



17 July, 2013

P1073 SNL Whitebridge Townhouses TIA Ver02.docx

**SNL Building Constructions Pty Ltd**  
**22 Pendlebury Road**  
**Cardiff NSW 2285**

**Attention: Wade Morris**

Dear Wade,

**Proposed Multiple Dwelling Development, Dudley Road and Kopa Street, Whitebridge**

We have reviewed the development plans for the proposed 90 dwelling development for the current vacant land off Kopa Street, Whitebridge and have collected traffic data as part of our site assessment. The proposed development has been assessed against the traffic and parking provisions of the Lake Macquarie Development Control Plan (DCP) No. 1, Australian Standard (AS) 2890 - Parking Facilities and the Austroads Guides and the following advice has been prepared in accordance with the RTA Guide to Traffic Generating Developments.

Item	Issue	Comment
<b>2. Existing Situation</b>		
2.1.1 Site Location and Access	NO	The proposed development site is located at 142 Dudley Road and 2-4 Kopa Street in Whitebridge. The proposed residential development site has road access to Kopa Street. Vehicle access is proposed from Kopa Street only. Part of the site in the area of Dudley Road is zoned for commercial use as an extension of the Whitebridge neighbourhood shopping centre and is not part of this application. There are two existing residential units on the proposed development site that have access from Kopa Street.
2.2.1 Road Hierarchy	NO	Dudley Road allows for movements between Redhead and Charlestown. This is a sealed road that operates as a two-way sub-arterial street with a sign-posted speed limit of 60 km/h. In the vicinity of the proposed site, this road fronts various land uses associated with the Whitebridge neighbourhood centre. Dudley Road has a road width of approximately 11 metres and has a continuous footpath along the southern side of the street and a non-continuous footpath on the northern side near the proposed development site. These paths do not connect to the Fernleigh Track. The street has kerbs, gutters and lighting in the area of the existing shops. There are no kerbs along the Dudley Road frontage of the proposed development site.  Lonus Avenue is a collector street that provides connections from Whitebridge neighbourhood centre to Whitebridge High School. This street has a single footpath on the northern side of the road with kerbs and gutter.  Kopa Street is a local road that connects with Lonus Avenue. This residential road operates with a speed limit of 50 km/h and has kerbs and gutters. In the vicinity of the proposed development site, Kopa Street has a width of approximately 9 metres with a footpath provided on the northern side of the street only. Five individual residential lots are located along Kopa Street (two of which are located within the proposed development site) and it is a non-through road for vehicles. There is no formal turning head at the termination point of Kopa Street.

Item	Issue	Comment
2.2.2 Road works	NO	There are no planned road works in the general locality except for Council maintenance work as required. It has been noted that the maps of the LMLEP2004 and Draft LMLEP2013 indicate there is the potential to extend Kopa Street from its current termination near the proposed development site up to the public recreation zone known as the Fernleigh Track.
2.2.3 Traffic Management Works	NO	No traffic management works are currently occurring in the vicinity of the proposed development site.
2.2.4 Pedestrian and Cycling Facilities	NO	<p>The Fernleigh Track is a significant bicycle / pedestrian / recreation route between Belmont and Adamstown and allows for connections throughout the Lake Macquarie and Newcastle local government areas. This path also provides an important commuter route for cyclists to connect into Newcastle as well as a convenient route to Westfield Kotara shopping centre.</p> <p>A network of pedestrian footpaths is available for use throughout the local street network in the vicinity of the proposed development site. Dudley Road provides a convenient route for access towards Charlestown and its associated facilities. There is a pedestrian and cyclist connection from the termination of Kopa Street to the Fernleigh track.</p>
<b>2.3 Traffic Flows</b>		
2.3.1 Daily Traffic Flows	NO	<p>Surveys conducted on Tuesday 28 May 2013 indicate that peak-hour traffic flows to occur at the intersection of Dudley Road / Bulls Garden Road / Waran Road / Lonus Avenue between 8.15 and 9.15 where two-way traffic volumes at this intersection are in the order of 1,800 vehicles. PM peak-hour (15.30 – 16.30) traffic flows through this intersection are also in the order of 1,800 vehicles per hour. It should be noted that this non-traditional PM peak hour is likely due to vehicular movements associated with Whitebridge High School. Traffic flows during the traditional PM peak (16.30 – 18.00) were in the order of 1,650 vehicles per hour.</p> <p>Lonus Avenue is a collector road that is the main street between Dudley Road and Whitebridge High School. Observation of this street during the AM peak hour indicates the traffic flows on this street from Dudley Road are predominately associated with Whitebridge High School and Birralea Long Day Care Centre. A significant number of set downs occur at these education facilities and approximately 60% of drivers that depart Whitebridge High School access Dudley Road / Bulls Garden Road from Whitebridge High School (along Lonus Avenue) while approximately 40% use Kurraka Street to access Waran Road. The peak 15-minute interval of traffic generation at Whitebridge High School was observed to be between 8.45 and 9.00 with a significant drop in traffic flows from the high school vicinity after 9.00 (roll call is taken at 8.55). Traffic surveys indicate there are approximately 130 vehicles per hour on Lonus Avenue during the peak hour. The peak 15-minute interval of traffic from the direction of Whitebridge High School on Lonus Avenue occurred between 9.00 and 9.15, which indicates a correlation between the school class start time (9.05) and traffic on Lonus Avenue.</p> <p>Traffic generated by the existing residences on Kopa Street has been determined with the use of the RTA Guide to Traffic Generating Developments, which indicates the existing 5 dwellings on Kopa Street (two of which are part of the proposed development site) generate approximately 5 trips during the peak hour.</p> <p>Traffic surveys have been provided at Appendix A.</p>

Item	Issue	Comment
2.3.2 Daily Traffic Flow Distribution	NO	Surveys indicate there is a directional bias as a significantly larger volume of vehicles head westbound than eastbound on Dudley Road during the AM peak. A directional bias was also observed on Lonus Avenue in correlation with Whitebridge High School start (AM) and end (PM) times.
2.3.3 Vehicle Speeds	NO	No speed surveys were undertaken as part of the study work. Observations made on site indicate that the design of the Whitebridge neighbourhood centre (including the raised pedestrian crossing on Dudley Road) causes drivers to proceed with caution and generally travel at a speed less than the speed limit along Dudley Road in the vicinity of the Whitebridge shops. Traffic flows along Lonus Avenue are also within the posted speed limit, due to the interaction with kerb side parking and driveways to individual residential lots.
2.3.4 Existing Site Flows	NO	The proposed development site on Kopa Street has two residences on it. Based on the RTA Guide to Traffic Generating Developments, these two dwelling units generate 2 trips during peak hours and 18 daily trips. The remainder of the site is currently vacant and generates no traffic movements.
2.3.5 Heavy Vehicle Flows	NO	Observations on site show that heavy vehicle traffic on the road network in vicinity of the proposed development site are low. There are some truck movements associated with deliveries to the Whitebridge Neighbourhood area.
2.3.6 Current Road Network Operation	NO	The roundabout at the critical intersection of Dudley Road / Bulls Garden Road / Waran Road / Lonus Avenue operates at a LoS between A and B based on Sidra analysis and confirms these site observations. Outside of the peak hours the road network operates well with minimal delays and congestion.
2.4 Traffic Safety and Accident History	NO	Accident data provided by the RMS indicates there is a very low occurrence of incidents at the intersection of Dudley Road / Bulls Garden Road / Lonus Avenue / Waran Road. Only one accident has been recorded at this intersection since July 2007. One accident has been recorded at the intersection of Kopa Street and Waran Road since July 2007 whilst no accidents have occurred on Kopa Street west of Lonus Avenue since July 2007. There have been no accidents recorded on Lonus Avenue in the past five years. Accident data provided by the RMS is provided at <b>Attachment B</b> .
2.5 Parking Supply and Demand		
2.5.1 On-street Parking Provision	NO	Car parking is permitted on the local residential streets in the vicinity of the proposed development site with no time restrictions nor local parking plans in place. There is a one-hour time-restricted parking on Dudley Road adjacent to the Whitebridge neighbourhood centre shops.
2.5.2 Off-Street Parking Provision	NO	There is an off street parking area provided as part of the nearby Dudley Neighbourhood shopping centre. This is highly used with regular turn-over of parking.
2.5.3 Parking Demand and Utilisation	NO	Observation indicates there is a high demand for parking in car park for Dudley Neighbourhood shopping centre with a high turnover. There is a low demand for parking on Lonus Avenue and Kopa Street in the vicinity of the proposed development site that is predominately used in association with the nearby residences and tennis courts.
2.5.4 Set down or pick up areas	NO	There is a bus stop on Dudley Road adjacent to the Whitebridge neighbourhood centre.

Item	Issue	Comment
<b>2.6 Public Transport</b>		
<i>2.6.1 Rail Station Locations</i>	NO	Kotara Railway Station and Adamstown Railway Station are located approximately 6.5 km to the north of the proposed development site. Public transport connections are available to both the Newcastle & Central Coast and Hunter train lines via the 322 bus.
<i>2.6.2 Bus Stops and Associated Facilities</i>	NO	The proposed development site is within 50m from existing bus stops on Dudley Road. These bus stops are serviced by Newcastle Buses route 322 and provide connections to Newcastle CBD and the Belmont local centre. The 322 bus arrives approximately every 30 minutes during peak hour for each direction of travel.
<i>2.6.3 Pedestrians</i>	NO	There is a network of pedestrian footpaths along Dudley Road, Lonus Avenue and Kopa Street that provides access between the proposed development site and essential services (retail and public transport) that exist on Dudley Road.
<b>2.7 Other Proposed Developments</b>	NO	No other major proposed developments have been noted in the vicinity of the subject site.
<b>3. Proposed Development</b>		
<b>3.1 The Development</b>		
<i>3.1.1 Nature of Development</i>		The development proposal is planned to include: <ul style="list-style-type: none"> <li>• Approximately 90 new dwellings (multiple dwelling housing), primarily 3bedroom units of two / three storeys;</li> <li>• Vehicle access from Kopa Street only; and</li> <li>• Pedestrian access to Dudley Road, Kopa Street and Fernleigh Track.</li> </ul>
<i>3.1.2 Access and Circulation Requirements</i>	NO	All vehicles will be able to enter the proposed development site from Kopa Street and circulate the site as required. Access and circulation will be provided in accordance with Australian Standard (AS) 2890 and the Council DCP. An internal road network will provide access to each unit.
<b>3.2 Access</b>	NO	
<i>3.2.1 Driveway Location</i>	NO	The driveway location for each lot will be determined during the detailed design phase and will be designed and constructed in accordance with AS2890 and the Council DCP.
<i>3.2.2 Sight Distances</i>	NO	The proposed development will require access driveways with a minimum sight distance in accordance with AS2890 and the DCP. The development will be provided in accordance with Council requirements during the detailed design phase of the project. Sight distances at the critical intersection of Kopa Street and Lonus Avenue exceed 100 metres in both directions and exceeds the requirements for the posted speed limit of 50 km/h (55 metres) from Austroads Guidelines.
<i>3.2.3 Service Vehicle Access</i>	NO	Limited service vehicles e.g. refuse collection truck will be required to access the development site. Access and circulation for these vehicles will be designed in accordance with the DCP and Austroads standards during the detailed design phase.
<i>3.2.4 Queuing at entrance to site</i>	NO	The proposed development is not likely to cause queues along Kopa Street due the very low volumes of traffic along this street together with the low flows on Lonus Avenue.
<i>3.2.5 Comparison with existing site access</i>	NO	The existing site has two vehicular access points off of Kopa Street and currently generates very little traffic movements.
<i>3.2.6 Access to Public Transport</i>	NO	Pedestrian access from the proposed development site to the existing shops on Dudley Road as well as the bus stops will be provided.
<i>3.3.1 Pattern of circulation</i>	NO	All vehicles will be able to access / egress the site via Kopa Street and circulate the site in a forward direction.
<i>3.3.2 Road width</i>	NO	All internal roads will be designed and constructed in accordance with Council requirements.

Item	Issue	Comment
3.3.3 Internal Bus Movements	NO	No internal bus movement will be required for this development.
3.3.4 Service Area Layout	NO	No dedicated service area will be required for this development.
<b>3.4 Parking</b>		
3.4.1 Proposed Supply	NO	The supply of parking within the proposed development site will be determined during the detailed design phase.
3.4.2 Authority Parking	NO	<p>The DCP and Draft DCP outline the following parking provisions in relation to the proposed uses on the subject site:</p> <p><i>Multiple dwelling housing (spaces)</i></p> <p>Small units (&lt;75m<sup>2</sup>) or 1 bedroom: 0.75 per unit</p> <p>Medium units (75-100m<sup>2</sup>) or 2 bedrooms</p> <p>Large units (&gt;100m<sup>2</sup>) or 3+ bedrooms: 1.5 per unit.</p> <p>Multiple dwelling housing – visitors parking: 0.5 per unit.</p> <p>For the purposes of this assessment, the proposed development has been assessed with use of an upper-limit of 90 large residential units. The proposed development will therefore require up to 135 residential parking spaces and 45 visitor parking spaces. The visitor parking can be accommodated on the internal road network.</p>
3.4.3 Parking Layout	NO	The parking layout will be designed in accordance with Council requirements during the detailed design process.
3.4.4 Parking Demand	NO	The provisions of the DCP indicate there will be up to 180 car parking spaces demanded as a result of the proposed development.
3.4.5 Service Vehicle Parking	NO	There will be limited demands for service vehicle parking and this limited demand can be satisfied on street adjacent to the property being serviced.
3.4.6 Pedestrian and Bicycle Facilities	NO	Pedestrian access will be provided from the proposed development site to Dudley Road and its associated facilities, Kopa Street and the Fernleigh Track. Bicycle parking will be contained within each dwelling.
<b>4. Impact of Proposed Development</b>		
4.1 Traffic Generation	NO	<p>Standard traffic generation rates are provided by the RTA Guide to Traffic Generating Development and have been used as a basis to determine the future traffic flows associated with the proposed development.</p> <p>The provisions of the RTA Guide to Traffic Generating Development indicate 0.85 weekday peak hour vehicle trips per dwelling house. The proposed 90 residential units will therefore generate 77 peak hour trips on the surrounding road network.</p> <p>The RTA Guide to Traffic Generating Developments also provides for an average of 9 daily trips generated by each residential unit and it is therefore considered that the multi-residential development of 90 units could generate an additional 810 daily trips on the surrounding road network.</p> <p>The location of the subject site within such close proximity to essential retail services, transport infrastructure (including the Fernleigh Track), educational and recreation facilities can provide for a significant modal shift to active transport and thus reduce the numbers of generated traffic movements. Where such facilities are provided in a sub-division, the RTA Guide allows for up to 25% containment of vehicle trips which could become pedestrian and cycling trips. Application of this rate the daily external traffic movements associated with the development would be reduced to 608 daily trips i.e. 304 outbound and 304 inbound per day via Kopa Street.</p>
4.1.1 Daily and Seasonal Factors	NO	Limited annual variation is expected from the proposed development.

Item	Issue	Comment															
4.1.2 Pedestrian Movements	NO	<p>The availability of services near the proposed development site on Dudley Road could generate a significant number of pedestrian movements to this neighbourhood centre.</p> <p>Given the proposed development site is located approximately 600 metres from Whitebridge High School, a significant number of pedestrian movements could occur on Kopa Street and Lonus Avenue to access this education facility from the proposed development site. There is an existing network of footpaths that will be able to accommodate these anticipated movements along Kopa Street and Lonus Avenue.</p> <p>The shared path from Kopa Street to the Fernleigh Track will be retained or relocated (to be determined during the detailed design phase).</p>															
<b>4.2 Traffic Distribution and Assignments</b>																	
4.2.1 Origin / destinations assignment	NO	<p>It is expected that the traffic generated by the proposed development will follow a distribution pattern similar to the existing pattern of movements during the AM peak (and opposite pattern during the PM peak) from the intersection of Dudley Road and Lonus Avenue during peak hours.</p> <p>The expected traffic distribution based on the traffic surveys at the intersection of Dudley Road / Bulls Garden Road / Waran Road / Lonus Avenue is indicated in <b>Table 2</b> below:</p> <p>■ <b>Table 1 Adjusted Existing Distribution from nearby Intersection of Dudley Rd / Bulls Garden Rd / Waran Rd / Lonus Ave</b></p> <table border="1"> <thead> <tr> <th>Direction</th><th>Distribution (%)</th><th>Estimated Additional Peak Hour Traffic Movements</th></tr> </thead> <tbody> <tr> <td>Dudley Road (West)</td><td>33.1</td><td>25</td></tr> <tr> <td>Dudley Road (East)</td><td>26.9</td><td>21</td></tr> <tr> <td>Waran Road</td><td>20.8</td><td>16</td></tr> <tr> <td>Bulls Garden Road</td><td>19.2</td><td>15</td></tr> </tbody> </table> <p>Traffic that is expected on Waran Road will likely avoid the intersection of Dudley Road / Bulls Garden Road / Waran Road / Lonus Avenue as drivers from the proposed development will continue on Kopa Street to access Waran Road.</p> <p>The proposed development is expected to generate during the morning peak hour 25 vehicles westbound on Dudley Road, 21 vehicles eastbound on Dudley Road, 16 vehicles on Waran Road (via Kopa Street west of Lonus Avenue) and 15 vehicles on Bulls Garden Road. The reverse will occur in the PM peak period.</p>	Direction	Distribution (%)	Estimated Additional Peak Hour Traffic Movements	Dudley Road (West)	33.1	25	Dudley Road (East)	26.9	21	Waran Road	20.8	16	Bulls Garden Road	19.2	15
Direction	Distribution (%)	Estimated Additional Peak Hour Traffic Movements															
Dudley Road (West)	33.1	25															
Dudley Road (East)	26.9	21															
Waran Road	20.8	16															
Bulls Garden Road	19.2	15															
4.3 Impact on Road Safety	NO	<p>The proposed residential development will have a low impact on road safety as the surrounding road network has ample capacity for growth and the key intersections that service the proposed development operate in a safe and effective manner.</p> <p>The sight visibility at the key intersection of Kopa Street and Lonus Avenue is good and ensures safe entry and exit movements from this intersection.</p>															

Item	Issue	Comment
<b>4.4 Impact of Generated Traffic</b>		
<b>4.4.1 Impact on Daily Traffic Flows</b>	NO	<p>The RTA Guide to Traffic Generating Developments indicates that the environmental capacity of a local road such as Kopa Street is 300 vehicles per hour during peak hours with a desirable limit of 200.</p> <p>There are 5 residences on Kopa Street east of Lonus Avenue and therefore the existing flows on Kopa Street during peak hours are estimated to be 5 vehicles per hour. Kopa Street east of Lonus Avenue therefore has capacity for an additional 295 vehicles per hour during peak hours based on this environmental limit.</p> <p>With the proposed development anticipated to generate 77 additional traffic movements on Kopa Street giving total future peak hour flows on less than 100 vehicles per hour and well with the environmental limit.</p> <p>The maximum environmental capacity of traffic volumes for Lonus Avenue (a collector street) is 500 vehicles per hour. This street operates with two-way traffic flows of approximately 400 vehicles per hour during peak hours. The majority of this peak hour traffic on Lonus Avenue is generated by Whitebridge High School, which is located approximately 600 metres north of the proposed development site. The proposed development will generate approximately 61 additional vehicles on Lonus Avenue during peak hours. These 61 additional trips would equate to a total two-way traffic flow on Lonus Avenue during the peak hours to approximately 460 vehicles per hour and within the environmental capacity of this road.</p> <p>The additional traffic will have a minimal impact upon the capacity and operation of Dudley Street.</p>
<b>4.4.2 Peak Hour Impacts on Intersections</b>	NO	<p>The key intersection that could be impacted by the development is the roundabout controlled intersection of Dudley Road / Bulls Garden Road / Waran Road / Lonus Street and as part of this assessment current traffic flows at this intersection have been collected. A Sidra analysis has been completed at this roundabout for both the current situation and the future design year of 2023. This has been completed for the base case and the future case with the additional traffic flows associated with the subject site.</p> <p>The results of the Sidra analysis indicate that this roundabout currently operates well with minimal delays and congestion (levels of service of A and B). With allowance of 1% background growth to 2023 the roundabout will continue to operate well.</p> <p>With the additional traffic associated with the development, there will be a minor increase in delays and congestion and the Sidra analysis indicates that these delays will be acceptable.</p> <p>Further details are provided at Appendix C.</p>
<b>4.4.3 Impact of Construction Traffic</b>	NO	<p>The construction work will be wholly contained within the site and there will be a minimal impact upon surrounding road network.</p> <p>It will be a requirement for construction machinery to access site and additional traffic may be generated in the short-term in association with construction of the proposed development. A Traffic Management Plan will be required for work on site and access controls. This will be completed by the contractor on site.</p>
<b>4.4.4 Other Developments</b>	NO	<p>No major planned developments have been noted in vicinity of the site.</p>
<b>4.5 Public Transport</b>		
<b>4.5.1 Options for improving services</b>	NO	<p>There are limited options for improving public transport. The proposed development has the potential to increase demand for bus patronage on the 322 bus route. Based upon typical bus patronage in the greater Newcastle / Lake Macquarie region, there is sufficient capacity to accommodate for this potential increase in patronage.</p>

Item	Issue	Comment
4.5.2 <i>Pedestrian Access to Bus Stops</i>	NO	Access from the site to bus stops is available to bus patrons via the existing pedestrian network surrounding the proposed development site. Improved access to the bus stops will be provided with a new pedestrian connection direct from the proposed development site to Dudley Road. There are pedestrian facilities already established within the shopping precinct along Dudley Road.
<b>4.6 Recommended Works</b>		
4.6.1 <i>Improvements to Access and Circulation</i>	NO	The proposed access and circulation pattern will need to be designed and constructed in accordance with Austroads Guidelines and Council requirements.
4.6.2 <i>Improvements to External Road Network</i>	NO	There will be no requirement for any external road network upgrades as part of this development.
4.6.3 <i>Improvements to Pedestrian Facilities</i>	NO	The existing pedestrian facilities provide a continuous network of footpaths to the shops, transport, recreational and education facilities in the vicinity of the proposed development site. Therefore no upgrades are required.
4.6.4 <i>Effect of Recommended Works on Adjacent Developments</i>	-	No additional works are recommended in relation to the proposed development.
4.6.5 <i>Effect of Recommended Works on Public Transport Services</i>	-	The proposed development will not significantly impact on public transport services and may generate a low increase in patronage on the 322 bus service.
4.6.6 <i>Provision of LATM Measures</i>	-	No local area traffic management measures will be required as a result of the proposed development.
4.6.7 <i>Funding</i>	-	No external road upgrades will be required in the vicinity of the site. Site access and internal road works will be funded by the developer.

A summary of the key points regarding the proposed development are provided below:

- The proposed development site is located at off Kopa Street / Dudley Road in Whitebridge and vehicular access will be provided off Kopa Street only. Local retail and public transport facilities exist within the immediate vicinity of the site on Dudley Road.
- Kopa Street and Lonus Avenue are primary routes to cater for traffic generated by the proposed development. Kopa Street is a 50km/h two-lane bi-directional local residential street that carries minimal traffic flows. It connects with Lonus Avenue via a give way controlled intersection. Kopa Street is currently a dead end for vehicle movements but provides a connection for pedestrians and cyclists to the Fernleigh Track.
- Traffic flow surveys were undertaken at the roundabout intersection of Dudley Road / Bulls Garden Road / Waran Road / Lonus Avenue on Tuesday 28 May 2013 between 7.00 – 9.30 and 15.00 – 18.00 to determine the peak two-way traffic flows in the vicinity of the site. The AM peak at this intersection had traffic flows of 1,521 vehicles per hour. The peak traffic flow at this intersection occurred between 15.30 and 16.30 with flows of 1,736 vehicles per hour. The two-way flow on Lonus Avenue during this time period was 165 vehicles and a significant number of these vehicles continued along Lonus Avenue to Whitebridge High School.
- The proposed development of up to 90 units could generate some 77 vehicle movements during the peak periods and 608 external vehicles movements per day, with the daily traffic numbers reduced by 25% due to the good connections for pedestrians and cyclists to local attractions.
- Sidra analysis indicates that the key intersection of Dudley Road / Bulls Garden Road / Waran Road / Lonus Avenue currently operates at a Level of Service of A and B and allowing for background growth of 1% per annum this will continue to operate well (LoS 'A' or 'B' for all approaches) for the future design year of 2023. With the additional traffic associated with the subject site this roundabout will continue to operate well with acceptable delays and congestion for road users.

- The proposed development includes an upper-limit of 90 dwellings (multiple unit dwellings of primarily 3 to 4 bedrooms). Parking at these units is to be provided in accordance with the DCP, which requires 1.5 vehicular parking spaces per unit for residents and 0.5 parking spaces per unit for visitors. The proposed development therefore will require 135 residential spaces and 45 visitor spaces which can be accommodated within the street network that will be provided as part of the development.
- Access and parking will be provided in accordance with Australian Standard (AS) 2890 and Council requirements.
- The additional traffic associated with the development will have an acceptable impact upon the environmental capacity of these roads based upon advice from the RTA Guide to Traffic Generating Developments.
- A formal pedestrian path will be provided to link the proposed development site to the existing shops and public transport facilities of the Whitebridge neighbourhood centre on Dudley Road.

It is recommended that the development be approved on traffic and access grounds. Please feel free to contact me directly on 02 4940 0025 should you have any queries.

Yours sincerely,



**Sean Morgan**  
***Manager – Traffic Engineering***

Attachments:      A – Survey Data  
                             B – Accident Data  
                             C – Sidra Analysis Results

## Appendix A. Survey Data

Better Transport Futures  
PO Box 130  
Wickham NSW 2293

### Turn Count Summary

Location: Dudley Road, Bulls Garden Road, Waran Road and Lonus Street  
GPS Coordinates: N = -32.968750, W= 151.605647  
Date: 28 May 2013  
Day of week: Tuesday  
Weather: Cloudy  
Analyst: JJB and CBT

### Total Vehicle Traffic

Interval starts	Southbound				Southbound				Westbound					Bulls Garden Road				Eastbound				Total
	Left	Through	Right	Hard Right	Left	Through	Right	Hard Right	Left	Through	Right	U-Turn	Hard Right	Left	Through Left	Right	Through Right	Hard Left	Through	Right	Left	
7:00	23	8	2	1	4	2	4	1	20	72	7	6	1	25	15	12	2	1	53	19	0	278
7:15	20	23	1	0	12	6	7	0	16	65	15	12	2	18	12	19	1	4	60	38	0	331
7:30	20	10	3	0	6	6	8	0	32	73	38	9	6	28	12	11	2	4	71	16	0	355
7:45	34	19	2	0	10	5	7	0	14	65	30	12	9	35	12	41	4	5	68	17	1	390
8:00	16	7	4	0	9	5	12	0	18	73	19	15	10	29	18	39	10	5	71	27	2	389
8:15	26	20	4	0	4	6	6	0	16	54	24	10	34	38	11	26	16	5	88	20	6	414
8:30	22	15	1	0	5	2	3	0	14	66	20	12	38	19	17	24	32	4	79	21	7	401
8:45	34	16	1	0	4	8	5	0	19	70	24	7	28	24	41	31	48	29	72	19	34	514
9:00	40	12	3	0	11	3	6	0	20	68	29	11	7	30	54	17	13	37	80	21	9	471
9:15	37	17	2	1	9	4	2	0	19	65	13	23	3	23	12	13	3	19	66	23	5	359
	272	147	23	2	74	47	60	1	188	671	219	117	138	269	204	233	131	113	708	221	64	3902

### Peak Hour 8.15 to 9.15

Interval starts	Southbound				Southbound				Westbound					Bulls Garden Road				Eastbound				Total
	Left	Through	Right	Hard Right	Left	Through	Right	Hard Right	Left	Through	Right	U-Turn	Hard Right	Left	Through Left	Right	Through Right	Hard Left	Through	Right	Left	
8:15	26	20	4	0	4	6	6	0	16	54	11	10	47	38	5	26	22	2	88	20	9	414
8:30	22	15	1	0	5	2	3	0	14	66	9	12	49	19	7	24	42	2	79	21	9	401
8:45	34	16	1	0	4	8	5	0	19	70	24	7	28	24	41	31	48	29	72	19	34	514
9:00	40	12	3	0	11	3	6	0	20	68	29	11	7	30	54	17	13	37	80	21	9	471
	122	63	9	0	24	19	20	0	69	258	73	40	131	111	107	98	125	70	319	81	61	1800

Better Transport Futures  
PO Box 130  
Wickham NSW 2293

### Turn Count Summary

Location: Dudley Road, Bulls Garden Road, Waran Road and Lonus Street  
GPS Coordinates: N = -32.968750, W= 151.605647  
Date: 28 May 2013  
Day of week: Tuesday  
Weather: Cloudy  
Analyst: JJB and CBT

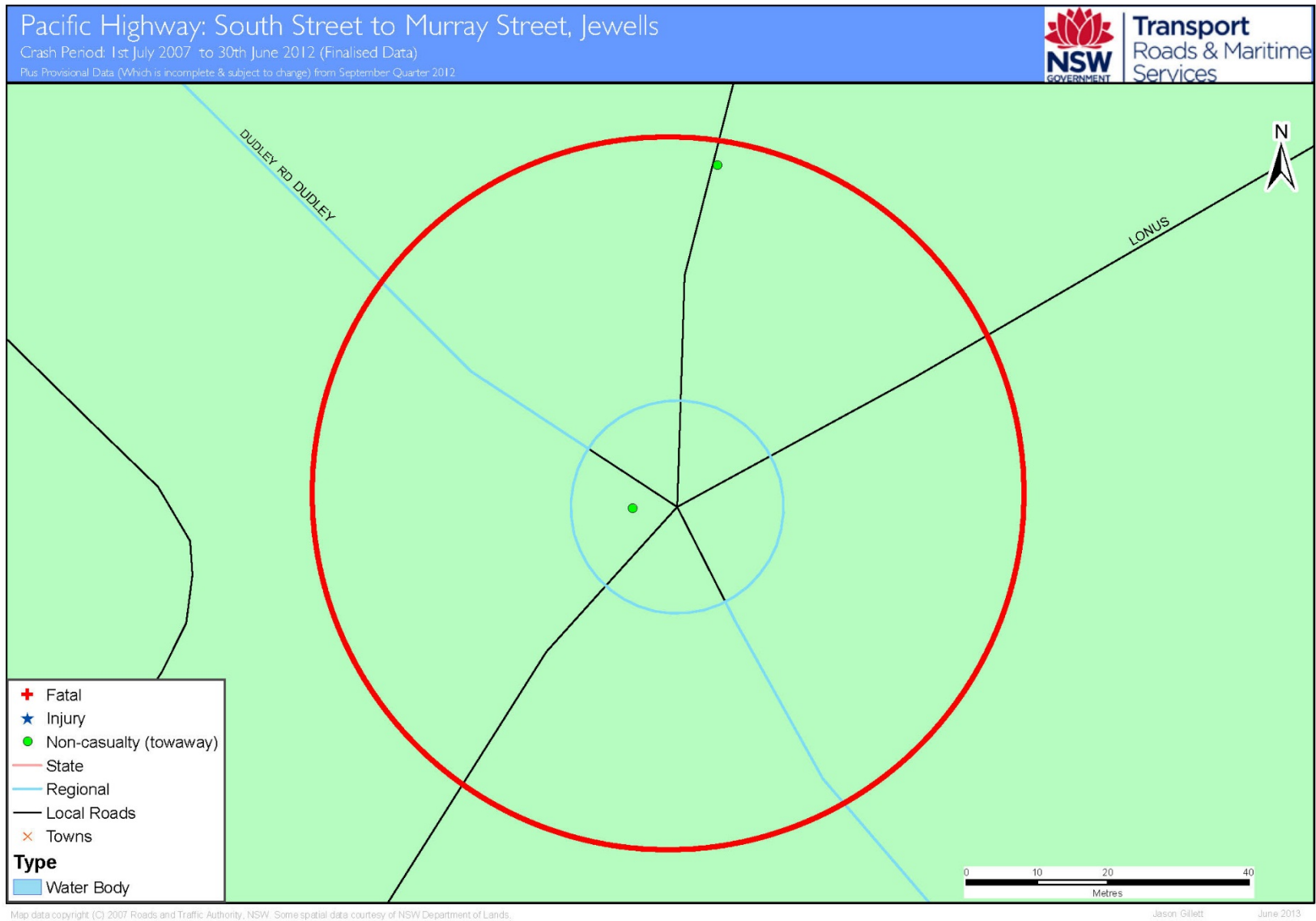
#### Total Vehicle Traffic

Interval starts	Southbound				Southbound				Westbound					Bulls Garden Road				Eastbound				Total
	Left	Through	Right	Hard Right	Left	Through	Right	Hard Right	Left	Through	Right	U-Turn	Hard Right	Left	Through Left	Right	Through Right	Hard Left	Through	Right	Left	
15:00	23	8	2	1	4	2	4	1	20	72	16	6	3.00	25	27	12	5	3	53	19	0	306
15:15	20	23	1	0	12	6	7	0	16	65	22	12	4.00	18	19	19	4	4	60	38	1	351
15:30	20	10	3	0	6	6	8	0	32	73	23	9	4.00	28	88	11	16	8	71	16	2	434
15:45	34	19	2	0	10	5	7	0	14	65	22	12	4.00	35	81	41	15	8	68	17	2	461
16:00	16	7	4	0	9	5	12	0	18	73	11	15	2.00	29	72	39	13	13	71	27	2	438
16:15	26	20	4	0	4	6	6	0	16	54	18	10	4.00	38	80	26	15	12	88	20	2	449
16:30	22	15	1	0	5	2	3	0	14	66	22	12	4.00	19	78	24	15	13	79	21	2	417
16:45	34	16	1	0	4	8	5	0	19	70	18	7	4.00	24	78	31	14	10	72	19	2	436
17:00	40	12	3	0	11	3	6	0	20	68	14	11	3.00	30	53	17	10	11	80	21	2	415
17:15	37	17	2	1	9	4	2	0	19	65	24	23	4.00	23	45	13	8	15	66	23	3	403
17:30	37	18	0	0	3	3	3	0	22	65	18	3	3.00	27	61	14	11	12	51	20	2	373
17:45	26	18	3	0	2	3	4	0	19	47	15	13	3.00	49	72	35	13	13	69	22	2	428
	335	183	26	2	79	53	67	1	229	783	223	133	42	345	753	282	140	122	828	263	22	4911

#### Peak Hour 15.30 to 16.30

Interval starts	Southbound				Southbound				Westbound					Bulls Garden Road				Eastbound				Total
	Left	Through	Right	Hard Right	Left	Through	Right	Hard Right	Left	Through	Right	U-Turn	Hard Right	Left	Through Left	Right	Through Right	Hard Left	Through	Right	Left	
15:30	20	10	3	0	6	6	8	0	32	73	23	9	4	28	88	11	16	8	71	16	2	434
15:45	34	19	2	0	10	5	7	0	14	65	22	12	4	35	81	41	15	8	68	17	2	461
16:00	16	7	4	0	9	5	12	0	18	73	11	15	2	29	72	39	13	13	71	27	2	438
16:15	26	20	4	0	4	6	6	0	16	54	18	10	4	38	80	26	15	12	88	20	2	449
	96	56	13	0	29	22	33	0	80	265	74	46	14	130	320	117	60	42	298	80	7	1782

## Appendix B. Accident Data



## Summary Crash Report

# Crash Type	Contributing Factors	Crash Movement	CRASHES	2	CASUALTIES	0
Car Crash 2 100.0%	Speeding 0 0.0%	Intersection, adjacent approaches 1 50.0%	Fatal crash 0 0.0%		Killed 0 0.0%	
Light Truck Crash 1 50.0%	Fatigue 0 0.0%	Head-on (not overtaking) 1 50.0%	Injury crash 0 0.0%		Injured 0 0.0%	
Rigid Truck Crash 0 0.0%		Opposing vehicles; turning 0 0.0%	Non-casualty crash 2 100.0%		^ Unrestrained 0 0.0%	
Articulated Truck Crash 0 0.0%		U-turn 0 0.0%	^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn			
'Heavy' Truck Crash (0) (0.0%)	Weather	Rear-end 0 0.0%	Time Group	% of Day	Crashes	Casualties
Bus Crash 0 0.0%	Fine 1 50.0%	Lane change 0 0.0%	00:01 - 02:59 1 50.0%	12.5%	1 2011	0
"Heavy Vehicle Crash (0) (0.0%)	Rain 0 0.0%	Parallel lanes; turning 0 0.0%	03:00 - 04:59 0 0.0%	8.3%	1 2008	0
Emergency Vehicle Crash 0 0.0%	Overcast 1 50.0%	Vehicle leaving driveway 0 0.0%	05:00 - 05:59 0 0.0%	4.2%		
Motorcycle Crash 0 0.0%	Fog or mist 0 0.0%	Overtaking; same direction 0 0.0%	06:00 - 06:59 0 0.0%	4.2%		
Pedal Cycle Crash 0 0.0%	Other 0 0.0%	Hit parked vehicle 0 0.0%	07:00 - 07:59 0 0.0%	4.2%		
Pedestrian Crash 0 0.0%	Road Surface Condition	Hit railway train 0 0.0%	08:00 - 08:59 0 0.0%	4.2%		
* Rigid or Artic. Truck " Heavy Truck or Heavy Bus		Hit pedestrian 0 0.0%	09:00 - 09:59 0 0.0%	4.2%		
# These categories are NOT mutually exclusive		Permanent obstruction on road 0 0.0%	10:00 - 10:59 0 0.0%	4.2%		
Location Type	Wet 0 0.0%	Hit animal 0 0.0%	11:00 - 11:59 0 0.0%	4.2%		
*Intersection 1 50.0%	Dry 2 100.0%	Off road, on straight 0 0.0%	12:00 - 12:59 0 0.0%	4.2%		
Non intersection 1 50.0%	Snow or ice 0 0.0%	Off road on straight, hit object 0 0.0%	13:00 - 13:59 0 0.0%	4.2%		
* Up to 10 metres from an intersection		Out of control on straight 0 0.0%	14:00 - 14:59 0 0.0%	4.2%		
~ 07:30-09:30 or 14:30-17:00 on school days		Off road, on curve 0 0.0%	15:00 - 15:59 0 0.0%	4.2%		
Collision Type	Natural Lighting	Off road on curve, hit object 0 0.0%	16:00 - 16:59 0 0.0%	4.2%		
Single Vehicle 0 0.0%	Dawn 0 0.0%	Out of control on curve 0 0.0%	17:00 - 17:59 0 0.0%	4.2%		
Multi Vehicle 2 100.0%	Daylight 0 0.0%	Other crash type 0 0.0%	18:00 - 18:59 0 0.0%	4.2%		
	Dusk 0 0.0%		19:00 - 19:59 0 0.0%	4.2%		
	Darkness 2 100.0%		20:00 - 21:59 1 50.0%	8.3%		
Road Classification	Speed Limit	~ 40km/h or less 0 0.0%	22:00 - 24:00 0 0.0%	8.3%		
Freeway/Motorway 0 0.0%	40 km/h or less 0 0.0%	80 km/h zone 0 0.0%	Street Lighting Off/Nil	% of Dark		
State Highway 0 0.0%	50 km/h zone 1 50.0%	90 km/h zone 0 0.0%	0 of 2 in Dark 0.0%			
Other Classified Road 1 50.0%	60 km/h zone 1 50.0%	100 km/h zone 0 0.0%				
Unclassified Road 1 50.0%	70 km/h zone 0 0.0%	110 km/h zone 0 0.0%				
Day of the Week	# Holiday Periods	New Year 0 0.0%	Queen's BD 0 0.0%	Easter SH 0 0.0%		
Monday 0 0.0%	Thursday 0 0.0%	Sunday 1 50.0%	Aust. Day 0 0.0%	Labour Day 0 0.0%	June/July SH 0 0.0%	
Tuesday 0 0.0%	Friday 0 0.0%	WEEKDAY 0 0.0%	Easter 0 0.0%	Christmas 0 0.0%	Sept./Oct. SH 0 0.0%	
Wednesday 0 0.0%	Saturday 1 50.0%	WEEKEND 2 100.0%	Anzac Day 0 0.0%	January SH 0 0.0%	December SH 0 0.0%	

Crashid dataset Dudley Road / Waran Road / Lonus Avenue / Bulls Garden Road, Whitebridge - 1/1/2007 to 2013\*

**Note:** Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

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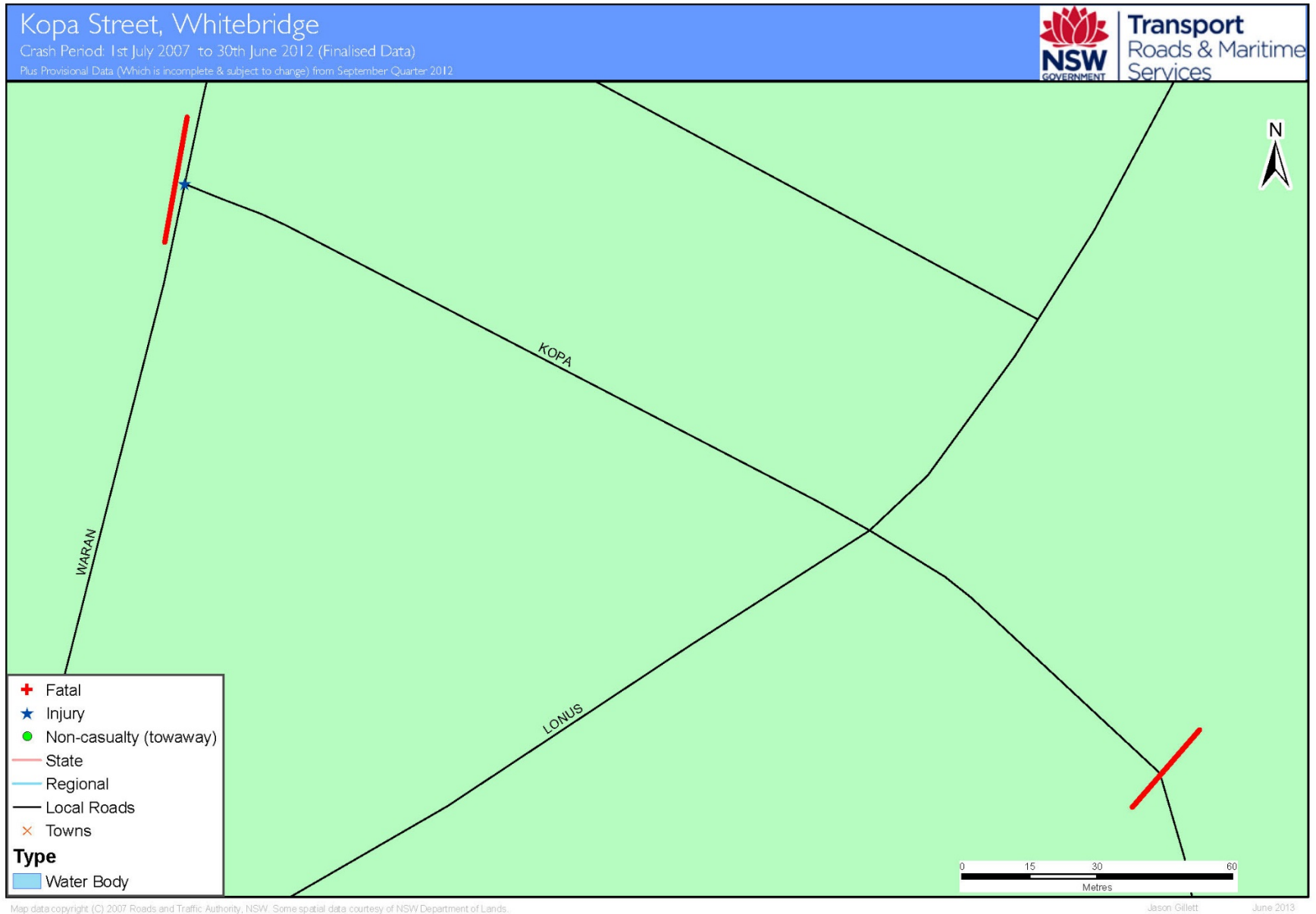
Generated: 11/06/2013 14:47

### Detailed Crash Report - sorted

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
<b>Natural Lighting</b>																				
<b>Hunter Region      Lake Macquarie City LGA      Whitebridge      Waran Rd</b>																				
633518	02/08/2008	Sat	00:15	50 m	N DUDLEY RD	2WY	STR	Fine	Dry	50	2	TRK	M21	N in WARAN RD	50	Incorrect side	N	0	0	
E34368236					Darkness	DCA : 201		Opp - Head on				CAR	M20	S in WARAN RD	50	Proceeding in lane				
<b>Hunter Region      Lake Macquarie City LGA      Whitebridge      Dudley Rd</b>																				
782409	14/08/2011	Sun	21:40		at BULLS GARDEN RD	RDB	STR	Overcast	Dry	60	2	CAR	M U	N in BULLS GARDEN RD	30	Proceeding in lane	N	0	0	
E45112552					Darkness	DCA : 101		Adj - Cross traffic				WAG	M18	W in DUDLEY RD	25	Proceeding in lane				
<b>Report Totals:</b>																				
				Total Crashes: 2		Fatal Crashes: 0		Injury Crashes: 0		Killed: 0		Injured: 0								

Crashid dataset Dudley Road / Waran Road / Lonus Avenue / Bulls Garden Road, Whitebridge - 1/1/2007 to 2013\*

**Note:** Ordered by: Crash Date. Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.



## Summary Crash Report

# Crash Type	Contributing Factors	Crash Movement	CRASHES	CASUALTIES
Car Crash 1 100.0%	Speeding 0 0.0%	Intersection, adjacent approaches 0 0.0%	Fatal crash 0 0.0%	Killed 0 0.0%
Light Truck Crash 1 100.0%	Fatigue 0 0.0%	Head-on (not overtaking) 0 0.0%	Injury crash 1 100.0%	Injured 1 100.0%
Rigid Truck Crash 0 0.0%		Opposing vehicles; turning 1 100.0%	Non-casualty crash 0 0.0%	^ Unrestrained 0 0.0%
Articulated Truck Crash 0 0.0%		U-turn 0 0.0%	^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn	
'Heavy' Truck Crash (0) (0.0%)		Rear-end 0 0.0%	Time Group	% of Day
Bus Crash 0 0.0%	Weather	Lane change 0 0.0%	00:01 - 02:59 0 0.0%	12.5%
"Heavy Vehicle Crash (0) (0.0%)	Fine 1 100.0%	Parallel lanes; turning 0 0.0%	03:00 - 04:59 0 0.0%	8.3%
Emergency Vehicle Crash 0 0.0%	Rain 0 0.0%	Vehicle leaving driveway 0 0.0%	05:00 - 05:59 0 0.0%	4.2%
Motorcycle Crash 0 0.0%	Overcast 0 0.0%	Overtaking; same direction 0 0.0%	06:00 - 06:59 1 100.0%	4.2%
Pedal Cycle Crash 0 0.0%	Fog or mist 0 0.0%	Hit parked vehicle 0 0.0%	07:00 - 07:59 0 0.0%	4.2%
Pedestrian Crash 0 0.0%	Other 0 0.0%	Hit railway train 0 0.0%	08:00 - 08:59 0 0.0%	4.2%
* Rigid or Artic. Truck " Heavy Truck or Heavy Bus		Hit pedestrian 0 0.0%	09:00 - 09:59 0 0.0%	4.2%
# These categories are NOT mutually exclusive		Permanent obstruction on road 0 0.0%	10:00 - 10:59 0 0.0%	4.2%
Location Type	Road Surface Condition	Hit animal 0 0.0%	11:00 - 11:59 0 0.0%	4.2%
*Intersection 1 100.0%	Wet 0 0.0%	Off road, on straight 0 0.0%	12:00 - 12:59 0 0.0%	4.2%
Non intersection 0 0.0%	Dry 1 100.0%	Off road on straight, hit object 0 0.0%	13:00 - 13:59 0 0.0%	4.2%
* Up to 10 metres from an intersection		Out of control on straight 0 0.0%	14:00 - 14:59 0 0.0%	4.2%
~ 07:30-09:30 or 14:30-17:00 on school days		Off road, on curve 0 0.0%	15:00 - 15:59 0 0.0%	4.2%
Collision Type	Natural Lighting	Off road on curve, hit object 0 0.0%	16:00 - 16:59 0 0.0%	4.2%
Single Vehicle 0 0.0%	Dawn 0 0.0%	Out of control on curve 0 0.0%	17:00 - 17:59 0 0.0%	4.2%
Multi Vehicle 1 100.0%	Daylight 1 100.0%	Other crash type 0 0.0%	18:00 - 18:59 0 0.0%	4.2%
			19:00 - 19:59 0 0.0%	4.2%
Road Classification	Speed Limit	~ 40km/h or less 0 0.0%	20:00 - 21:59 0 0.0%	8.3%
Freeway/Motorway 0 0.0%	40 km/h or less 0 0.0%	80 km/h zone 0 0.0%	22:00 - 24:00 0 0.0%	8.3%
State Highway 0 0.0%	50 km/h zone 1 100.0%	90 km/h zone 0 0.0%	Street Lighting Off/Nil % of Dark	
Other Classified Road 0 0.0%	60 km/h zone 0 0.0%	100 km/h zone 0 0.0%	0 of 0 in Dark 0.0%	
Unclassified Road 1 100.0%	70 km/h zone 0 0.0%	110 km/h zone 0 0.0%		
Day of the Week	# Holiday Periods	New Year 0 0.0%	Queen's BD 0 0.0%	Easter SH 0 0.0%
Monday 0 0.0%	Thursday 0 0.0%	Sunday 0 0.0%	Aust. Day 0 0.0%	Labour Day 0 0.0%
Tuesday 1 100.0%	Friday 0 0.0%	WEEKDAY 1 100.0%	Easter 0 0.0%	Christmas 0 0.0%
Wednesday 0 0.0%	Saturday 0 0.0%	WEEKEND 0 0.0%	Anzac Day 0 0.0%	January SH 1 100.0%
				June/July SH 0 0.0%
				Sept./Oct. SH 0 0.0%
				December SH 0 0.0%

Crashid dataset Kopa Street, Whitebridge - 1/1/2007 to 2013\*

**Note:** Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Rep ID: REG01 Office: Hunter User ID: gilletj

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### Detailed Crash Report - sorted

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
<b>Natural Lighting</b>																				
<b>Hunter Region</b>				<b>Lake Macquarie City LGA</b>				<b>Whitebridge</b>				<b>Kopa St</b>								<b>S F</b>
695599	05/01/2010	Tue	06:15		at WARAN RD	TJN	STR	Fine	Dry	50	2	TRK	M38	N in WARAN RD		30 Turning right	I	0	1	
E76546701					Daylight	DCA : 202		Opp - Right-thru				CAR	M31	S in WARAN RD		50 Proceeding in lane				
<b>Report Totals:</b>		Total Crashes: 1				Fatal Crashes: 0				Injury Crashes: 1				Killed: 0				Injured: 1		

Crashid dataset Kopa Street, Whitebridge - 1/1/2007 to 2013\*

**Note:** Ordered by: Crash Date. Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

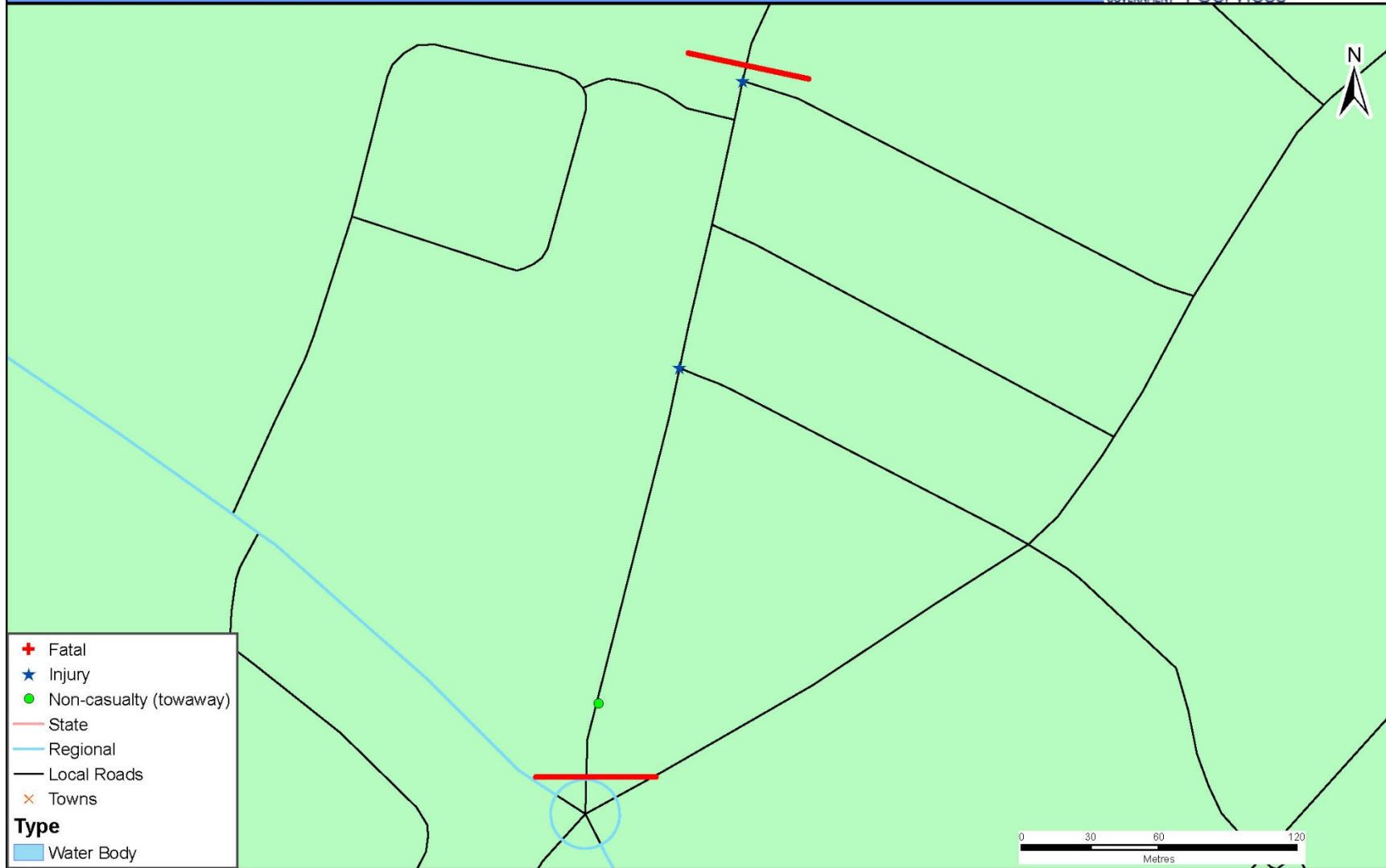
## Waran Street: Dudley Road to Turrug Street, Whitebridge

Crash Period: 1st July 2007 to 30th June 2012 (Finalised Data)

Plus Provisional Data (Which is incomplete & subject to change) from September Quarter 2012



**Transport**  
Roads & Maritime  
Services



Map data copyright (C) 2007 Roads and Traffic Authority, NSW. Some spatial data courtesy of NSW Department of Lands.

Jason Gillett

June 2013

## Summary Crash Report

# Crash Type	Contributing Factors	Crash Movement	CRASHES	CASUALTIES
Car Crash 2 66.7%	Speeding 0 0.0%	Intersection, adjacent approaches 0 0.0%	Fatal crash 0 0.0%	Killed 0 0.0%
Light Truck Crash 3 100.0%	Fatigue 0 0.0%	Head-on (not overtaking) 1 33.3%	Injury crash 2 66.7%	Injured 3 100.0%
Rigid Truck Crash 0 0.0%		Opposing vehicles; turning 1 33.3%	Non-casualty crash 1 33.3%	^ Unrestrained 0 0.0%
Articulated Truck Crash 0 0.0%		U-turn 0 0.0%	^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn	
'Heavy' Truck Crash (0) (0.0%)	Weather	Rear-end 0 0.0%	Time Group	% of Day
Bus Crash 0 0.0%	Fine 3 100.0%	Lane change 0 0.0%	00:01 - 02:59 1 33.3%	12.5%
"Heavy Vehicle Crash (0) (0.0%)	Rain 0 0.0%	Parallel lanes; turning 0 0.0%	03:00 - 04:59 0 0.0%	8.3%
Emergency Vehicle Crash 0 0.0%	Overcast 0 0.0%	Vehicle leaving driveway 0 0.0%	05:00 - 05:59 0 0.0%	4.2%
Motorcycle Crash 0 0.0%	Fog or mist 0 0.0%	Overtaking; same direction 0 0.0%	06:00 - 06:59 1 33.3%	4.2%
Pedal Cycle Crash 0 0.0%	Other 0 0.0%	Hit parked vehicle 0 0.0%	07:00 - 07:59 0 0.0%	4.2%
Pedestrian Crash 1 33.3%	Road Surface Condition	Hit railway train 0 0.0%	08:00 - 08:59 0 0.0%	4.2%
* Rigid or Artic. Truck " Heavy Truck or Heavy Bus		Hit pedestrian 1 33.3%	09:00 - 09:59 0 0.0%	4.2%
# These categories are NOT mutually exclusive		Permanent obstruction on road 0 0.0%	10:00 - 10:59 0 0.0%	4.2%
Location Type	Wet 0 0.0%	Hit animal 0 0.0%	11:00 - 11:59 0 0.0%	4.2%
*Intersection 2 66.7%	Dry 3 100.0%	Off road, on straight 0 0.0%	12:00 - 12:59 0 0.0%	4.2%
Non intersection 1 33.3%	Snow or ice 0 0.0%	Off road on straight, hit object 0 0.0%	13:00 - 13:59 0 0.0%	4.2%
* Up to 10 metres from an intersection		Out of control on straight 0 0.0%	14:00 - 14:59 0 0.0%	4.2%
~ 07:30-09:30 or 14:30-17:00 on school days		Off road, on curve 0 0.0%	15:00 - 15:59 1 33.3%	4.2%
Collision Type	Natural Lighting	Off road on curve, hit object 0 0.0%	16:00 - 16:59 0 0.0%	4.2%
Single Vehicle 0 0.0%	Dawn 0 0.0%	Out of control on curve 0 0.0%	17:00 - 17:59 0 0.0%	4.2%
Multi Vehicle 3 100.0%	Daylight 2 66.7%	Other crash type 0 0.0%	18:00 - 18:59 0 0.0%	4.2%
Road Classification	Dusk 0 0.0%		19:00 - 19:59 0 0.0%	4.2%
Freeway/Motorway 0 0.0%	Darkness 1 33.3%		20:00 - 21:59 0 0.0%	8.3%
State Highway 0 0.0%			22:00 - 24:00 0 0.0%	8.3%
Other Classified Road 0 0.0%	Speed Limit		Street Lighting Off/Nil	% of Dark
Unclassified Road 3 100.0%	~ 40km/h or less 0 0.0%		0 of 1 in Dark 0.0%	
	40 km/h or less 0 0.0%	80 km/h zone 0 0.0%		
	50 km/h zone 2 66.7%	90 km/h zone 0 0.0%		
	60 km/h zone 1 33.3%	100 km/h zone 0 0.0%		
	70 km/h zone 0 0.0%	110 km/h zone 0 0.0%		
Day of the Week	# Holiday Periods	New Year 0 0.0%	Queen's BD 0 0.0%	Easter SH 0 0.0%
Monday 0 0.0%	Thursday 0 0.0%	Sunday 0 0.0%	Aust. Day 0 0.0%	Labour Day 0 0.0%
Tuesday 1 33.3%	Friday 1 33.3%	WEEKDAY 2 66.7%	Easter 0 0.0%	Christmas 0 0.0%
Wednesday 0 0.0%	Saturday 1 33.3%	WEEKEND 1 33.3%	Anzac Day 0 0.0%	January SH 1 33.3%
				June/July SH 0 0.0%
				Sept./Oct. SH 0 0.0%
				December SH 0 0.0%

Crashid dataset Waran Street: Dudley Road to Turrug Street, Whitebridge - 1/1/2007 to 2013\*

**Note:** Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

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Generated: 11/06/2013 15:25

### Detailed Crash Report - sorted

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors	
Natural Lighting																					
Hunter Region Lake Macquarie City LGA						Whitebridge Waran Rd															
633518	02/08/2008	Sat	00:15	50 m	N DUDLEY RD	2WY	STR	Fine	Dry	50	2	TRK	M21	N in WARAN RD	50	Incorrect side	N	0	0		
E34368236					Darkness	DCA :	201	Opp - Head on				CAR	M20	S in WARAN RD	50	Proceeding in lane					
Hunter Region Lake Macquarie City LGA						Whitebridge Kopa St															
695599	05/01/2010	Tue	06:15		at WARAN RD	TJN	STR	Fine	Dry	50	2	TRK	M38	N in WARAN RD	30	Turning right	I	0	1		
E76546701					Daylight	DCA :	202	Opp - Right-thru				CAR	M31	S in WARAN RD	50	Proceeding in lane					
Hunter Region Lake Macquarie City LGA						Whitebridge Turrug St															
795029	04/05/2012	Fri	15:30		at WARAN RD	TJN	STR	Fine	Dry	60	3	TRK	M47	N in TURRUG ST	40	Proceeding in lane	I	0	2		
E47970146					Daylight	DCA :	3	Ped - Far side				PED	M13	W in WARAN RD		Run across carriageway					
												PED	M12	W in WARAN RD		Run across carriageway					
Report Totals:		Total Crashes: 3				Fatal Crashes: 0				Injury Crashes: 2				Killed: 0				Injured: 3			

Crashid dataset Waran Street: Dudley Road to Turrug Street, Whitebridge - 1/1/2007 to 2013\*

**Note:** Ordered by: Crash Date. Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

## Appendix C. Sidra Analysis Results

**Table C1 – Existing (2013) operation of roundabout at Dudley Road and Bulls Garden Road**

Approach	Level of service	Delay (seconds)	Queue (metres)
Dudley Rd south	A / A	9.1 / 9.0	24.3 / 21.7
Lonus Avenue	A / A	10.0 / 12.0	2.6 / 5.0
Waran Road	A / B	10.8 / 14.6	10.0 / 9.4
Dudley Rd north	A / A	11.1 / 13.3	16.3 / 37.8
Bulls Garden Rd	A / B	11.3 / 15.1	28.9 / 62.4

NB – results for AM / PM peak

**Table C2 –Existing (2013) plus development traffic operation of roundabout at Dudley Road and Bulls Garden Road**

Approach	Level of service	Delay (seconds)	Queue (metres)
Dudley Rd south	A / A	9.5 / 9.3	25.1 / 23.8
Lonus Avenue	A / A	10.3 / 12.0	5.3 / 5.0
Waran Road	A / B	10.8 / 15.2	10.0 / 10.4
Dudley Rd north	A / B	11.1 / 15.5	16.3 / 47.4
Bulls Garden Rd	A / B	11.8 / 17.1	30.7 / 73.2

NB – results for AM / PM peak

The above results confirm that the additional traffic associated with the development of the subject site will have an acceptable impact upon the operation of the roundabout controlled intersection of Dudley Road and Bulls Garden Road. The additional traffic will increase the delays and congestion over the existing situation but overall the operation of the roundabout is good.

The intersection was then modelled for the future (2023) design year with allowance for background traffic growth of 1% per annum on all approaches.

**Table C3 – Design Year 2023 base operation of roundabout at Dudley Road and Bulls Garden Road**

Approach	Level of service	Delay (seconds)	Queue (metres)
Dudley Rd south	A / A	9.4 / 9.3	28.9 / 25.9
Lonus Avenue	A / A	10.3 / 12.8	3.1 / 6.2
Waran Road	A / B	11.5 / 15.2	12.1 / 11.7
Dudley Rd north	A / B	11.8 / 17.3	20.0 / 55.7
Bulls Garden Rd	A / B	13.4 / 21.9	40.1 / 101.9

NB – results for AM / PM peak

**Table C4 – 2013 plus development traffic operation of roundabout at Dudley Road and Bulls Garden Road**

Approach	Level of service	Delay (seconds)	Queue (metres)
Dudley Rd south	A / A	9.8 / 9.5	30.0 / 27.0
Lonus Avenue	A / A	10.7 / 12.5	6.2 / 5.9
Waran Road	A / B	11.5 / 15.8	12.2 / 12.2
Dudley Rd north	A / B	11.8 / 19.6	20.2 / 63.9
Bulls Garden Rd	A / B	14.2 / 23.4	43.0 / 108.1

NB – results for AM / PM peak

The above results confirm that the additional traffic associated with the development of the subject site will have an acceptable impact upon the future operation of the roundabout controlled intersection of Dudley Road and Bulls Garden Road in 2023 allowing for 10% overall background growth. The additional traffic associated with the development will increase the delays and congestion over the base model but overall the operation of the roundabout is good.