>It is claimed that the longer stops ‘would be accommodated within the approved project footprint’. However, no information or plans are provided to support this claim for the High Street and Anzac Parade stops.</p> <p>The increase in length of the platform, as well as the increase in length of the LRV, has the potential to significantly change the layout and operation of the stops, in particular the High Street stop.</p> <p>No details are provided regarding the proposed 67m-long LRV such as door locations and swept paths. In particular, swept path changes at the High Street / Wansey Road intersection may impact on the layout surrounding properties.</p>
	25	3.6.2 Description of the modified design	<p>It is understood that the increased stop lengths would align with the proposed 67 metre LRVs. The approved lengths of the Central Station and Moore Park stops were 90 metres (as special event platforms). The proposed length of these stops would be reduced to approximately 75 metres as part of the modification to accommodate the changed LRV sizes.</p>	<p>UNSW requires further information (i.e. plans) showing the proposed changes to the stops at High Street and Anzac Parade to be able to assess the proposed changes to the stops.</p> <p>For the Anzac Parade centre island stop, with a potential 98m platform length, there is no detail regarding any proposed reduction in the length of the 98m platform footprint.</p> <p>The 98m platform footprint is possible due to the location of the proposed northern Pedestrian Operated Signals at College Walk.</p>

Reference Document	Page	Section	Summary of Issues	UNSW Response																																
	26	3.6.2 Description of the modified design	<p>The Modifications Report states:</p> <p><i>Future capacity for the service frequency to increase to up to approximately 3 minutes in the CBD and 6 minutes on each branch line would also be available in response to additional patronage demand, where necessary. In these future operations (at least 10 years after opening) during the peak hour the there is potential capacity to increase to enable the movement of up to 8,620 passengers per hour (18.5 LRVs per hour each carrying up to 466 passengers). This would represent an increase of approximately 20 per cent in peak capacity against the approved project which would have enabled the movement of up to 7,200 passengers (24 LRVs per hour each carrying up to 300 passengers). This increase would provide for significant ‘future proofing’ against patronage growth and/or expansion of the network. This capacity does not include special events which would provide up to 10,800 passengers per hour.</i></p> <p><i>The proposed infrastructure could further increase ultimate capacity through future service frequencies of up to 2 minutes in the CBD and 4 minutes on the branch lines. This would require a significant increase in future demand and is therefore not addressed in this report.</i></p>	<p>UNSW is concerned that the impacts of the proposed changes to the service frequency (and capacity of the LRV) on the stop operation, capacity and safety have not been adequately addressed. UNSW’s estimated patronage (that includes only UNSW staff and students) using the most recent 2014 campus survey data indicates light rail passenger volumes (in 2021) at the Anzac Parade and High Street stops that are higher than TfNSW’s passenger volumes (in 2038) at the stops. UNSW is able to provide this detailed information to DP+I and/or TfNSW.</p> <p>The results UNSW 2014 Travel Survey and Campus Counts are now available.</p> <p>UNSW 2014 Travel Survey – The survey was conducted over a three-week period in April 2014 and received a significant number of responses from approximately 2,500 staff and 7,700 students. The responses represented 19.6% of staff and students attending the campus.</p> <p>UNSW 2014 Campus Counts – In 2014, simultaneously with the Travel Survey, the University conducted a count of movements at the campus perimeter during a typical semester’s week. The aim was to obtain more specific data of where and how many pedestrians, cars, bicycles, motorbikes and commercial vehicles arrived and departed from, the campus. All arrival and departure movements at strategic points on the campus perimeter were counted in 15 minute intervals over a 24 hours period for 7 days – Friday 4th April to Thursday 11th April.</p> <p>This updated data has been used to predict expected usage of the High Street and Anzac Parade stops. The graphs below present the predicted boarding and alighting at the UNSW stops (for 2014). Key findings are:</p> <table><tr><th>2014</th><th>Type</th><th>Maximum 15 Minute Volume</th><th>Maximum Hourly Volume</th><th>Daily Volume</th></tr><tr><td rowspan="2">Anzac Parade</td><td>Alighting</td><td>930</td><td>2781</td><td>12516</td></tr><tr><td>Boarding</td><td>1013</td><td>2719</td><td>14607</td></tr><tr><td rowspan="2">High Street</td><td>Alighting</td><td>569</td><td>1830</td><td>8124</td></tr><tr><td>Boarding</td><td>238</td><td>584</td><td>3792</td></tr><tr><td rowspan="2">Total (both stops)</td><td>Alighting</td><td>1437</td><td>4611</td><td>20640</td></tr><tr><td>Boarding</td><td>1166</td><td>3187</td><td>18399</td></tr></table> <ul style="list-style-type: none">Adopting a conservative 2% p.a. growth rate for the campus population (which has grown at 5% p.a. since 2007) and retaining the existing proportion of public transport users (60%), light rail patronage for the campus stops will increase by 15% by 2021.Assuming a peak hour capacity (at opening in 2021) of 3,495 pax per hour (7.5 LRV per hour x 466 pax per LRV) per line, UNSW passengers will utilise up to 90% of the capacity of the services.All the above figures are for UNSW staff and students only. Additional passengers already on each LRV will reduce their capacity to take on passengers at the UNSW stops. Passengers from the surrounding areas using the UNSW stops will increase crowding on the stops and at the access points to the stops. <div><p>UNSW - By Stop Boarding & Alighting Passenger Volumes Per 15 Minutes (2014)</p><p>UNSW - Total Boarding & Alighting Passenger Volumes Per 15 Minutes (2014)</p><p>UNSW - Total Boarding & Alighting Passenger Volumes Per Rolling Hour (2014)</p></div> <p>UNSW is concerned that although additional services may be provided to cater for the additional growth in patronage, the size of the stops have not been designed to cater for this expected growth.</p>	2014	Type	Maximum 15 Minute Volume	Maximum Hourly Volume	Daily Volume	Anzac Parade	Alighting	930	2781	12516	Boarding	1013	2719	14607	High Street	Alighting	569	1830	8124	Boarding	238	584	3792	Total (both stops)	Alighting	1437	4611	20640	Boarding	1166	3187	18399
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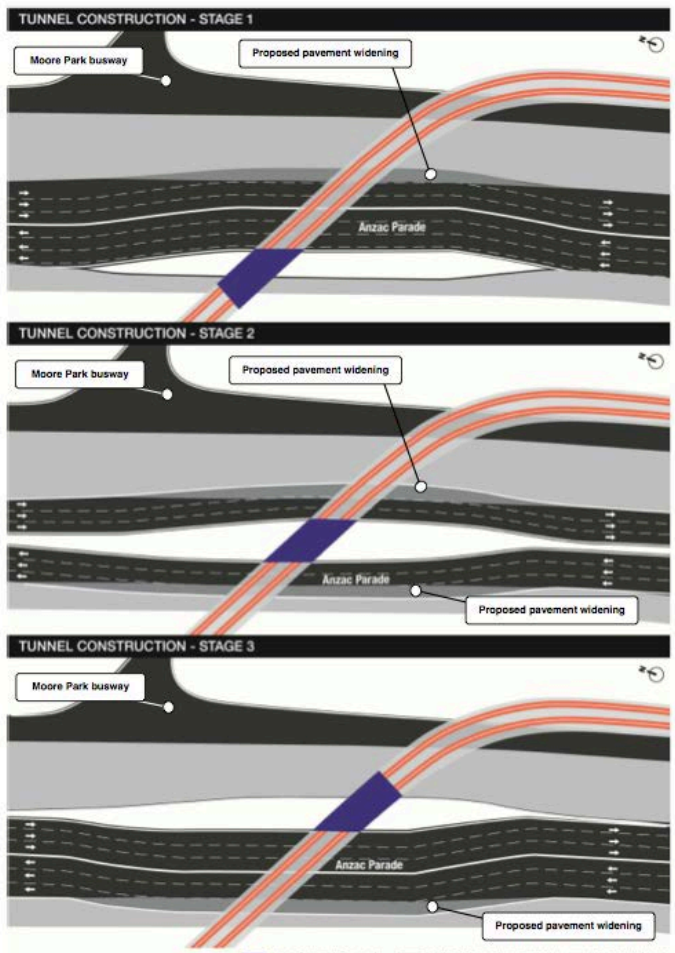
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	27	3.6.2 Description of the modified design	<p>The Modifications Report states:</p> <p>Table 3.2 Comparison of LRV service headway (in minutes) for the approved project and proposed modified design</p> <table><tr><th rowspan="2">Time of day</th><th colspan="2">CBD/Surry Hills/ Moore Park</th><th colspan="2">Kensington/Kingsford</th><th colspan="2">Randwick</th></tr><tr><th>Opening</th><th>Future</th><th>Opening</th><th>Future</th><th>Opening</th><th>Future</th></tr><tr><td colspan="7">LRV service frequency in minutes (approved project)</td></tr><tr><td>10.00 pm to 7.30 am¹</td><td>10</td><td>10</td><td>20</td><td>20</td><td>20</td><td>20</td></tr><tr><td>7.30 am to 9.30 am</td><td>3</td><td>2.5</td><td>6</td><td>5</td><td>6</td><td>5</td></tr><tr><td>9.30 am to 5.00 pm</td><td>4</td><td>3</td><td>8</td><td>6</td><td>8</td><td>6</td></tr><tr><td>5.00 pm to 7.00 pm</td><td>3</td><td>2.5</td><td>6</td><td>5</td><td>6</td><td>5</td></tr><tr><td>7.00 pm to 10.00 pm</td><td>5</td><td>5</td><td>10</td><td>10</td><td>10</td><td>10</td></tr><tr><td colspan="7">LRV service frequency in minutes (proposed modification)²</td></tr><tr><td>5.00 am to 7.00 am¹</td><td>6</td><td>5</td><td>12</td><td>10</td><td>12</td><td>10</td></tr><tr><td>7.00 am to 7.00 pm</td><td>4</td><td>3.25</td><td>8</td><td>6.5</td><td>8</td><td>6.5</td></tr><tr><td>7.00 pm to 10.00 pm</td><td>5</td><td>5</td><td>10</td><td>10</td><td>10</td><td>10</td></tr><tr><td>10.00 pm to 1.00 am²</td><td>6</td><td>6</td><td>12</td><td>12</td><td>12</td><td>12</td></tr></table> <p>NB: Future operation will be 10 or more years after opening).</p>	Time of day	CBD/Surry Hills/ Moore Park		Kensington/Kingsford		Randwick		Opening	Future	Opening	Future	Opening	Future	LRV service frequency in minutes (approved project)							10.00 pm to 7.30 am ¹	10	10	20	20	20	20	7.30 am to 9.30 am	3	2.5	6	5	6	5	9.30 am to 5.00 pm	4	3	8	6	8	6	5.00 pm to 7.00 pm	3	2.5	6	5	6	5	7.00 pm to 10.00 pm	5	5	10	10	10	10	LRV service frequency in minutes (proposed modification) ²							5.00 am to 7.00 am ¹	6	5	12	10	12	10	7.00 am to 7.00 pm	4	3.25	8	6.5	8	6.5	7.00 pm to 10.00 pm	5	5	10	10	10	10	10.00 pm to 1.00 am ²	6	6	12	12	12	12	<p>UNSW has repeatedly raised the concerns of passenger and pedestrian safety at the High Street and Anzac Parade stops. The proposed increase the capacity of the LRV is considered to be significant justification to undertake a detailed review the capacity, operation and passenger safety of each of the UNSW stops.</p> <p>The proposed change in LRV (300 pax up to 466 pax) and change in service frequency (6 minutes up to 8 minutes) will significantly change to usage of the stops at UNSW. No details are provided regarding the impact of these changes on the operation of the High Street and Anzac Parade stops.</p> <p>Based on the details in the Modifications Report, it is understood that as project opening will be 2021, the future service frequencies may not be implemented until 2031, ten years after opening.</p> <p>UNSW has repeatedly raised the concerns of passenger and pedestrian safety at these stops. The proposed increase the capacity of the LRV is considered to be significant reasons to review the capacity, operation and passenger safety of each of the UNSW stops.</p> <p>UNSW agrees with the statement on page 18 of TfNSW’s Additional Information Report (June 2014) that ‘it is always best to err on the side of caution with respect to design forecasts to ensure safety is not compromised.’</p>																																																									
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	28	3.6.3 Change in impact	<p>The Modifications Report states:</p> <p><i>Operational assessment</i></p> <p><i>The longer LRVs would have an increased vehicle capacity of approximately 466 people (compared to approximately 300 people for the previously proposed 45 metre long LRVs). The LRVs would also operate at peak hour headways of up to 4 minutes (compared to 3 minutes as assessed in the CSELR Project EIS) within the CBD and 8 minutes along the branches (compared to 6 minutes as assessed in the CSELR Project EIS). This represents a reduction in the frequency of LRVs at intersections along the route, with operational benefits for the integrated transport network.</i></p>	<p>A review of TfNSW’s patronage numbers indicates that the proportion of passengers from other areas is between 21% and 91% of the total use of the UNSW stops. For example, UNSW's predicted number (of UNSW staff and students only) in 2014 (AM 8-9) is significantly higher than TfNSW's predicted number of UNSW passengers in 2036 (AM) for Anzac Parade. If the predicted 91% of passengers from other areas are included in the assessment, there will be significant capacity and safety issues at the stop.</p> <p>The TfNSW Additional Information reprot (June 2014) provided a summary of predicted boardings and alightings at the UNSW stops. The following tables analyse this information and present a comparison to UNSW’s numbers from the 2014 Travel Survey.</p> <table><tr><td colspan="7">Page 16 TfNSW Additional Information report (June 2014)</td></tr><tr><td>2036 AM</td><td colspan="2">UNSW Anzac Pde</td><td colspan="2">UNSW High St</td><td colspan="2">Total</td></tr><tr><td>Hourly</td><td>Boarding</td><td>Alighting</td><td>Boarding</td><td>Alighting</td><td>Boarding</td><td>Alighting</td></tr><tr><td>To/from UNSW</td><td>66</td><td>1327</td><td>115</td><td>1310</td><td>181</td><td>2637</td></tr><tr><td>To/from other areas</td><td>642</td><td>346</td><td>727</td><td>1493</td><td>1369</td><td>1839</td></tr><tr><td>Total</td><td>708</td><td>1673</td><td>842</td><td>2803</td><td>1550</td><td>4476</td></tr></table> <p>Proportion of passengers from UNSW and other areas (from above table)</p> <table><tr><td>2036 AM</td><td colspan="2">UNSW Anzac Pde</td><td colspan="2">UNSW High St</td><td colspan="2">Total</td></tr><tr><td>Hourly</td><td>Boarding</td><td>Alighting</td><td>Boarding</td><td>Alighting</td><td>Boarding</td><td>Alighting</td></tr><tr><td>To/from UNSW</td><td>9%</td><td>79%</td><td>14%</td><td>47%</td><td>12%</td><td>59%</td></tr><tr><td>To/from other areas</td><td>91%</td><td>21%</td><td>86%</td><td>53%</td><td>88%</td><td>41%</td></tr><tr><td>Total</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td></tr></table> <p>UNSW Passenger Numbers (from 2014 Travel Survey)</p> <table><tr><td>2014 AM (8-9)</td><td colspan="2">UNSW Anzac Pde</td><td colspan="2">UNSW High St</td><td colspan="2">Total</td></tr><tr><td>Hourly</td><td>Boarding</td><td>Alighting</td><td>Boarding</td><td>Alighting</td><td>Boarding</td><td>Alighting</td></tr><tr><td>To/from UNSW</td><td>132</td><td>1990</td><td>103</td><td>1287</td><td>235</td><td>3277</td></tr><tr><td>To/from other areas</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Total</td><td>132</td><td>1990</td><td>103</td><td>1287</td><td>235</td><td>3277</td></tr></table> <p>Comparison of 2036 AM (TfNSW) to 2014 AM (UNSW)</p> <table><tr><td>Comparison</td><td colspan="2">UNSW Anzac Pde</td><td colspan="2">UNSW High St</td><td colspan="2">Total</td></tr><tr><td>Hourly</td><td>Boarding</td><td>Alighting</td><td>Boarding</td><td>Alighting</td><td>Boarding</td><td>Alighting</td></tr><tr><td>To/from UNSW</td><td>100%</td><td>50%</td><td>-10%</td><td>-2%</td><td>30%</td><td>24%</td></tr><tr><td>To/from other areas</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>Total</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></table> <p>The above tables highlight that in the AM peak hour:</p> <ul style="list-style-type: none">▪ The proportion of passengers from other areas is between 21% and 91% of the total use of the UNSW stops. The UNSW analysis using only UNSW passengers is therefore conservative.▪ UNSW's predicted number of UNSW passengers in 2014 (AM 8-9) is significantly higher than TfNSW's predicted number of UNSW passengers in 2036 (AM) for Anzac Parade.▪ UNSW's predicted number of UNSW passengers in 2021 (AM 8-9) are expected to be 15% higher than the 2014 (AM 8-9) numbers.▪ The 15 years of growth from 2021 to 2036 has not been calculated due to too many uncertainties, but it is considered that the passenger numbers will be even larger.▪ It is expected that for the PM peak there will be similar discrepancies.	Page 16 TfNSW Additional Information report (June 2014)							2036 AM	UNSW Anzac Pde		UNSW High St		Total		Hourly	Boarding	Alighting	Boarding	Alighting	Boarding	Alighting	To/from UNSW	66	1327	115	1310	181	2637	To/from other areas	642	346	727	1493	1369	1839	Total	708	1673	842	2803	1550	4476	2036 AM	UNSW Anzac Pde		UNSW High St		Total		Hourly	Boarding	Alighting	Boarding	Alighting	Boarding	Alighting	To/from UNSW	9%	79%	14%	47%	12%	59%	To/from other areas	91%	21%	86%	53%	88%	41%	Total	100%	100%	100%	100%	100%	100%	2014 AM (8-9)	UNSW Anzac Pde		UNSW High St		Total		Hourly	Boarding	Alighting	Boarding	Alighting	Boarding	Alighting	To/from UNSW	132	1990	103	1287	235	3277	To/from other areas	0	0	0	0	0	0	Total	132	1990	103	1287	235	3277	Comparison	UNSW Anzac Pde		UNSW High St		Total		Hourly	Boarding	Alighting	Boarding	Alighting	Boarding	Alighting	To/from UNSW	100%	50%	-10%	-2%	30%	24%	To/from other areas	-	-	-	-	-	-	Total	-	-	-	-	-	-
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Reference Document	Page	Section	Summary of Issues	UNSW Response
	31	3.6.3 Change in impact	<p>The Modifications Report states:</p> <p><i>Other intersection impacts</i></p> <p><i>Coordination of traffic signals at the Grosvenor Street/Bridge Street intersection and the Hunter Street/Margaret Street intersection (including Jamison and Bond Streets) would be required as part of the proposed modification. This would ensure that LRVs can clear both intersections at once without stopping, resulting from insufficient available storage length between these two intersections for the longer LRVs. Similarly, coordination of traffic signals at the Devonshire Street/Marlborough Street intersection and the Devonshire Street/Crown Street intersection would also be required.</i></p> <p><i>It is assessed that the longer clearance times involved with the longer LRVs would result in some minor additional delays along the side streets, with lesser impacts in Surry Hills due to the local operation and lower volumes experienced along these streets. However, given that the headways between LRVs would be increased (service frequency decreased), the overall traffic impact is expected to be limited compared to the approved project. Traffic analysis undertaken during the detailed design process (in consultation with Roads and Maritime), would ensure that satisfactory traffic signal operation for all road users is achieved along the route.</i></p>	<p>It is noted that longer LRVs will require more time to clear each intersection, in particular at intersections where the LRV will be travelling slow e.g. High Street / Wansey Road.</p>

Reference Document	Page	Section	Summary of Issues	UNSW Response
	31	3.6.3 Change in impact	<p>The Modifications Report states:</p> <p><i>Pedestrian impacts</i></p> <p><i>The proposed opening headways of 4 minutes would increase the available time for pedestrian movements to and from the platform during the morning and afternoon peaks. This would also increase the number of passengers boarding and alighting each service. Passenger wait times would also increase slightly as a result of the slightly longer headways during the peak periods, but would generally be shorter outside the peaks. Given that the platforms would be proportionally longer to cater for the 67 metre LRVs, pedestrian capacity on the longer platforms is expected to be sufficient to meet the required demand. As such, no significant adverse pedestrian impacts are expected. Further detailed pedestrian modelling would be undertaken during detailed design to confirm that pedestrian amenity and safety is appropriately catered for at the stops and immediate surrounds (platform access routes).</i></p> <p><i>The combination of longer platforms, reduced pedestrian waiting areas at traffic signals adjacent to some platforms, and changes to pedestrian crossing locations and/or traffic signal coordination, would potentially result in a higher risk of pedestrians not complying with the pedestrian signals, crossing away from traffic signals (mid-block) or crossing directly between the platform and the footpath.</i></p> <p><i>The detailed design phase would investigate urban design opportunities to minimise mid-block crossings together with appropriate educational campaigns (as identified in section 10.10 of the CSELR Project EIS (Volume 1A) (Transport for NSW, 2013)) would be implemented to encourage higher levels of compliance and safety across the corridor, in addition to the provision of appropriate warning signage.</i></p>	<p>UNSW's 2014 campus surveys indicate that 60.1% of all staff and students use public transport to access the campus, an 10.6% increase since 2007. This, coupled with an increase in campus population of 41% during the same period, indicates the significant role that the light rail will provide for access to the campus. It is predicated that approximately 49% of UNSW staff and students will use the light rail.</p> <p>UNSW has significant concerns that TfNSW has not addressed the issue of how passengers will get on to and off each of the stops. There is no mention how a 55% increase in passenger capacity on each LRV will impact the ramps and crossing points. The second crossing at the north end of the Anzac Parade stop is considered essential to cater for the increased passenger flows.</p> <p>All previous advice from TfNSW has been that the stops have been designed to cater for 'one load' of a LRV to board or alight. TfNSW propose to cater for the increased length of the LRV by lengthening the stops 'proportionally' (e.g. increasing from 45m to, presumably, approximately 67m.</p> <p>UNSW has significant concerns that TfNSW has not addressed the issue of how passengers will get on to and off each of the stops. There is no mention how a 55% increase in passenger capacity on each LRV will impact the ramps and crossing points. At Anzac Parade, it is highly unlikely that 466 passengers would be able to cross Anzac Parade during the 30 seconds 'walk' phase (every 110 seconds) at the Pedestrian Operated Signals. This lack of capacity will encourage pedestrians to cross against the signals or to cross at unsignalised locations. Alternatively, Anzac Parade traffic may need to be stopped for longer periods of time to allow pedestrians to clear the platform. This would also increase delays to the LRV.</p> <p>This increase in capacity makes it imperative that the second signalised crossing point (at College Walk/NIDA) is provided. TfNSW plans indicate these signals 'subject to further discussion with RMS'.</p> <p>In addition, UNSW now has available the results of the 2014 Travel Survey for the campus. The results of the 2014 Travel Survey, and the analysis of the potential passenger numbers at each of the stops, is presented in Appendix ### and summarised below.</p> <p>The key findings from the 2014 surveys are:</p> <ul style="list-style-type: none">■ In 2014, a majority of the respondents (60.1%) travelled by public transport, a 10.6% increase since 2007 when this method of travel was used by only 49% of staff and students.■ When the percentages were applied to the average daily campus population the results demonstrated an increase from 14,450 daily public transport users in 2007 to 26,000 in 2014.■ The average daily campus population has increased by 41% since 2007 to 41,800 in 2014. <p>Figure 1. Travel Trends 2007-2014 (Percentage of Respondents)</p> <p>Figure 2. Travel Trends Extrapolated to Campus Population 2007-2014 (Staff and Students on a Typical Semester Day)</p>
			THIRD RAIL	

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	65	3.9 Third rail wire-free infrastructure within the CBD	<p>The Modifications Report states that third rail wire-free infrastructure will be provided within the CBD. There is no mention of if this infrastructure could be used in other sensitive areas such as High Street past UNSW.</p> <p>The Modifications Report states:</p> <p><i>The modified design would continue to require a transition between the OHWs and the APS at the Town Hall stop. At Town Hall, overlap of the OHW and APS would facilitate a transition from one system to the other. Transition between the below vehicle (APS) to above vehicle (OHW) power supply would occur within the Town Hall stop (as would have occurred as part of the approved project) where a stationary LRV would simultaneously lower the roof pantograph (connection between the LRV and OHW) and the underfloor connection point to the ground level power supply system (or reversing this procedure for outbound LRVs connecting to the OHW system).</i></p>	<p>It is understood that a ground level power supply system, Alstom’s Aesthetic Power Solution (APS) will be used within the CBD.</p> <p>It is understood that the APS also provides a lower EMI outcome than traditional power supplies. To minimise the impacts on sensitive environments along High Street, UNSW requests further investigation of the use of third rail wire-free infrastructure.</p>																																													
			NOISE / EMI																																														
	34	3.6.3 Change in impact	<p>The Modifications Report states:</p>  <p>Figure 3.9 Noise level profile for 45 metre and 67 metre LRVs</p>	<p>Figure 3.9 indicates that the longer LRVs will increase the duration of the maximum noise level.</p> <p>The Modifications Report does not provide any detail of the expected increased Electromagnetic Interference (EMI) and vibration impacts.</p> <p>There are many sensitive environments at UNSW that will be affected by EMI and vibration. As stated in our previous submission:</p> <p><i>Sensitive environments at UNSW include but are not limited to:</i></p> <ul style="list-style-type: none"> Current and future research spaces, such as the Lowy Cancer Research Centre and Wallace Wurth Building (which front High Street), the Tyree Energy Technologies Building which fronts Anzac Parade, the Mark Wainwright Analytical Centre, the Newton Building and Old Main Building and research development sites such as the Materials Science and Engineering Building Stages 1 and 2 and the Biosciences Renewal Project Stages 1 and 2; Teaching and performance spaces in vicinity of the proposed stops and construction compound; Student accommodation along both Anzac Parade and High Street; Teaching and performance spaces at NIDA at Anzac Parade (and adjacent to the proposed construction compound location); and Other UNSW environments in the vicinity of the proposed stops. 																																													
	38	3.6.3 Change in impact	<p>The Modifications Report states:</p> <p>Table 3.4 Comparison of the previously assessed and potential additional noise exceedances for each Noise Catchment Area</p> <table border="1"> <thead> <tr> <th>Area</th><th>Area description</th><th>Potential number of exceedances (approved project)</th><th>Potential number of exceedances (proposed modification)</th><th>Type of receptor impacted (number of receptors impacted)^a</th></tr> </thead> <tbody> <tr> <td>NCA04.1</td><td>Kensington between Alison Road and Todman Avenue</td><td>1</td><td>11</td><td>Separate dwelling (4) Semi-detached (5) Unit (3) Mixed use (2) Commercial (1)</td></tr> <tr> <td>NCA04.2</td><td>Kensington from Todman Avenue to beyond University of New South Wales (UNSW)</td><td>1</td><td>22</td><td>Separate dwelling (1) Unit (13) Mixed use (17) Commercial (13)</td></tr> <tr> <td>NCA04.3</td><td>Kingsford from Strachan Street to the terminus</td><td>0</td><td>2</td><td>Mixed use (4)</td></tr> <tr> <td>NCA05.1</td><td>Alison Road to Doncaster Avenue</td><td>0</td><td>1</td><td>Unit (1)</td></tr> <tr> <td>NCA05.2</td><td>Doncaster Avenue and Royal Randwick Racecourse</td><td>0</td><td>0</td><td>No change</td></tr> <tr> <td>NCA05.3</td><td>Alison Road and Wansey Road to High Street and UNSW</td><td>0</td><td>23</td><td>Separate dwelling (17) Unit (5) Commercial (1)</td></tr> <tr> <td>NCA05.4</td><td>Randwick High Street to Randwick hospital precinct and terminus</td><td>3</td><td>23</td><td>Separate dwelling (2) Unit (15) Commercial (5)</td></tr> <tr> <td>Total</td><td></td><td>15</td><td>101</td><td></td></tr> </tbody> </table>	Area	Area description	Potential number of exceedances (approved project)	Potential number of exceedances (proposed modification)	Type of receptor impacted (number of receptors impacted) ^a	NCA04.1	Kensington between Alison Road and Todman Avenue	1	11	Separate dwelling (4) Semi-detached (5) Unit (3) Mixed use (2) Commercial (1)	NCA04.2	Kensington from Todman Avenue to beyond University of New South Wales (UNSW)	1	22	Separate dwelling (1) Unit (13) Mixed use (17) Commercial (13)	NCA04.3	Kingsford from Strachan Street to the terminus	0	2	Mixed use (4)	NCA05.1	Alison Road to Doncaster Avenue	0	1	Unit (1)	NCA05.2	Doncaster Avenue and Royal Randwick Racecourse	0	0	No change	NCA05.3	Alison Road and Wansey Road to High Street and UNSW	0	23	Separate dwelling (17) Unit (5) Commercial (1)	NCA05.4	Randwick High Street to Randwick hospital precinct and terminus	3	23	Separate dwelling (2) Unit (15) Commercial (5)	Total		15	101		<p>Table 3.4 indicates a significant increase in the number of exceedances in the Kensington and Randwick area. UNSW is concerned that the table and associated figures do not present the full impact of the increase in additional noise exceedances.</p> <p>On the associated figures, ‘the potential number of exceedances is represented by ‘blocks’ of receptors and not individual dwellings within blocks or buildings’. This method of presentation significantly under-represents the potential impact on UNSW’s high density residential buildings.</p>
Area	Area description	Potential number of exceedances (approved project)	Potential number of exceedances (proposed modification)	Type of receptor impacted (number of receptors impacted) ^a																																													
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	42	3.6.3 Change in impact	<p>Figure 3.17 shows:</p> 	<p>Figure 3.17 does not identify several UNSW residential properties along Anzac Parade that are the same distance from the light rail alignment as other identified properties e.g. New College on the east side of Anzac Parade south of Day Street.</p>																																													
	43	3.6.3 Change in impact	<p>Figure 3.18 shows:</p> 	<p>The UNSW High Street stop is shown (incorrectly?) on Wansey Road. It is understood that the stop had been relocated to High Street.</p> <p>It is unclear if the modelled noise impact are based on the stop in High Street or in Wansey Road.</p>																																													

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	33	3.6.3 Change in impact	<p>The Modifications Report states:</p> <p>Table 3.3 Extent of proposed tree removal as a result of the proposed modification to stop lengths</p> <table><tr><th>Stop</th><th>Approximate number of trees removed as part of approved stop design</th><th>Approximate number of trees removed as part of modified platform design</th><th>Change in tree impacts as a result of increase stop length</th></tr><tr><td>Circular Quay</td><td>9</td><td>9</td><td>No change</td></tr><tr><td>Grosvenor</td><td>3</td><td>0</td><td>Reduction due to platform reconfiguration. Refer to section 3.3</td></tr><tr><td>Wynyard</td><td>0</td><td>0</td><td>No change</td></tr><tr><td>Queen Victoria Building</td><td>0</td><td>0</td><td>No change</td></tr><tr><td>Town Hall</td><td>0</td><td>0</td><td>No change</td></tr><tr><td>World Square</td><td>14</td><td>0</td><td>Note. Stop removed. Refer to section 3.4</td></tr><tr><td>Chinatown</td><td>0</td><td>0</td><td>No change</td></tr><tr><td>Rawson Place</td><td>4</td><td>4</td><td>No change</td></tr><tr><td>Central Station</td><td>12</td><td>12</td><td>No change</td></tr><tr><td>Surry Hills</td><td>15</td><td>16</td><td>Increased impact by approximately 1 tree</td></tr><tr><td>Moore Park</td><td>3 + 10 relocated</td><td>3 + 10 relocated</td><td>No change</td></tr><tr><td>Royal Randwick Racecourse</td><td>7</td><td>10</td><td>Increased impact by approximately 3 trees</td></tr><tr><td>Wansey Road</td><td>6</td><td>6</td><td>No change</td></tr><tr><td>UNSW High Street</td><td>12</td><td>12</td><td>No change</td></tr><tr><td>Randwick</td><td>18</td><td>18</td><td>No change</td></tr><tr><td>Carlton Street</td><td>8</td><td>8</td><td>No change</td></tr><tr><td>Todman Avenue</td><td>7</td><td>7</td><td>No change</td></tr><tr><td>UNSW Anzac Parade</td><td>2</td><td>2</td><td>No change</td></tr><tr><td>Strachan Street</td><td>0</td><td>0</td><td>No change</td></tr><tr><td>Kingsford</td><td>8</td><td>8</td><td>No change</td></tr><tr><td>TOTAL</td><td>128 + 10 relocated</td><td>115 + 10 relocated</td><td>Reduced impact by approximately 13 trees as a result of changes to approved stops</td></tr></table> <p>Note 1: Final number of trees removed subject to detailed design. Note 2: Tree impacts have been calculated based on stop platform length impacts and subsequent track alignment only (except for Grosvenor Street stop and World Square stop). Impacts from other design modifications have been noted where relevant within this report.</p>	Stop	Approximate number of trees removed as part of approved stop design	Approximate number of trees removed as part of modified platform design	Change in tree impacts as a result of increase stop length	Circular Quay	9	9	No change	Grosvenor	3	0	Reduction due to platform reconfiguration. Refer to section 3.3	Wynyard	0	0	No change	Queen Victoria Building	0	0	No change	Town Hall	0	0	No change	World Square	14	0	Note. Stop removed. Refer to section 3.4	Chinatown	0	0	No change	Rawson Place	4	4	No change	Central Station	12	12	No change	Surry Hills	15	16	Increased impact by approximately 1 tree	Moore Park	3 + 10 relocated	3 + 10 relocated	No change	Royal Randwick Racecourse	7	10	Increased impact by approximately 3 trees	Wansey Road	6	6	No change	UNSW High Street	12	12	No change	Randwick	18	18	No change	Carlton Street	8	8	No change	Todman Avenue	7	7	No change	UNSW Anzac Parade	2	2	No change	Strachan Street	0	0	No change	Kingsford	8	8	No change	TOTAL	128 + 10 relocated	115 + 10 relocated	Reduced impact by approximately 13 trees as a result of changes to approved stops	<p>There are a number trees being removed along High Street and Anzac Parade at UNSW. It is acknowledged that the final number of trees removed is subject to the detailed design. However, it is considered that there are some other opportunities to retain existing trees that should be further considered at the above stops:</p> <ul style="list-style-type: none">Third wire infstructure (to remove need for overhead wires and poles).Pedestrianisation of High Street to minimse road widening.
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	32	3.6.3 Change in impact	<p>The Modifications Report states:</p> <p>The extended LRVs would also result in a minor visual impact at each of the terminus stops (Circular Quay stop, Randwick stop and Kingsford stop) due to the longer LRVs presenting a slightly larger visual mass whilst stationary at this location and whilst staff change shifts. However this would not substantially alter the previous assessment presented in the CSELR Project EIS (Volume 1B) (Transport for NSW, 2013). However, while the longer vehicles would be more visible, they would operate less frequently during peak periods, offsetting this impact.</p>	<p>The extended LRV’s will create a minor visual impact at each stop not just the terminus stops.</p>																																																																																								
	66	3.9.2 Description of the modified design	<p>The Modifications Report states:</p> <p>This type of power supply represents proven technology and has been installed in a number of light rail systems within Europe, including Bordeaux and Nice, in order to minimise visual impacts and preserve the appearance of the historic cities. In addition to the aesthetic benefits, APS is also considered to be one of the most available transmission power supply technologies, reducing the impacts of poor weather on system performance and providing light rail customers with greater reliability.</p>	<p>It is considered that Anzac Parade at University Mall and High Street at Wansey Road are stops of significant importance and any visual impacts should be minimised.</p> <p>UNSW considers that the use of the third rail infrastructure at these locations will provide a significant aesthetic benefit that will complement the importance of these locations.</p>																																																																																								
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	97	4.4 Operation	<p>The Modifications Report states:</p> <p>Table 4.3 Revised environmental management measures for the CSELR proposal – operation</p> <table><tr><th>CSELR EIS ID</th><th>Environmental management measure – operational phase</th><th>Modification(s) to which the management measures would be applicable</th></tr><tr><td colspan="3">Traffic, transport and access</td></tr><tr><td>AH.6</td><td><p>The following intersections would be signalised as part of the CSELR to manage light rail conflicts with pedestrian and traffic movements:</p><ul style="list-style-type: none">Devonshire Street/Marlborough Street intersection.Devonshire Street/Bourke Street intersection.South Dowling Street southbound and northbound traffic lanes at the CSELR crossing point.Wansey Road/Alison Road intersection would be signalised (on all arms) to provide pedestrian access from the residential catchments in the north and east to the Wansey Road stop.High Street/Wansey Road intersection would be signalised to accommodate pedestrians and the light rail turning movements between Wansey Road and High Street. Pedestrian crossings would be provided across Wansey Road and the eastern arm of High Street as a minimum, which would replace the existing zebra crossing on High Street.High Street/Hospital Road intersection.High Street/Care Street intersection.The existing Nine Ways roundabout would be reconstructed and upgraded to incorporate traffic signals.</td><td><ul style="list-style-type: none">Realignment of light rail alignment along Alison Road (including the relocation of Royal Randwick Racecourse stop)</td></tr><tr><td>AH.23</td><td><p>The off-road shared pedestrian and cyclist path between Darley Road and Wansey Road would be reinstated between the proposed CSELR route and Royal Randwick racecourse.</p></td><td><ul style="list-style-type: none">Realignment of light rail alignment along Alison Road (including the relocation of Royal Randwick Racecourse stop)Increase to existing levee bank in Centennial Park</td></tr></table>	CSELR EIS ID	Environmental management measure – operational phase	Modification(s) to which the management measures would be applicable	Traffic, transport and access			AH.6	<p>The following intersections would be signalised as part of the CSELR to manage light rail conflicts with pedestrian and traffic movements:</p> <ul style="list-style-type: none">Devonshire Street/Marlborough Street intersection.Devonshire Street/Bourke Street intersection.South Dowling Street southbound and northbound traffic lanes at the CSELR crossing point.Wansey Road/Alison Road intersection would be signalised (on all arms) to provide pedestrian access from the residential catchments in the north and east to the Wansey Road stop.High Street/Wansey Road intersection would be signalised to accommodate pedestrians and the light rail turning movements between Wansey Road and High Street. Pedestrian crossings would be provided across Wansey Road and the eastern arm of High Street as a minimum, which would replace the existing zebra crossing on High Street.High Street/Hospital Road intersection.High Street/Care Street intersection.The existing Nine Ways roundabout would be reconstructed and upgraded to incorporate traffic signals.	<ul style="list-style-type: none">Realignment of light rail alignment along Alison Road (including the relocation of Royal Randwick Racecourse stop)	AH.23	<p>The off-road shared pedestrian and cyclist path between Darley Road and Wansey Road would be reinstated between the proposed CSELR route and Royal Randwick racecourse.</p>	<ul style="list-style-type: none">Realignment of light rail alignment along Alison Road (including the relocation of Royal Randwick Racecourse stop)Increase to existing levee bank in Centennial Park	<p>Under AH.6, traffic signals are not proposed at the intersection of Arthur Street / Botany Street. UNSW considers that these signals are an important part of the project to facilitate access around the one way section of Wansey Road and the High Street stop.</p> <p>Under AH.23, it is mentioned that the shared path will be reinstated on the ‘outside’ of the tracks (adjacent to Randwick Racecourse). However, on Wansey Road, the shared path is proposed between Wansey Road and the tracks. This creates a significant safety issue at the Wansey Road / High Street intersection. UNSW considers that the safer location for the shared path on Wansey Road is on the ‘outside’ of the tracks.</p>																																																																												
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Reference Document	Page	Section	Summary of Issues	UNSW Response
	n/a	n/a	At the meeting with TfNSW 17 November 2014, it was advised that Customer Service Attendants (37) would be included in the Project.	<p>There is no mention of Customer Service Attendants in the Modifications Report.</p> <p>UNSW is concerned that, based on previous discussions with TfNSW, Customer Service Attendants will be used at heavily patronised stops to marshal passengers. If Anzac Parade is considered, there are four potential locations to access the stop as well as other pedestrians wanting to cross the full width of Anzac Parade.</p>  <p>The independent Road Safety Audit undertaken of the proposed Anzac Parade stop (March 2014) states:</p> <p><i>It is understood that marshals may be employed to stop and control pedestrians on either side of Anzac Parade prior to crossing at the University Mall crossing in the event that the centre island platform is not large enough to cater for demand. While the use of marshals seems like a good idea in theory, compliance is likely to be poor. Marshalling is expected to be difficult when dealing with large numbers of pedestrians without physical barriers stopping and corralling pedestrians. Verbal messages and directions are likely to be unheeded, with most pedestrians likely to be aware of the lack of power available to the marshals, and be intent on boarding the next available light rail vehicle regardless of directions provided by a marshal. Passive control measures such as larger platforms and storage and waiting areas are obviously the best way to deal with peak demands. The provision of the centre island platform will help somewhat deal with the changing tidal flow demands (compared to other possible platform arrangement such as two side loading platforms).</i></p>
	69	3.10 Revised construction methodology for the tunnel under Anzac Parade	<p>The Modifications Report states that a ‘cut and cover’ technique will be used to construct the Anzac Parade tunnel, as shown in Figure 3.26 below.</p>  <p>Note: Indicative only, not to scale. Subject to detailed design.</p> <p>Figure 3.26 Proposed staging of the modified construction methodology for the Moore Park tunnel</p> <p>The Modifications Report states:</p> <p>Bus network impacts</p> <p><i>The modified construction methodology is not expected to have any additional impacts on the Moore Park busway. However, temporary bus stop relocations along Anzac Parade would be required as a result of the proposed lane deviations. Suitable alternate bus stops and associated facilities would be provided to mitigate any associated impacts. Construction activity at the Moore Park busway (the impacts of which are described in the CSELR Project EIS) would not commence until traffic diversions on Anzac Parade are complete, to reduce any associated impacts. Overall the duration of the impacts to the busway are expected to be reduced as a result of the modified construction method.</i></p>	<p>As the bus way is used by a significant number of buses that service UNSW, the impacts on the bus way during construction must be minimised.</p> <p>Additionally, some environments at the Kensington campus also have sensitive periods, such as exam, enrolment and census periods. Exams are typically held during the whole of June and whole of November and from 9am to 5pm throughout the day, enrolment periods are typically from mid-February to mid-March and mid-July to mid-August and census periods are generally from the beginning of April to mid-April and the beginning of September to mid-September.</p> <p>Summer exams also occur in early to mid-February, typically from 9am to 4pm.</p> <p>Further, student vacation periods’ acting as study time precedes each of the exam periods and are also considered sensitive periods.</p> <p>It is noted that many exams are held at Randwick Racecourse during the above times.</p>