



Reference: 12.060r06v02

20 November 2020

Orica Limited
C/- DBL Property
Level 6, 432 Kent Street
SYDNEY NSW 2000

Attention: Mr Jeff Lord, Director

**Re: Orica Southlands Lot 9 (SSD-9691) – Proposed Warehouse Development
28 McPherson Street, Banksmeadow
Response to Road Safety Audit**

Dear Jeff,

We refer to the State Significant Development Application (SSDA) relating to a proposed warehouse development at 28 McPherson Street, Banksmeadow. More specifically, a Road Safety Audit (RSA) has been requested to be undertaken by TfNSW as contained within TfNSW letter, dated 7 October 2020, which has been conducted by DC Traffic Engineering with the following objectives:

-) Identify potential road safety impacts of the proposed driveway access and its interface with McPherson Street; and
-) Identify potential road safety impacts associated with entry/exit conflicts and obstructions (landscaping and barriers) at the proposed driveway access.

Reference should be made to the RSA report included in **Attachment 1**. In summary, the RSA identified various items that are considered low, medium and high in priority. As such, TRAFFIX has responded to each item as contained in **Attachment 2** and now considers all items resolved with no further action required.

On the basis of the above, the proposed warehouse development at 28 McPherson Street, Banksmeadow are considered supportable on transport planning grounds. We trust the above is of assistance and please don't hesitate to contact the undersigned should you have any queries.

Yours faithfully,

Traffix

Vince Doan
Executive Engineer

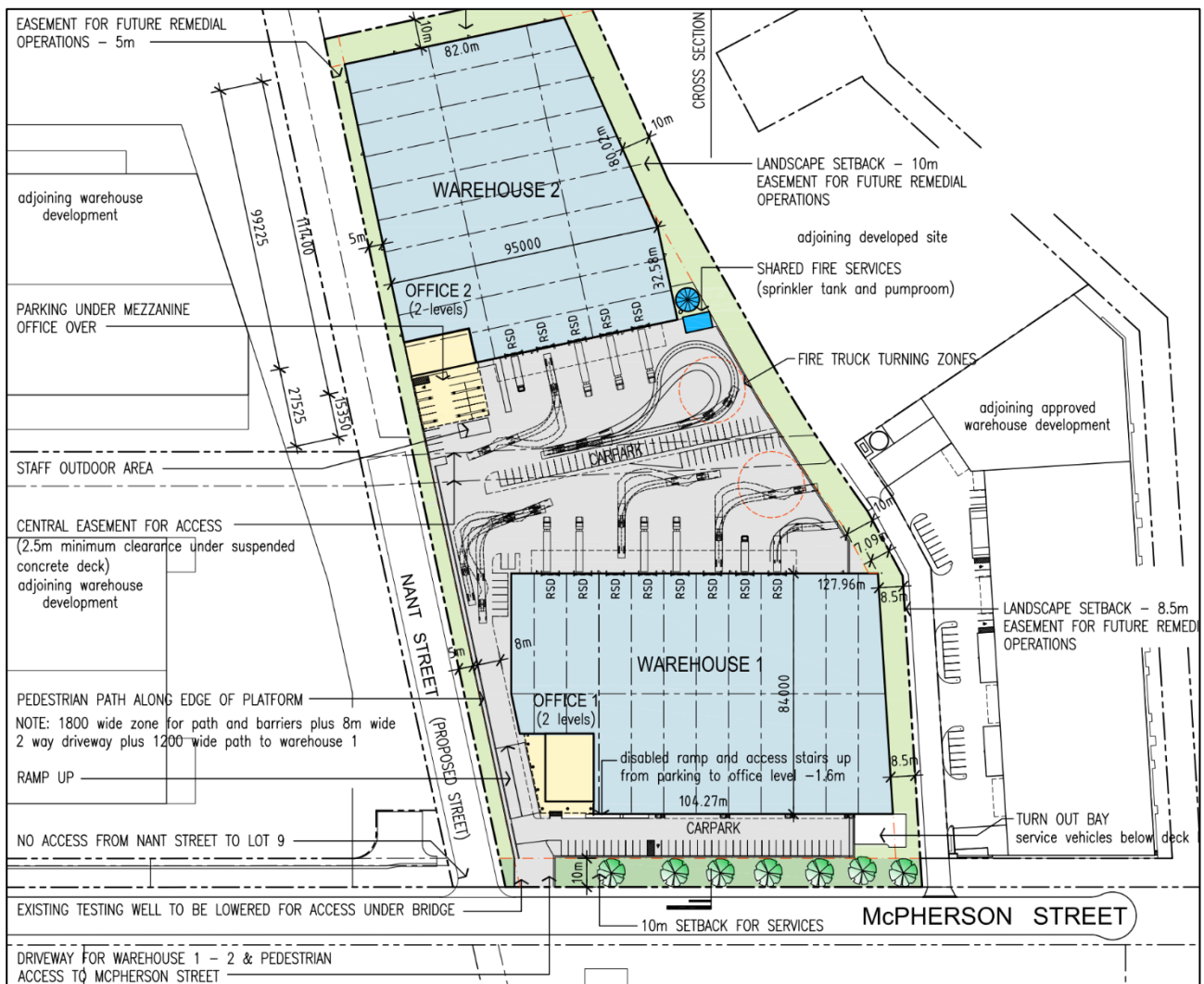
ATTACHMENT 1

Road Safety Audit

Traffic

28 McPherson Street, Banksmeadow

Concept design road safety audit



Traffix

28 McPherson Street, Banksmeadow

Concept design road safety audit

Authors

Damien Chee



Report No

TRF-PROJ-0027-01 CD RSA BANKSMEADOW REV 1

Date

2/11/2020

This report has been prepared for Traffix.



CONTENTS

1	Introduction	2
1.1	Project and audit details	2
1.2	Responding to the audit report	3
1.3	Previous audits	3
2	Safety audit findings	4
3	TfNSW comments	10
4	Concluding statement.....	11

Appendices

- Appendix A
Road Safety Audit Checklist

1 Introduction

1.1 Project and audit details

Details of the audit have been summarised in Table 1.

Table 1 Details of the road safety audit.

Audited project	Driveway access to proposed warehouse distribution and office development at 28 McPherson Street, Banksmeadow.
Client/contact	Vince Doan Executive Engineer Traffix Ph: (02) 8324 8700 / 0401 950 038 E: vince.doan@traffix.com.au
Audit type	<i>Concept design</i> road safety audit.
Purpose	A <i>concept design</i> road safety audit was required to assess the potential road safety risks with a proposed driveway to a future warehouse distribution and office facility at 28 McPherson Street, Banksmeadow. This was also required in response to a review comment by Transport for NSW (TfNSW).
Background	<p>Orica are planning to re-develop the site at 28 McPherson Street, Banksmeadow. The development includes two warehouses of approximate 10,000 square metre floor space/ area each with their own two-storey office building, and accompanying heavy vehicle loading docks and light vehicle car parking areas.</p> <p>The site will be accessed by a proposed driveway stemming off the northern side of McPherson Street to the immediate east of a right-of-way referenced as Nant Street. This site is situated to the west of the Botany Goods Railway Line. The site and its driveway are depicted on the front cover of this report.</p> <p>A road safety audit was requested by TfNSW of the proposed access. More specifically, TfNSW's comments are re-produced below:</p> <p><u>Comment</u> It is noted that:</p> <ul style="list-style-type: none"> • <i>There is a potential safety risk associated with entry/ exit conflicts and the landscaping or other barriers (vegetation is shown in the artist's impression) at the entrance adjoining Nant Street frontage with the restriction of visibility for vehicles entering and exiting the site.</i> • <i>The proposed site entrance/ exit is opposite the Toll driveway. However, the traffic modelling and swept path analysis infers that there is street parking opposite the entrance to the site.</i> <p><u>Recommendation</u> It is requested that the applicant undertakes a Road Safety Audit for the proposed Orica entry/ exit as part of the applicant's Response to the Submissions, in accordance with Austroads Guide to Road Safety Part 6: Managing Road Safety Audits and Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits by an independent TfNSW accredited road safety auditor. Based on the results of the road safety audit, the applicant shall review the design drawings and implement safety measures if required.</p>
Scope of project/ audit	<p>The following design plans were issued to the audit team and constitute the design concept of the development:</p> <ul style="list-style-type: none"> ▪ SK-A106 rev P2 – Site plan option 6 no access via Nant Street. ▪ TX.01 rev A – Swept path analysis McPherson Street vehicular access 19.0m articulated vehicle. ▪ TX.02 rev A – Swept path analysis McPherson Street vehicular access 26.0m B-double vehicle.

Audit team details	Damien Chee, level 3 (lead) road safety auditor - Registration number: RSA-02-0094. Linda Chee, level 2 road safety auditor –Registration number RSA-02-1069.
Audit methodology	The audit was undertaken using the following methodology: <ul style="list-style-type: none"> ▪ Site inspection for familiarisation on 31/10/2020. ▪ Review of the design plans on 2/11/2020. ▪ The road safety audit findings have been documented in this report in accordance with the NSW Centre for Road Safety's <i>Guidelines for Road Safety Audit Practices</i> (2011). ▪ This report includes completed <i>checklist 2 –concept design stage audit</i> as sourced from the Austroads <i>Guide to Road Safety Part 6A: Implementing Road Safety Audits</i>.
Material supplied	See <i>scope of audit</i> .
Meeting and assessment details	Site inspection carried out on 31/10/2020. Review of plans on 2/11/2020.

1.2 Responding to the audit report

Road safety audits provide the opportunity to highlight potential road safety problems and have them formally considered by the project manager in conjunction with all other project considerations.

The responsibility for the project rests with the project manager, not with the auditor. The project manager is under no obligation to accept the audit findings. Also, it is not the role of the auditor to agree to, or approve the project manager's responses to the audit.

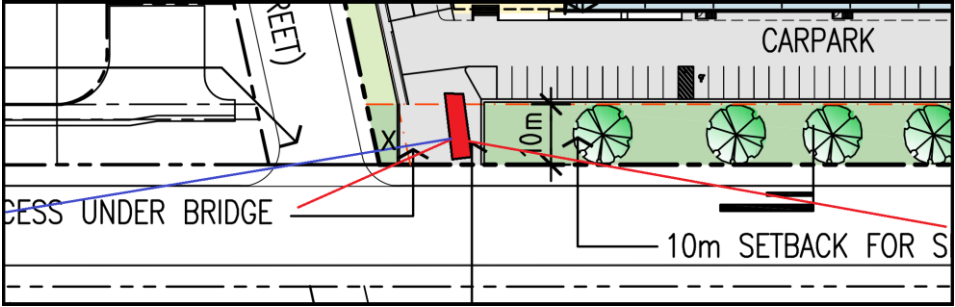
1.3 Previous audits

There were no previous road safety audit reports of direct relevance to this project that were issued to the audit team.


2 Safety audit findings

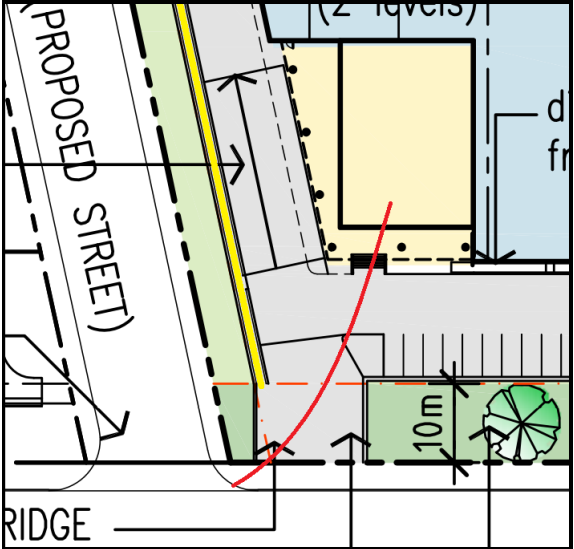
The road safety audit findings are detailed in Table 2.


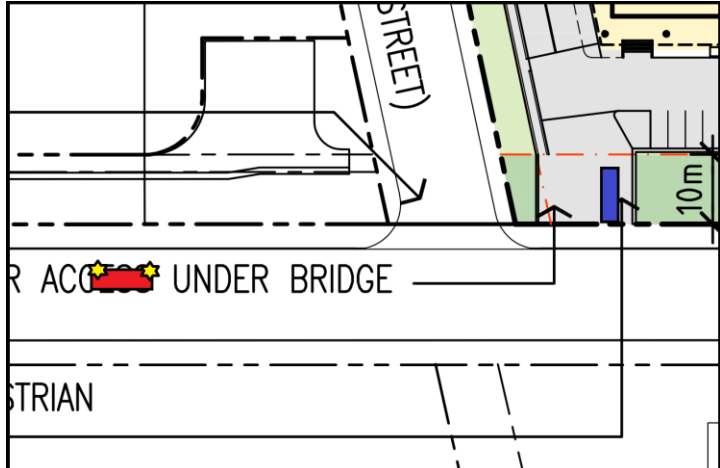
Table 2 Road safety audit findings

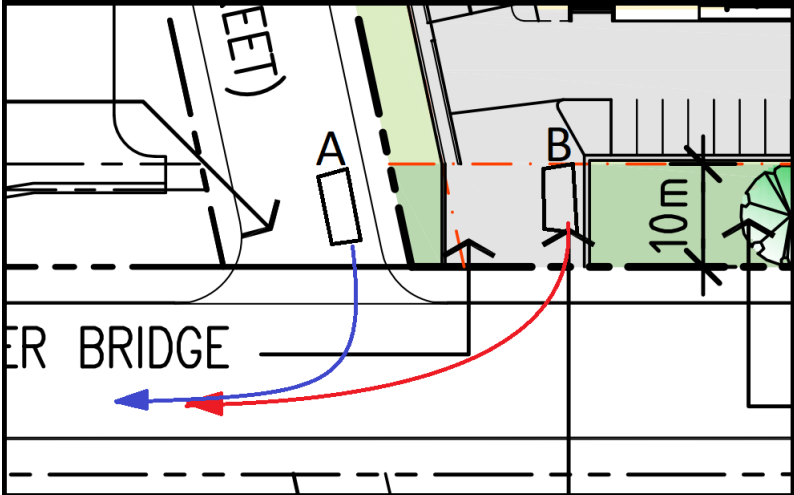
Ref	Location	Road safety audit findings	Priority
1a	Egress movements from the property driveway.	<p>The proposal includes a driveway which will stem off the northern side of McPherson Street. The design indicates that there would be landscaped areas on the northern verge of McPherson Street either side of the driveway. However, the vegetation type was not specified. There is a risk that if tall shrubs or trees are planted, these may obstruct the following sightlines to the driveway.</p> <ul style="list-style-type: none"> ▪ The <i>stopping sight distance</i> (SSD) from eastbound drivers on McPherson Street to the driveway. This is the sight distance needed for eastbound drivers to detect a potential hazard emerging from the driveway, to react and then brake to a full stop. Figure 3.2 of AS2890.1 indicates that for a 50km/h design speed, an SSD of 45m would be required. The SSD by westbound drivers (ie. by drivers on McPherson Street approaching the driveway from the east) is less critical since (i) this traffic stream would be further (laterally offset) from the northern kerblines and driveway of the road and hence less likely to be obstructed by landscaping and (ii) there would be substantially less traffic approaching the site from this side since it is a terminating road with a cul-de-sac. ▪ The <i>minimum gap sight distance</i> (MGSD) from egressing drivers in the driveway to the east and west. These are the sight lines needed by an egressing driver to view approaching traffic and detect and select safe gaps to turn out of the driveway. Figure 3.2 of AS2890.1 adopts a critical gap time of 5 seconds which equates to an MGSD of 69m at a 50km/h design speed. <p>These risks would be appropriately mitigated by keeping the landscaping in the northern verge, particularly along the sight lines discussed above, to low-height species only. This includes any support frames used during the establishment period.</p> <p><i>NB. The audit team notes the potentially sight-obstructing impacts due to parked cars, trucks and trailers on the northern kerblines. However, this was not raised as a formal audit finding since this is common practice along McPherson Street, and any such parked vehicles would also tend to have a speed-limiting effect compared with vacant kerblines. As such, whilst parked vehicles/ trailers may restrict sight lines, they also reduce demand for sightlines by virtue of the lowered traffic speeds.</i></p>  <p>Above: The egressing driver will need clear MGSD sight lines to detect and select safe gaps to enter McPherson Street. The red lines are used to illustrate the potential impact to the MGSD sight line if constrained by (i) tall vegetation planted in area X and (ii) if the trees to the west of the driveway are tall and sight-obstructing.</p>	High

Ref	Location	Road safety audit findings	Priority
1b	Egress movements from the property driveway.	<p>Further to item 1a, the egressing driver will also need to be aware of any pedestrians that may suddenly move into a crash conflict space. For example, a pedestrian at the Nant Street right-of way (labelled "ped" and circled in red) may emerge into the space of the egressing vehicle (blue rectangle) with risks of <i>vehicle-pedestrian</i> crashes. This is especially if the pedestrian is obscured by tall landscaping or boundary fencing. With respects to the latter, the right-hand image shows the extremely limited "see-through" visibility through this palisade fence used on the adjacent property to the west. The combined effect of the closely spaced balusters and the acute viewing angle towards and "through" the fence means that drivers would not have clear visibility to the area behind the fence. The same risk could arise with egressing drivers and pedestrians emerging from the sides of the driveway.</p> <p>Similarly, egressing drivers will need clear sight lines to any pedestrians at point "Y". This means this area should also be kept free of tall and sight-obstructing vegetation and the impact of any boundary fencing should also be considered.</p> <div data-bbox="521 501 1731 1011"> </div> <p>Left: Extract from the design showing the potential risks of vehicle-pedestrian crash risks if pedestrians emerge into a crash conflict space with the egressing driver without any warning or advanced expectation. Right: The palisade fences used along most properties along McPherson Street have limited "see-through" visibility due to the closely spaced balusters and the acute viewing angle.</p>	High

Ref	Location	Road safety audit findings	Priority
2	Spatial provisions for coinciding inbound and outbound traffic movements	<p>Swept path models were provided for 19.0m semi-trailers and 26.0m B-doubles. The inbound and outbound swept path models for semi-trailers are provided below in the left and right-hand images respectively. The left-hand image indicates that an inbound truck would occupy the entire width of the driveway due to the combined width footprint of the prime mover and the trailer. The model illustrates that if an outbound vehicle arrives at the gate at the same time, it would be required to stop well in advance of the gate and even steer slightly to the left to clear enough space for the inbound vehicle to pass through first. This is not considered a safe and sustainable access arrangement as it puts too much onus on the drivers to assess the situation well in advance and make preparatory movements to ensure that no blockages occur. In reality, the audit team envisages that blockages would occur, and even worse, that one or both trucks may be required to reverse to clear space for the other to pass through first. Any reversing movements would be undesirable due to the large number of blind spots on a reversing truck. There would also be risks of <i>head-on</i> collisions and nuisance impacts with gates, fences and barriers if either or both vehicles do not execute a perfect steering trajectory.</p> <p>The right-hand image shows a considerable swept path envelope for the egressing right-turning truck as well. The large spatial requirements confirm that these turning movements would not be able to coincide with an inbound left-turning truck.</p> <p>The swept path correctly acknowledges that there may be vehicles parked along either side of the road, as this behaviour was confirmed on site as well.</p>  <p>Left: Extract from the swept path model indicating that an inbound left-turning semi-trailer would occupy the entire width of the driveway when entering the property. Right: Similarly, there is a large swept path envelope for outbound right-turning semi-trailers.</p>	Medium

Ref	Location	Road safety audit findings	Priority
3	Pedestrian access and egress from the site.	<p>The design indicates that a 1.8m wide walkway will be provided on the western side of the driveway for pedestrian access (shaded in yellow in image below). However, the audit team notes the following general issues with respects to pedestrian safety:</p> <ul style="list-style-type: none"> As the office to Warehouse 1 is on the eastern (right-hand) side of the driveway, any pedestrian movements to this building from the street are more likely to be across the middle of the driveway as shown by the red line. This is due to the substantially shorter walking distance. This could create direct <i>vehicle-pedestrian</i> crash conflicts involving vehicles on the driveway and from the car park access aisle. The plans state that a 1800mm wide zone will be provided along the yellow line for a “path plus barriers”. It is not clear from the designs whether the barrier will be on the western side of the walkway or on its eastern side such that it forms a separation between the walkway and the driveway. Whilst the latter would ensure better protection for pedestrians against driveway traffic movements, it would only service pedestrian access needs to Warehouse 2. There does not appear to be any gaps in the barrier to access Warehouse 1. This would also force pedestrians to walk along the driveway if heading to Warehouse 1. <p>Pedestrian movements from the street to the buildings is conceivable with any parking of vehicles on the street or if workers leave the site for lunch and return etc.</p>  <p><i>Left: Pedestrian movements from the street to the building of Warehouse 1 via the driveway would be an attractive walk path due to the shorter distance.</i></p>	Medium

Ref	Location	Road safety audit findings	Priority
4a	The impact of Nant Street on safe operations of the property driveway.	<p>At the time of the inspection, Nant Street was not a publicly accessible road. In fact, it was gated and access-egress appeared to be restricted for authorised users only (see left-hand image). Notwithstanding this, the audit team recognises that this appears to be a formal right-of-way which may evolve into a publicly accessible road.</p> <p>The long-term function and access to Nant Street would strongly govern the safe performance of the proposed driveway at 28 McPherson Street. If Nant Street remains a restricted access road, then its impacts on the proposed property driveway would be relatively benign. However, if this side road attracts more frequent use, there could be significant impacts to the safe operations of the subject driveway. Some examples include:</p> <ul style="list-style-type: none"> ▪ If an egressing driver (blue vehicle in right-hand image) sees an eastbound vehicle (red) approaching with its left-turn indicator light activated, the driver of the blue car may falsely believe that the red vehicle will turn left into Nant Street. If this is actually an intended left-turn into the subject driveway, there could be more direct interaction between the two vehicles with corresponding crash risks. ▪ A similar risk would also apply to outbound drivers from Nant Street. If they see an eastbound vehicle with left-turn indicator lights activated, they may falsely believe that the vehicle will turn into Nant Street. They may therefore attempt a right-turn out of the site at the same time. However, if the eastbound left-turning vehicle is in fact heading to the subject driveway at 28 McPherson Street, this could result in a <i>cross-traffic</i> crash between the two vehicles. <p>Continued over the page...</p> <div style="display: flex; justify-content: space-around;">   </div> <p>Left: During the site inspection, Nant Street appeared to be a right-of-way for vehicular traffic. However, this was closed off to public traffic and gated. The long-term function and access of this road was not known. Right: A situation where an egressing driver from the subject driveway sees an eastbound vehicle with its left-turn indicator lights activated and falsely believes that this is an intended left-turn to Nant Street.</p>	Low (much of this is uncertain based on the unknown long-term function of Nant Street)

Ref	Location	Road safety audit findings	Priority
4b	The impact of Nant Street on safe operations of the property driveway.	<p>Continued from previous page...</p> <ul style="list-style-type: none"> ▪ If Nant Street is frequently used as an access-egress point, there could also be a conflict between coinciding left-turns from this right-of-way (vehicle A) and the subject driveway (vehicle B). This is particularly because both vehicles would tend to move into McPherson Street under similar gap-opportunities. That is, if there are coinciding gaps in the eastbound and westbound traffic directions of McPherson Street and both vehicles A and B decide to make a right-turn at the same time, this could create a crash conflict between the two vehicles. ▪ Further to the previous point there is also a cross over crash conflict if vehicle A decides to turn right and vehicle B decides to turn left. However, this is less critical since an egressing left-turn movement would be relatively rare due to the terminating nature of McPherson Street and its cul-de-sac to the east.  <p>The diagram illustrates a road intersection. A horizontal road labeled 'ER BRIDGE' runs across the bottom. A vertical road, 'Nant Street', intersects it from the top. A driveway, labeled '10m', branches off from the vertical road to the right. Vehicle A is shown on the vertical road, with a blue arrow indicating a left-turn movement into the horizontal road. Vehicle B is shown on the driveway, with a red arrow indicating a right-turn movement into the horizontal road. The text 'Left: The risk of coinciding left-turns if Nant Street becomes a frequently used side road.' is positioned to the right of the diagram.</p>	Low (much of this is uncertain based on the unknown long-term function of Nant Street)

3 TfNSW comments

This section provides commentary on the TfNSW concerns stated in Table 1. These are outlined in Table 3 along with the audit team’s comments.

Table 3 Commentary on TfNSW's concerns

TfNSW concerns	Audit team’s comments
<p>There is a potential safety risk associated with entry/ exit conflicts and the landscaping or other barriers (vegetation is shown in the artist’s impression) at the entrance adjoining Nant Street frontage with the restriction of visibility for vehicles entering and exiting the site.</p>	<p>Items 1a and 1b of Table 2 discussed the potential safety issues associated with restricted driver sight lines to and from the subject driveway if the adjacent landscaping is tall and sight-obstructing.</p> <p>Item 2 of Table 2 discussed the large spatial footprints of left-turning inbound trucks, and right-turning outbound trucks. There are spatial conflicts evident in the swept path model.</p> <p>Items 4a and 4b discuss potential safety issues if the Nant Street right-of-way (which currently appears to be a low-volume and gated, private road), becomes a higher volume and publicly accessible road.</p>
<p>The proposed site entrance/ exit is opposite the Toll driveway. However, the traffic modelling and swept path analysis infers that there is street parking opposite the entrance to the site.</p>	<p>This has not affected the audit. The audit team were mindful of all pre-existing driveways and side roads. These were considered in the context of them continuing to operate in their current functions along with the proposed driveway at 28 McPherson Street. Furthermore, as detailed in items 4a and 4b of Table 2, the audit team also considered the potential safety impacts if Nant Street evolves into a higher volume publicly accessible road.</p> <p>Street parking was assumed to continue in the post-construction period.</p>

4 Concluding statement

DC Traffic Engineering has undertaken a *concept design* road safety audit of this project in accordance with the methodology outlined in Section 1 of this report.

Issues identified have been noted in this report for the Project Manager to review, assess, and where appropriate, make the necessary recommendations to improve safety.



Damien Chee
Audit Team Leader
DC Traffic Engineering Pty Ltd

Appendix A

Road Safety Audit Checklist

Issue	Comment
2.1 General topics	
1 Changes since previous audit <ul style="list-style-type: none"> ▪ Do the conditions for which the scheme was originally designed still apply? (eg. no changes to the surrounding network, area activities or traffic mix) ▪ Has the general form of the project design remained unchanged since previous audit (if any)? 	No previous audit reports issued.
2 Drainage <ul style="list-style-type: none"> ▪ Will the scheme drain adequately? ▪ Has the possibility of surface flooding been adequately addressed, including overflow from surrounding or intersecting drains and water courses? 	Drainage plans not issued.
3 Climatic conditions <ul style="list-style-type: none"> ▪ Has consideration been given to weather records or local experience which may indicate a particular problem? (eg. snow, ice, wind, fog). 	Yes.
4 Landscaping <ul style="list-style-type: none"> ▪ If any landscaping proposals are available, are they compatible with safety requirements (eg. sight lines and hazards in clear zones)? 	Issues raised with potentially sight-obstructing vegetation.
5 Services <ul style="list-style-type: none"> ▪ Does the design adequately deal with buried and overhead services (especially in regard to overhead clearances, etc)? ▪ Has the location of fixed objects or furniture associated with services been checked, including the position of poles? 	Yes.
6 Access to property and developments <ul style="list-style-type: none"> ▪ Can all accesses be used safely? (entry and exit/merging). ▪ Is the design free of any downstream or upstream effects from accesses, particularly near intersections? ▪ Have rest areas and truck parking accesses been checked for adequate sight distance, etc.? 	All issues were with respects to the proposed property access.
7 Adjacent developments <ul style="list-style-type: none"> ▪ Does the design handle accesses to major adjacent generators of traffic and developments safely? ▪ Is the drivers' perception of the road ahead free of misleading effects of any lighting or traffic signals on an adjacent road? 	Coinciding inbound and outbound truck movements are not possible.
8 Emergency vehicles and access <ul style="list-style-type: none"> ▪ Has provision been made for safe access and movements by emergency vehicles? ▪ Does the design and positioning of medians and vehicle barriers allow emergency vehicles to stop & turn without unnecessarily disrupting traffic? 	Yes.

Issue	Comment
<p>9 Future widening and/or realignments</p> <ul style="list-style-type: none"> ▪ If the scheme is only a stage towards a wider or dual carriageway is the design adequate to impart this message to drivers? (Is the reliance on signs minimal/appropriate, rather than excessive?) ▪ Is the transition between single and dual carriageway (either way) handled safely? 	Unknown.
<p>10 Staging of the scheme</p> <ul style="list-style-type: none"> ▪ If the scheme is to be staged or constructed at different times: <ul style="list-style-type: none"> ▪ Are the construction plans and program arranged to ensure maximum safety? ▪ Do the construction plans and program include specific safety measures, signing; adequate transitional geometry; etc. for any temporary arrangements? 	The long-term function and access of Nant Street is unknown.
<p>11 Staging of the works</p> <ul style="list-style-type: none"> ▪ If the construction is to be split into several contracts, are they arranged safely? 	Unknown.
<p>12 Maintenance</p> <ul style="list-style-type: none"> ▪ Can maintenance vehicles be safely located? 	Yes.
<p>2.2 Design issues (general)</p>	
<p>1 Design standards</p> <ul style="list-style-type: none"> ▪ Is the design speed and speed limit appropriate (eg. consider the terrain; function of the road)? ▪ Has the appropriate design vehicle and check vehicle been used? 	Yes.
<p>2 Typical cross sections</p> <ul style="list-style-type: none"> ▪ Are lane widths, shoulders, medians and other cross section features adequate for the function of the road? ▪ Is the width of traffic lanes and carriageway suitable in relation to: <ul style="list-style-type: none"> ▪ Alignment? ▪ Traffic volume? ▪ Vehicle dimensions? ▪ The speed environment? ▪ Combinations of speed and traffic volume? ▪ Are overtaking/climbing lanes provided if needed? ▪ Have adequate clear zones been achieved? 	The driveway does not facilitate coinciding inbound and outbound truck movements.

Issue	Comment
<p>3 The effect of cross sectional variation</p> <ul style="list-style-type: none"> ▪ Is the design free of undesirable variations in cross section design? ▪ Are crossfalls safe? (particularly where sections of existing highway have been utilised or there have been compromises to accommodate accesses, etc.) ▪ Does the cross section avoid unsafe compromises such as narrowings at bridge approaches or past physical features? 	See previous item.
<p>4 Roadway layout</p> <ul style="list-style-type: none"> ▪ Are all traffic management features designed so as to avoid creating unsafe conditions? ▪ Is the layout of road markings and reflective materials able to deal satisfactorily with changes in alignment? (particularly where the alignment may be substandard.) 	Yes.
<p>5 Shoulders and edge treatment</p> <ul style="list-style-type: none"> ▪ Are the following safety aspects of shoulder provision satisfactory: ▪ Provision of sealed or unsealed shoulders? ▪ Width and treatment on embankments? ▪ Cross fall of shoulders? ▪ Are the shoulders likely to be safe if used by slow moving vehicles or cyclists? ▪ Are any rest areas and truck parking areas safely designed? 	NA.
<p>6 Effect of departures from standards or guidelines</p> <ul style="list-style-type: none"> ▪ Any approved departures from standards or guidelines: is safety maintained? ▪ Any hitherto undetected departures from standards: is safety maintained? 	Yes.
<p>2.3 Alignment details</p>	
<p>1 Geometry of horizontal and vertical alignment</p> <ul style="list-style-type: none"> ▪ Does the horizontal and vertical design fit together correctly? ▪ Is the design free of visual cues that would cause a driver to misread the road characteristics (eg. visual illusions, subliminal delineation such as lines of trees, poles, etc.)? ▪ Does the alignment provide for speed consistency? 	Insufficient space for coinciding inbound-outbound movements.

Issue	Comment
<p>2 Visibility; sight distance</p> <ul style="list-style-type: none"> ▪ Are horizontal and vertical alignments consistent with the visibility requirements? ▪ Will the design be free of sight line obstructions due to: <ul style="list-style-type: none"> ▪ Safety fences or barriers? ▪ Boundary fences? ▪ Street furniture? ▪ Parking facilities? ▪ Signs? ▪ Landscaping? ▪ Bridge abutments? ▪ Parked vehicles in laybys or at the kerb? ▪ Queued traffic? ▪ Are railway crossings, bridges and other hazards all conspicuous? ▪ Is the design free of any other local features which may affect visibility? 	<p>Risks identified if tall and sight-obstructing vegetation is planted. Potential sightline obstructions due to boundary fences also discussed.</p>
<p>3 New/existing road interface</p> <ul style="list-style-type: none"> ▪ Does the interface occur well away from any hazard? (eg. a crest, a bend, a roadside hazard or where poor visibility/distractions may occur.) ▪ If carriageway standards differ, is the change effected safely? ▪ Is the transition where the road environment changes (eg. urban to rural; restricted to unrestricted; lit to unlit) Is it done safely? ▪ Has the need for advance warning been considered? 	<p>Yes.</p>
<p>4 'Readability' of the alignment by drivers</p> <ul style="list-style-type: none"> ▪ Will the general layout, function and broad features be recognised by drivers in sufficient time? ▪ Will approach speeds be suitable and can drivers correctly track through the scheme? 	<p>Yes.</p>
<p>2.4 Intersections</p>	

Issue	Comment
<p>1 Visibility to and visibility at intersections</p> <ul style="list-style-type: none"> ▪ Are horizontal and vertical alignments at the intersection or on the approaches to the intersection consistent with the visibility requirements? ▪ Will drivers be aware of the presence of the intersection (especially on the minor road approach)? ▪ Will the design be free of sight line obstructions due to: <ul style="list-style-type: none"> ▪ Safety fences or barriers? ▪ Boundary fences? ▪ Street furniture? ▪ Parking facilities? ▪ Signs? ▪ Landscaping? ▪ Bridge abutments? ▪ Are railway crossings, bridges and other hazards near intersections conspicuous? ▪ Will the design be free of any local features which adversely affect visibility? ▪ Will intersection sight lines be obstructed by permanent or temporary features such as parked vehicles in laybys, or by parked or queued traffic generally? 	<p>Potential sight line obstructions discussed.</p>
<p>2 Layout, including the appropriateness of type</p> <ul style="list-style-type: none"> ▪ Is the type of intersection selected (cross roads, T, roundabout, signalised, etc.) appropriate for the function of the two roads? ▪ Are the proposed controls (Give Way, Stop, Signals, etc.) appropriate for the particular intersection? ▪ Are junction sizes appropriate for all vehicle movements? ▪ Are the intersections free of any unusual features which could affect road safety? ▪ Are the lane widths and swept paths adequate for all vehicles? ▪ Is the design free of any upstream or downstream geometric features which could affect safety? (eg. merging of lanes.) ▪ Are the approach speeds consistent with the intersection design? ▪ Where a roundabout is proposed: <ul style="list-style-type: none"> ▪ Have pedal cycle movements been considered? ▪ Have pedestrian movements been considered? ▪ Are details regarding the circulating carriageway sufficient? 	<p>A major factor would be the co-operation of this driveway with Nant Street should Nant Street become a more frequently used and publicly accessible side road.</p>

Issue	Comment
<p>3 Readability by drivers</p> <ul style="list-style-type: none"> ▪ Will the general type, function and broad features be perceived correctly by drivers? ▪ Are the approach speeds and likely positions of vehicles as they track through the scheme safe? ▪ Is the design free of sunrise or sunset problems which may create a hazard for motorists? 	<p>Yes.</p>
<p>2.5 Special road users</p>	
<p>1 Adjacent land</p> <ul style="list-style-type: none"> ▪ Will the scheme be free of adverse effects from adjacent activity and intensity of land use? (If not, what special measures are needed?) 	<p>Yes.</p>
<p>2 Pedestrians</p> <ul style="list-style-type: none"> ▪ Have pedestrian needs been satisfactorily considered? ▪ If footpaths are not specifically provided, is the road layout safe for use by pedestrians (particularly at blind corners or on bridges)? ▪ Are pedestrian subways or footbridges sited to provide maximum use? (i.e. Is the possibility of pedestrians crossing at grade in their vicinity minimised?) ▪ Has specific provision been made for pedestrian crossings, school crossings or pedestrian signals? ▪ Where present, are these facilities sited to provide maximum use with safety? ▪ Are pedestrian refuges/kerb extensions provided where needed? ▪ Has specific consideration been given to provision required for special groups (eg. young, elderly, disabled, deaf or blind)? 	<p><i>Vehicle-pedestrian conflicts in the driveway noted.</i></p>
<p>3 Cyclists</p> <ul style="list-style-type: none"> ▪ Have the needs of cyclists been satisfactorily considered, especially at intersections? ▪ Have cycle lanes been considered? ▪ Are all cycleways of standard or adequate design? ▪ Where a need for shared pedestrian/cycle facilities exists, have they been safely treated? ▪ Where cycleways terminate at intersections or adjacent to the carriageway, has the transition treatment been handled safely? ▪ Have any needs for special cycle facilities been satisfactorily considered? (eg. cycle signals) 	<p>Yes.</p>

Issue	Comment
<p>4 Motorcyclists</p> <ul style="list-style-type: none"> ▪ Has the location of devices or objects which might destabilise a motorcycle been avoided on the road surface? ▪ Will warning or delineation be adequate for motorcyclists? ▪ Has barrier kerb been avoided in high speed areas? ▪ In areas more likely to have motorcycles run off the road is the roadside forgiving or safely shielded? 	Yes.
<p>5 Equestrians and stock</p> <ul style="list-style-type: none"> ▪ Have the needs of equestrians been considered, including the use of verges or shoulders and rules regarding the use of the carriageway? ▪ Can underpass facilities be used by equestrians/stock? 	NA.
<p>6 Freight</p> <ul style="list-style-type: none"> ▪ Have the needs of truck drivers been considered, including turning radii and lane widths? 	Truck movements were considered as this is a warehouse development.
<p>7 Public transport</p> <ul style="list-style-type: none"> ▪ Has public transport been catered for? ▪ Have the needs of public transport users been considered? ▪ Have the manoeuvring needs of public transport vehicles been considered? ▪ Are bus stops well positioned for safety? 	NA.
<p>8 Road maintenance vehicles</p> <ul style="list-style-type: none"> ▪ Has provision been made for road maintenance vehicles to be used safely at the site? 	Considered along with truck access-egress.
<p>2.6 Signs and lighting</p>	
<p>1 Lighting</p> <ul style="list-style-type: none"> ▪ Is this project to be lit? Will safety be maintained if the project is not lit? ▪ Is the design free of features which make illuminating sections of the road difficult (eg. Shadow from trees or overbridges)? ▪ Has the question of siting of lighting poles been considered as part of the general concept of the scheme? ▪ Are frangible or slip-base poles to be provided? ▪ Are any special needs created by ambient lighting? Will safety be maintained if special treatments are not provided? ▪ Have the safety consequences of vehicles striking lighting poles (of any type) been considered? 	Lighting plans not issued.

Issue	Comment
<p>2 Signs</p> <ul style="list-style-type: none"> ▪ Are signs appropriate for their location? ▪ Are signs located where they can be seen and read in adequate time? ▪ Will signs be readily understood? ▪ Are signs located so that visibility to and from accesses and intersecting roads is maintained? ▪ Are signs appropriate to the driver's needs (eg. destination signs, advisory speed signs, etc.)? ▪ Have the safety consequences of vehicles striking sign posts been considered? ▪ Are signs located so that drivers' sight distance is maintained? ▪ Any signs to be located in the clear zone: are they frangible or adequately shielded by a crash barrier? 	<p>Signage plans not issued.</p>
<p>3 Marking and delineation</p> <ul style="list-style-type: none"> ▪ Has the appropriate standard of delineation and marking been adopted? ▪ Are the proposed markings consistent with the works in the adjoining section of the route? ▪ Are the previous/adjacent markings to be upgraded? If not, will safety be maintained? 	<p>Linemarking plans not issued.</p>
<p>2.7 Traffic management</p>	
<p>1 Traffic flow and access restrictions</p> <ul style="list-style-type: none"> ▪ Can traffic volumes from the proposed scheme be safely accommodated on existing sections of road? ▪ Has parking provision and parking control been adequately considered? ▪ Can any turn bans be implemented without causing problems at adjacent intersections? ▪ Has the effect of access to future developments been considered? ▪ Any traffic diverting to other roads (eg. to avoid a traffic control device): is safety maintained? 	<p>Two-way truck movements are not possible at the gate.</p>
<p>2 Overtaking and merges</p> <ul style="list-style-type: none"> ▪ Is overtaking sight distance and stopping distance adequate? ▪ Have suitable shoulder widths been provided at lane drop merges? ▪ Have standard signs and markings been provided for any lane drop? ▪ Has adequate sight distance been provided to any lane drop? ▪ Are shoulders wide enough opposite access points and intersections? 	<p>NA.</p>

Issue	Comment
<p>3 Rest areas and stopping zones</p> <p>Are there sufficient roadside stopping areas, rest areas and truck parking areas?</p> <p>Are any entries and exits to rest areas or truck parking areas safe?</p>	NA.
<p>4 Construction and operation</p> <ul style="list-style-type: none"> ▪ If the scheme is to be constructed "under traffic", can this be done so safely? ▪ Can the scheme be safely constructed? ▪ Have the maintenance requirements been adequately considered? ▪ Is safe access to and from the works available? 	Yes.
<p>2.8 Additional questions to be considered for development proposals</p>	Questions omitted as the internal areas of the land use development were not included in this audit.
<p>2.9 Any other matter</p>	
<p>1 Safety aspects not already covered</p> <ul style="list-style-type: none"> ▪ Will there be special events? Have any consequent unusual or hazardous conditions been considered? ▪ Is the road able to safely handle oversize vehicles, or large vehicles like trucks, buses, emergency vehicles, road maintenance vehicles? ▪ If required, can the road be closed for special events in a safe manner? ▪ If applicable, are special requirements of scenic or tourist routes satisfied? 	Within reason.

ATTACHMENT 2

TRAFFIX Response to RSA



Audit Reference Number(s)	Location	TRAFFIX Response
Item 1a <i>High Priority</i>	Egress movements from the property driveway	<p>TRAFFIX has reviewed the audit team findings and considers the potential risks associated with stopping sight distance (SSD) and minimum gap sight distance (MGSD) at the proposed vehicular access to be minimal, noting the following key aspects:</p> <ul style="list-style-type: none"> • Orica will retain ownership of the front 10 metres of the site, which contains critical ground water infrastructure. The 10 metre strip currently contains landscape, with existing GTP infrastructure unable to permit additional planting. Therefore, the proposal does not include any additional planting or landscaping that will obstruct SSD/MGSD areas; • Existing palisade fencing to be retained to protect GTP infrastructure; and • Any obstructions that can potentially obstruct SSD/MGSD areas are to have a maximum height of 600mm. <p>In light of the above, the SSD and MGSD areas within the site will effectively remain clear, thereby mitigating any potential risks associated with sight distance visibility for egressing drivers of the development.</p>
Item 1b <i>High Priority</i>	Egress movements from the property driveway	<p>The proposed vehicular access is provided 2.5m x 2.0m visual sight splays for egressing drivers, as required under AS2890.1 (2004) Figure 3.3. These visual sight splays are proposed to be clear of any obstructions to visibility, noting the following exceptions:</p> <ul style="list-style-type: none"> • Palisade fencing or any other fencing that will not obstruct an egressing driver's visibility. It should be noted that palisade fencing is widely utilised at the vehicle access for several warehouse developments to enable egressing drivers to identify potential pedestrians at the vehicle access; and • All obstructions (excluding palisade fencing) and landscaping are to have a maximum height of 600mm, which is consistent with various councils. <p>In addition to the above, it is noted that Nant Street is primarily utilised as the main access for the Qenos Tank Farm, located to the immediate north of the site on an intermittent basis only. The unformed Nant Street sits within the flood storage area for the local area, which would require considerable filling in order to transform Nant Street into a usable heavily trafficked road. Accordingly, Nant Street is highly unlikely to become a more trafficable road and does not accommodate general vehicle or pedestrian traffic, with a rarely opened gate restricting public access to the road. As such, pedestrian activity from Nant Street is envisaged to be considerably low (if any).</p> <p>In summary, the above arrangements are considered appropriate to satisfy the requirements of AS2890.1 (2004), therefore considered acceptable.</p>



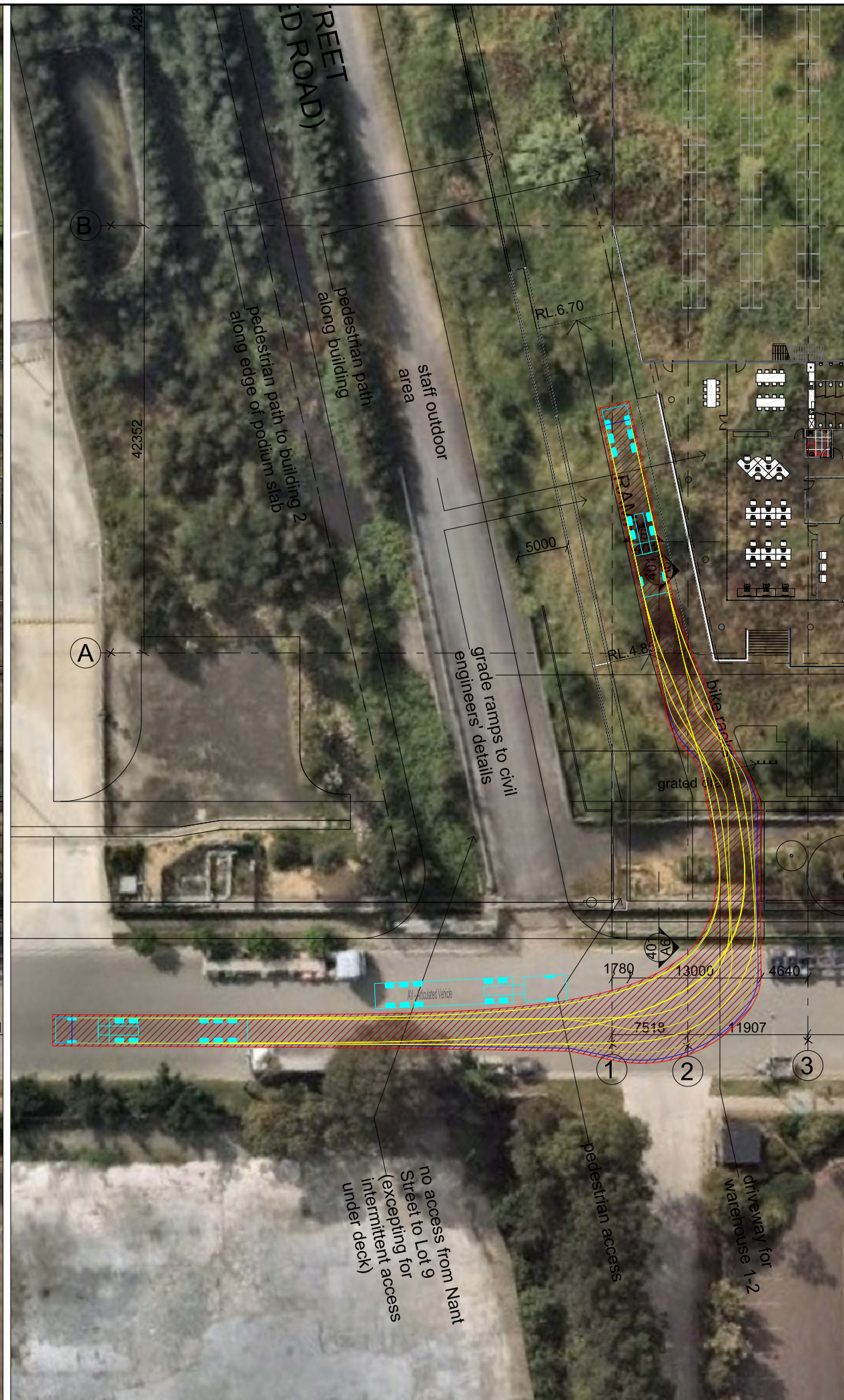
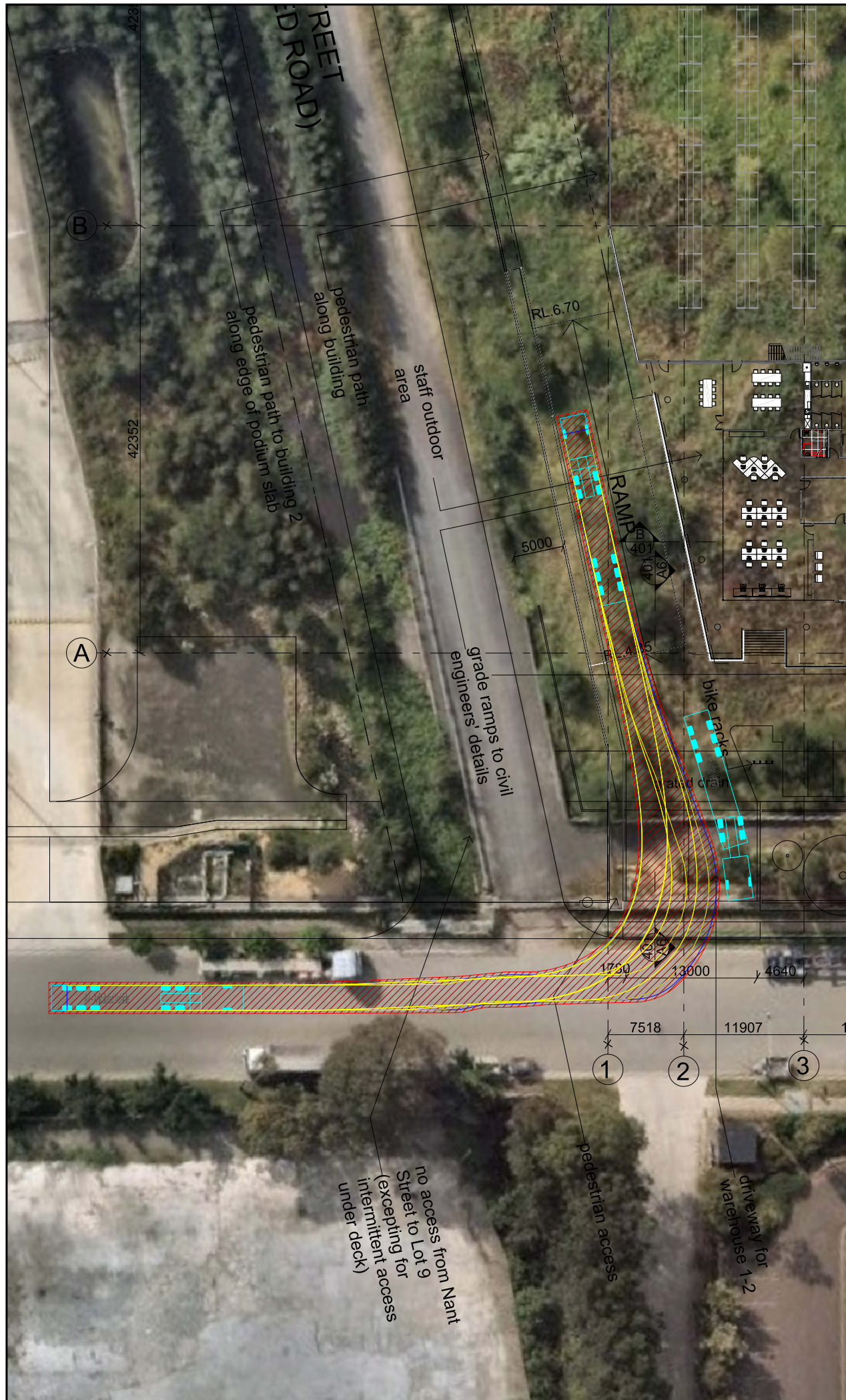
Audit Reference Number(s)	Location	TRAFFIX Response
Item 2 <i>Medium Priority</i>	Spatial provisions for coinciding inbound and outbound traffic movements	<p>In accordance with AS2890.2 (2018), the development is required to provide a combined entry and exit access with a minimum width of 12.5 metres, noting that there is no requirement for simultaneous commercial vehicle entry and egress movements at the access. It should be emphasised that that no vehicle is permitted to perform reverse manoeuvres at the vehicular access, with egressing drivers required to 'keep left' and follow the kerb line at the access, which in turn, would provide sufficient manoeuvring area for potential entering vehicles.</p> <p>Accordingly, the development proposes a 13.0 metre wide (kerb to kerb) combined entry and exit access, which is considered superior to the requirements of AS2890.2 (2018). Furthermore, a revised swept path analysis has been undertaken and included in Attachment 3, which demonstrates the following:</p> <ul style="list-style-type: none">• Egressing vehicle is able to wait at the site boundary and provide sufficient manoeuvring area for a vehicle to enter; and• Entering vehicle is able to stand on-street and within proximity of the vehicle access to enable a vehicle to egress.
Item 3 <i>Medium Priority</i>	Pedestrian access and egress from the site	<p>The development proposes a 1.3 metre wide pedestrian footpath along the western boundary of the development for pedestrian access from McPherson Street. As such, pedestrians are provided increased separation and protection from vehicle circulation movements, noting that the development can also provide an additional pedestrian access on the eastern side of the driveway for access to Office 1, which can be incorporated within the detailed design plans during the construction certificate stage.</p> <p>These arrangements are considered acceptable and will ensure all pedestrians are provided separated access to both offices/warehouses.</p>



Audit Reference Number(s)	Location	TRAFFIX Response
Item 4a and 4b <i>Low (much of this is uncertain based on the unknown long-term function of Nant Street)</i>	The impact of Nant Street on safe operations of the property driveway	<p>As previously mentioned, Nant Street is primarily utilised as the main access for the Qenos Tank Farm, located to the immediate north of the site on an intermittent basis only. As such, this road does not accommodate general traffic, with a rarely opened gate restricting public access to the road. This is emphasised with traffic count surveys that were conducted in October 2018, which identified no vehicle movements from Nant Street during the morning and evening peak periods.</p> <p>In addition to the above, Nant Street is acknowledged to be owned by Bayside Council, however, the road itself is considered to be within a flood prone area, hence not considered appropriate to accommodate public traffic. Furthermore, in order to make the road function as a public road it would be required to be filled and its levels increased to meet flood requirements. This in turn would have unacceptable impacts on the surrounding flood levels. For this reason, Nant Street is envisaged to remain as an unformed road that does not accommodate general traffic, hence mitigating any potential conflicts at the proposed access.</p>

ATTACHMENT 3

Swept Path Analysis



Notes:
 This drawing is prepared for information purposes only. It is not to be used for construction.
 TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.
 Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (AS/NZS 2890.1:2004 Parking facilities - Off-street car parking, and/or AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Swept Path Analysis	NC	12-11-20
B	Swept Path Analysis	NC	18-11-20
C	Updated Plans	NC	20-11-20


Swept Path Legend
 — Wheel Path
 — Vehicle Body Envelope
 ▨ Clearance Envelope (300mm)

Architect
 Axis Architectural
 4/112 Cronulla Street
 CRONULLA NSW 2230

Client
 DBL Property
 Level 6, 432 Kent Street
 SYDNEY NSW 2000

Scale / Plan Orientation
 0 5 10 15 20m
 1:500 @ A3

Project Description
 Orica Southlands
 Lot 9 McPherson Street, BOTANY NSW 2019

Drawing Prepared By

 Suite 2.08, 50 Holt Street
 Surry Hills, NSW 2010
 PO Box 1124
 Strawberry Hills, NSW 2012
 t: +61 2 8324 8700
 f: +61 2 9830 4481
 w: www.traffix.com.au

Drawing Title
 Swept Path Analysis
 McPherson Street Vehicular Access
 19.0m Articulated Vehicle
 Left: Entry Movement
 Right: Exit Movement

Drawn: NC	Checked: VD	Date: 12-11-2020
-----------	-------------	------------------

12.060d04v01 TRAFFIX [2020-11-20] - Design Review.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
12.060	RSA	TX.01	C