

Proposed alterations & additions at 51 Grandview Drive, Lot 26, D.P. 16029, in Newport, NSW

Stage 3 (Detailed design) Road Safety Audit

May 2020

Prepared for **Elizabeth McCartney Royal**,
the resident of 51 Grandview Drive, in
Newport, NSW

Traffic Engineering Centre
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Revision	Details	Date	Amended by

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Approved by: Zoran Bakovic

Date: 5 May 2020

Distribution: Elizabeth McCartney Royal, Traffic Engineering Centre (file)

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1. Summary

Audited project:	Proposed alterations & additions at 51 Grandview Drive, Lot 26, D.P. 16029, in Newport, NSW
Audit for:	Elizabeth McCartney Royal, the resident of 51 Grandview Drive, in Newport, NSW
Address:	51 Grandview Drive, in Newport, NSW
Email address:	emccartneyroyal@gmail.com
Telephone:	0401502140
Client's contact:	Elizabeth McCartney Royal
Auditors:	Zoran Bakovic (Lead Level 3 Road Safety Auditor - ID:471), Director / Traffic Engineering & Road Safety Expert, Traffic Engineering Centre Pty Ltd Snezana Bakovic (Level 3 Road Safety Auditor - ID:470), Associate / Principal Traffic Engineer, Traffic Engineering Centre Pty Ltd Ben Hubbard (Level 3 Road Safety Auditor - ID:322), Associate / Principal Traffic Engineer, Traffic Engineering Centre Pty Ltd
Audit type:	Stage 3 (detailed design) Road Safety Audit
Commencement meeting:	27 April 2020
Site visit:	27 April 2020
Completion meeting:	to be advised by Elizabeth McCartney Royal
Previous audit:	/

This Stage 3 (Detailed design) Road Safety Audit considered the detailed design for a proposed alterations & additions at 51 Grandview Drive, Lot 26, D.P. 16029, in Newport, NSW.

The audit checked that the safety features of the design were suitable for the intended purpose and so conducive to a safety road environment for all types of road users.

This report documents the identified audit findings dated 5 May 2020.

The road safety audit identified one (1) safety issue, with risk attached this issue was classified as high priority. Two (2) issues were identified as 'to note' only.

2. Introduction

This report presents the findings of the Stage 3 (Detailed design) Road Safety Audit for the detailed design of alterations & additions the property at 51 Grandview Drive, Lot 26, D.P. 16029, in Newport, NSW (refer to Figure 2.1).



Figure 2.1: Study area - Locality map
 (Source: nearmap)

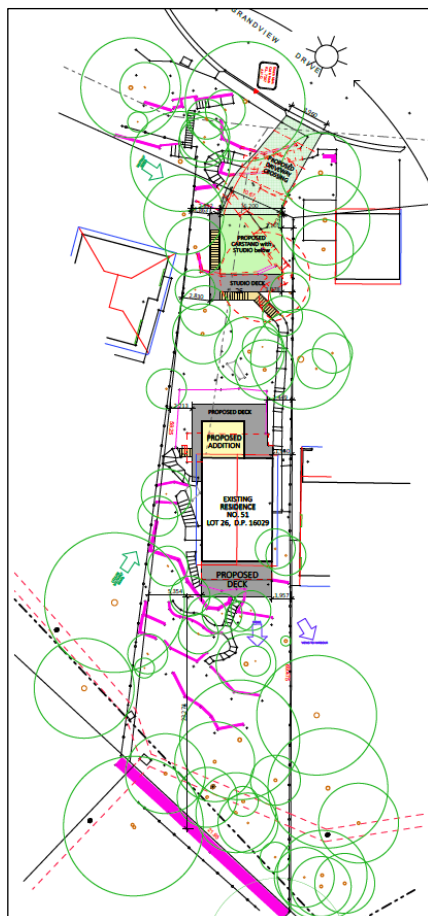


Figure 2.2: Study area - Locality plan
 (Source: nearmap)

2.1 Audit objectives

The main objective of this road safety audit was to identify relevant road safety deficiencies in the preliminary design which, if addressed, would improve safety for all categories of road users.

The other objectives of this Stage 3 (detailed design) Road Safety Audit were to:

- check the compatibility between the design's safety features and the functional classification of the roads
- identify any design's feature that can, either now or with time, create a safety problem
- identify additional design's features at the site that pose a safety hazard or risk to any of the road users
- determine the extent of deficiencies in the design, considering all road user groups

In addition, the Audit considered the following requirements listed in Chapter 18 -Road Safety Audit, of the Northern Beaches Council's Development Application Assessment Report, associated to the Application Number DA2019/0863:

"The application is to undertake a Safety Audit of the driveway position and the crash barrier location. The outcome should reveal if there is a nexus for the location of the driveway to change, or if additional safety measures are required within the roadway."

2.2 Procedures and reference material

The procedures used are those in the Roads and Maritime Services' (2011) *Guidelines for Road Safety Audit Practices* and Austroads' (2009) *Guide to Road safety – Part 6: Road Safety Audit*.

The Stage 3 (Detailed design) Road Safety Audit checklist from the Austroads' guide was used by the audit team as a reference.

It should be noted that positive attributes of the design have not been discussed.

2.3 Supporting information

Table 2.1 lists the drawings that have been provided for the purpose of this road safety audit.

Table 2.1: Drawing list

Drawing number	Review	Description
DA 01	/	Alterations & Additions at 51 Grandview Drive, Lot 26, D.P. 16029, in Newport, NSW
DA 02	/	Alterations & Additions at 51 Grandview Drive, Lot 26, D.P. 16029, in Newport, NSW
DA 03	/	Alterations & Additions at 51 Grandview Drive, Lot 26, D.P. 16029, in Newport, NSW
DA 04	/	Alterations & Additions at 51 Grandview Drive, Lot 26, D.P. 16029, in Newport, NSW

2.4 Audit team

This Stage 3 (Detailed design) Road Safety Audit was carried out by the following team:

- **Zoran Bakovic**, Traffic Engineering Centre, Director / Traffic Engineering and Road Safety Expert – Level 3 Road Safety Auditor – Audit team leader (Auditor ID: 471), Master of Engineering (Traffic & Transportation) & Master of Engineering (Traffic & Logistic)
- **Ben Hubbard**, Traffic Engineering Centre, Associate / Principal Traffic Engineer – Level 3 Road Safety Auditor - Audit team member (Auditor ID: 322), Master of Engineering (Civil)
- **Snezana Bakovic**, Traffic Engineering Centre, Associate / Principal Traffic Engineer – Level 3 Road Safety Auditor – Audit team member (Auditor ID:470), Bachelor of Engineering (Traffic & Transportation)

2.5 Responding to the audit report

The responsibility for the design and implementation of this project rests with the client's project management team, not with the auditors. The project manager is under no obligation to accept the audit findings. Also, it is not the role of the auditor to agree or to approve the project manager's responses to the audit. Rather, the audit provides the opportunity to highlight potential road safety problems and have them formally considered by the project manager or design manager in conjunction with all other project considerations.

3. Road safety program

3.1 Commencement meeting

A commencement meeting between Zoran Bakovic, Lead Level 3 Road Safety Auditor (Traffic Engineering Centre Pty Ltd) and Elizabeth McCartney Royal, the resident of 51 Grandview Drive, in Newport, NSW was held at the site, when the auditing procedure was explained in detail.

3.2 Site inspection

Daylight site inspections were undertaken on 27 April 2020 in dry weather and road conditions.

A walk beside the audited road section was undertaken to investigate the surrounding environment and the existing traffic movements and behaviours. A number of photographs and video-footage of the site and adjoining road sections were taken.



Photo 3.1: Grandview Drive, looking westbound toward the development site – in daylight
(Photo: Traffic Engineering Centre Pty Ltd)



Photo 3.2: Grandview Drive, looking westbound toward the development site – at night
(Photo: Traffic Engineering Centre Pty Ltd)

3.3 Completion meeting

Elizabeth McCartney Royal is to advise of the need for a Completion meeting.

3.4 Corrective action response

The road safety audit is a formal process. The road safety audit report is by no means the end of the audit process. The audit report documents the audit teams' identified concerns made to improve the safety of the roads. This report must be responded to by the client with a written response to each and every audit finding.

3.5 Disclaimer

The findings and opinions in the report are based on the examination of the design and might not address all concern existing at the time of the audit. The auditors have endeavoured to identify features of the design that could be modified or removed in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe. The problems identified have been noted in this report and should be considered for improving road safety. Where corrective actions are not taken, this should be reported in writing, providing the reason for the decision. Readers are urged to seek specific advice on particular matters and not to rely solely on this report. While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that everyone relying on it does so at their own risk without any liability to the Auditors.

4. Road Safety audit findings

4.1 Risk level

The rationale behind assessment of risk is shown in Tables 4.1 to 4.3.

Risk level (Table 4.3) would be calculated as a product of likelihood (Table 4.1) and severity (Table 4.2).

Table 4.1: Likelihood

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every five or ten years
Improbable	Less often than once every ten years

Table 4.2: Severity

Severity	Description	Examples
Catastrophic	Likely multiple deaths	High-speed, multi-vehicle crash on a freeway. Car runs into crowded bus stop. Bus and petrol tanker collide. Collapse of a bridge or tunnel.
Serious	Likely death or serious injury	High or medium-speed vehicle/vehicle collision. High or medium-speed collision with a fixed roadside object. Pedestrian or cyclist struck by a car.
Minor	Likely minor injury	Some low-speed vehicle collisions. Cyclist falls from bicycle at low speed. Left-turn rear-end crash in a slip lane.
Limited	Likely trivial injury or property damage only	Some low-speed vehicle collisions. Pedestrian walks into object (no head injury). Car reverses into post.

Table 4.3: Risk level

	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

4.2 Road safety audit findings

The audit findings have been documented in the deficiency log which provides (Table 4.4):

- specific details of each safety deficiency identified during the audit
- priority risk rating for each deficiency item

In accordance with Roads and Maritime Services' preferred practice, the road safety audit does not include recommended actions.

It should be noted that the positive attributes of the detailed design have not been discussed.

Table 4.4: Road safety audit findings

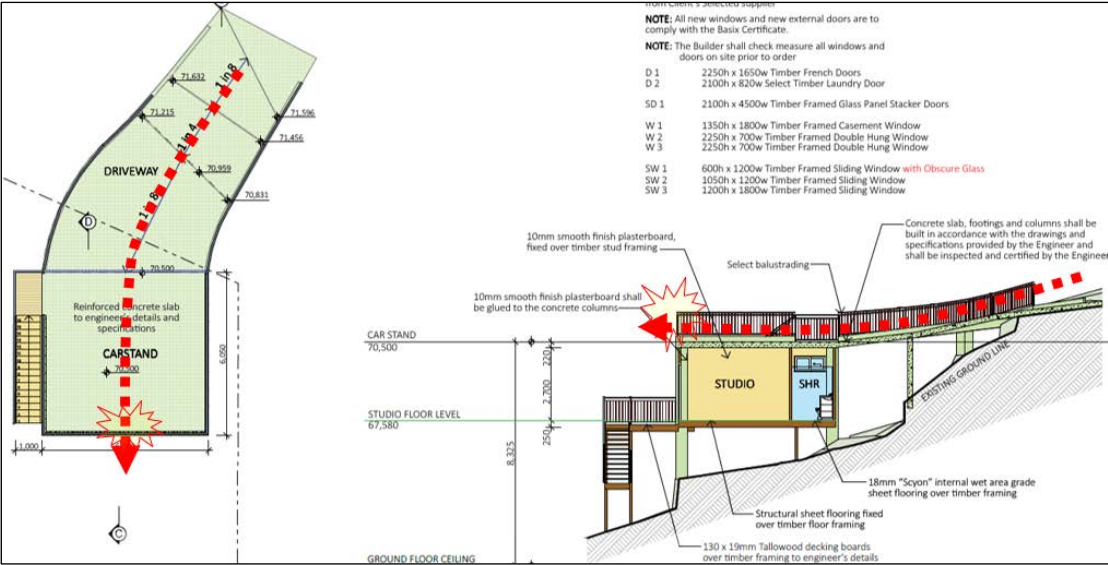



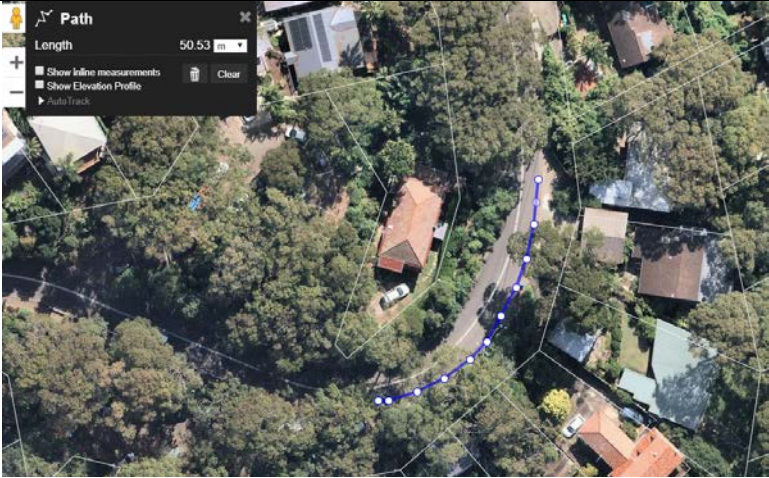

No.	Drawings / Approximate Location	Description of findings	Risk rating (likelihood/severity)
1	DA 03 / Car stand	<p>The design does not propose guardrail safety barriers to stop an errant vehicle from running over the edge and falling into a drop behind the parking space (refer to Figure 4.1). Also, there is no wheel stop proposed on the edge of the car stand, where it is considered necessary to limit the travel of a vehicle into the car stand/parking space.</p> <p>The Auditors also believe that the proposed balustrading is unlikely to stop an errant vehicle, especially considering the downhill Driveway.</p> <p>Consequently, an errant vehicle falling into the drop behind the edge of the proposed car stand could result in severe injury or even death to the occupants.</p> 	High (Improbable / Catastrophic)

Figure 4.1


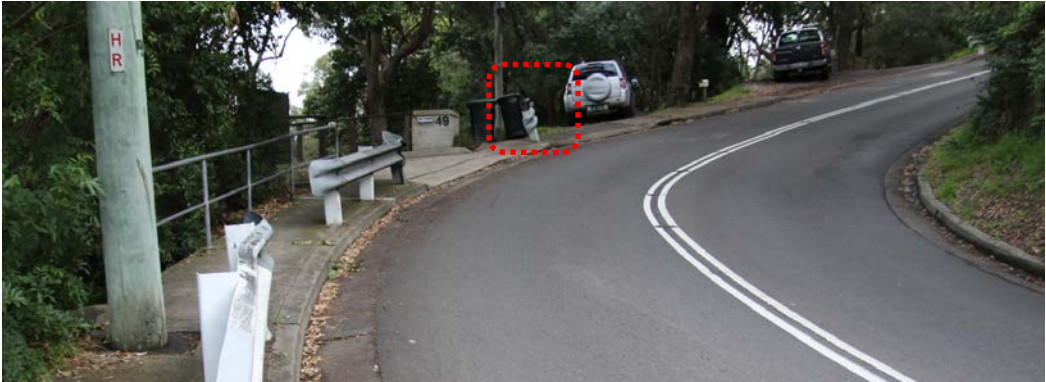
No.	Drawings / Approximate Location	Description of findings	Risk rating (likelihood/ severity)
2	N/A / Grandview Drive, on approach to the Proposed Driveway Crossing	<p>The development site is located within 40km/h speed limit zone (refer to Photo 4.1).</p>  <p>Photo 4.1: Grandview Drive, looking eastbound, from the intersection with toward the development site – at night (Photo: Traffic Engineering Centre Pty Ltd)</p> <p>During the site inspection, the Auditors measured the available Stopping Sight Distance (SSD) [which is the distance to enable a normally alert driver, traveling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead].</p> <p>The available Stopping Sight Distance (SSD) sight distance was measured to be approximately 50m and 75m respectively for eastbound and westbound drivers on Grandview Drive (refer to Photos 4.2 & 4.3, and Figures 4.2 & 4.3).</p>	To note

No.	Drawings / Approximate Location	Description of findings	Risk rating (likelihood/ severity)
2 Cont'd		 <p>Photo 4.2: Grandview Drive, looking eastbound, toward the location of the proposed driveway (Photo: Traffic Engineering Centre Pty Ltd)</p>  <p>Photo 4.3: Grandview Drive, looking eastbound, toward the location of the proposed driveway (Photo: Traffic Engineering Centre Pty Ltd)</p>	

No.	Drawings / Approximate Location	Description of findings	Risk rating (likelihood/ severity)
2 Cont'd		 <p>Figure 4.2 (Source: nearmap)</p>  <p>Figure 4.3 (Source: nearmap)</p>	

No.	Drawings / Approximate Location	Description of findings	Risk rating (likelihood/ severity)
2 Cont'd		<p>As measured at the site, the slope of the roadway is 12.7% (refer to Photo 4.4).</p>  <p>Photo 4.4: Grandview Drive, looking eastbound, from the location of the proposed driveway (Photo & measurement: Traffic Engineering Centre Pty Ltd)</p> <p>According to the Austroads' Guide to Road Design, Part 3: Geometric Design, for a speed limit of 40km/h and a grade of more than 8%, the desirable minimum values for the Stopping Sight Distance is 37m for eastbound drivers, and 45m for westbound drivers 40m, for a standard Drivers Reaction Time (R_t) of 2.0 seconds (refer to table 4.1).</p> <p>This means that the available Stopping Sight Distance (SSD) does fully comply with the desirable minimum values as per Austroads' Guide to Road Design, Part 3: Geometric Design.</p>	

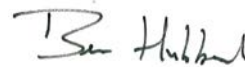
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2 Cont'd		<div>GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN</div> <div>Table 5.4: Stopping sight distances for cars on sealed roads</div> <table><tr><th>Design speed (km/h)</th><th colspan="3">Absolute minimum values Only for specific road types and situations⁽¹⁾ based on d = 0.46 ^{(2), (3)}</th><th colspan="3">Desirable minimum values for most urban and rural road types based on d = 0.36</th><th colspan="2">Desirable values for major highways and freeways based on d = 0.26</th></tr><tr><td></td><td>R_T = 1.5s⁽⁴⁾</td><td>R_T = 2.0 s⁽⁴⁾</td><td>R_T = 2.5s</td><td>R_T = 1.5 s⁽⁴⁾</td><td>R_T = 2.0 s⁽⁴⁾</td><td>R_T = 2.5 s</td><td>R_T = 2.0s</td><td>R_T = 2.5 s</td></tr><tr><td>40</td><td>30</td><td>36</td><td>–</td><td>34</td><td>40</td><td>45</td><td>–</td><td>–</td></tr><tr><td>50</td><td>42</td><td>49</td><td>–</td><td>48</td><td>55</td><td>62</td><td>–</td><td>–</td></tr><tr><td>60</td><td>56</td><td>64</td><td>–</td><td>64</td><td>73</td><td>81</td><td>–</td><td>–</td></tr><tr><td>70</td><td>71</td><td>81</td><td>–</td><td>83</td><td>92</td><td>102</td><td>113</td><td>123</td></tr><tr><td>80</td><td>88</td><td>99</td><td>–</td><td>103</td><td>114</td><td>126</td><td>141</td><td>152</td></tr><tr><td>90</td><td>107</td><td>119</td><td>132</td><td>126</td><td>139</td><td>151</td><td>173</td><td>185</td></tr><tr><td>100</td><td>–</td><td>141</td><td>155</td><td>–</td><td>165</td><td>179</td><td>207</td><td>221</td></tr><tr><td>110</td><td>–</td><td>165</td><td>180</td><td>–</td><td>193</td><td>209</td><td>244</td><td>260</td></tr><tr><td>120</td><td>–</td><td>190</td><td>207</td><td>–</td><td>224</td><td>241</td><td>285</td><td>301</td></tr><tr><td>130</td><td>–</td><td>217</td><td>235</td><td>–</td><td>257</td><td>275</td><td>328</td><td>346</td></tr><tr><td>Corrections due to grade ^{(5) (6)}</td><td>-8</td><td>-6</td><td>-4</td><td>-2</td><td>2</td><td>4</td><td>6</td><td>8</td></tr><tr><td>40</td><td>5</td><td>3</td><td>2</td><td>1</td><td>-1</td><td>-2</td><td>-2</td><td>-3</td></tr><tr><td>50</td><td>8</td><td>5</td><td>3</td><td>2</td><td>-1</td><td>-3</td><td>-4</td><td>-5</td></tr><tr><td>60</td><td>11</td><td>8</td><td>5</td><td>2</td><td>-2</td><td>-4</td><td>-6</td><td>-7</td></tr><tr><td>70</td><td>15</td><td>11</td><td>7</td><td>3</td><td>-3</td><td>-5</td><td>-8</td><td>-10</td></tr><tr><td>80</td><td>20</td><td>14</td><td>9</td><td>4</td><td>-4</td><td>-7</td><td>-10</td><td>-13</td></tr><tr><td>90</td><td>25</td><td>18</td><td>11</td><td>5</td><td>-5</td><td>-9</td><td>-13</td><td>-16</td></tr><tr><td>100</td><td>31</td><td>22</td><td>14</td><td>6</td><td>-6</td><td>-11</td><td>-16</td><td>-20</td></tr><tr><td>110</td><td>38</td><td>26</td><td>17</td><td>8</td><td>-7</td><td>-13</td><td>-19</td><td>-24</td></tr><tr><td>120</td><td>45</td><td>31</td><td>20</td><td>9</td><td>-8</td><td>-16</td><td>-22</td><td>-29</td></tr><tr><td>130</td><td>53</td><td>37</td><td>23</td><td>11</td><td>-10</td><td>-18</td><td>-26</td><td>-34</td></tr></table> <div>Table 4.1 (Source: Austroads' Guide to Road Design, Part 3: Geometric Design)</div>	Design speed (km/h)	Absolute minimum values Only for specific road types and situations ⁽¹⁾ based on d = 0.46 ^{(2), (3)}			Desirable minimum values for most urban and rural road types based on d = 0.36			Desirable values for major highways and freeways based on d = 0.26			R _T = 1.5s ⁽⁴⁾	R _T = 2.0 s ⁽⁴⁾	R _T = 2.5s	R _T = 1.5 s ⁽⁴⁾	R _T = 2.0 s ⁽⁴⁾	R _T = 2.5 s	R _T = 2.0s	R _T = 2.5 s	40	30	36	–	34	40	45	–	–	50	42	49	–	48	55	62	–	–	60	56	64	–	64	73	81	–	–	70	71	81	–	83	92	102	113	123	80	88	99	–	103	114	126	141	152	90	107	119	132	126	139	151	173	185	100	–	141	155	–	165	179	207	221	110	–	165	180	–	193	209	244	260	120	–	190	207	–	224	241	285	301	130	–	217	235	–	257	275	328	346	Corrections due to grade ^{(5) (6)}	-8	-6	-4	-2	2	4	6	8	40	5	3	2	1	-1	-2	-2	-3	50	8	5	3	2	-1	-3	-4	-5	60	11	8	5	2	-2	-4	-6	-7	70	15	11	7	3	-3	-5	-8	-10	80	20	14	9	4	-4	-7	-10	-13	90	25	18	11	5	-5	-9	-13	-16	100	31	22	14	6	-6	-11	-16	-20	110	38	26	17	8	-7	-13	-19	-24	120	45	31	20	9	-8	-16	-22	-29	130	53	37	23	11	-10	-18	-26	-34	
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No.	Drawings / Approximate Location	Description of findings	Risk rating (likelihood/ severity)
3	N/A / beside Grandview Drive, close to the eastern edge of the entry driveway	<p>The road furniture circled on Photos 4.5 & 4.6 is not considered by the Auditors to be part of a safety barrier system as it clearly would not be capable of containing or redirecting an errant vehicle.</p>  <p>Photo 4.5 (Photo: Traffic Engineering Centre Pty Ltd)</p>  <p>Photo 4.6 (Photo: Traffic Engineering Centre Pty Ltd)</p>	To note

No.	Drawings / Approximate Location	Description of findings	Risk rating (likelihood/ severity)
3 Cont'd		<p>When considering whether to install a safety barrier, it is important to remember that the barrier will present some danger to the occupants of errant vehicles, and especially to unprotected road users such as motorcyclists. A barrier should only be installed if a collision with it will present less of an injury risk to vehicle users and occupants than would result from a collision with the roadside hazard that is to be shielded by the barrier.</p> <p>The road furniture circled in the above photos is a failed attempt to install a safety barrier and is not capable of shielding and protecting anything or anyone behind it. It is thus a road side hazard that would increase risk to road users if struck and so the Auditors are of the opinion that, as such, this road furniture is redundant and should be removed from this location.</p> <p>Incidentally, as observed at the site, this road furniture neither obstructs sight distance toward and from the access driveway nor it is likely to obstruct the swept path of a vehicle entering or exiting the property and so removal is for safety reasons and no other reason.</p>	

5. Formal statement

The findings and opinions in the report are based on the examination of the design and might not address all concerns existing at the time of the audit. The Auditors have endeavoured to identify features of the design that could be modified or removed in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe. While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that anyone relying on it does so



.....
Zoran Bakovic

.....
Ben Hubbard

Director / Traffic Engineering & Road
Safety Expert

Associate / Principal Traffic Engineer

Master of Engineering (Traffic &
Transportation) & Master of
Engineering (Traffic & Logistic)

Master of Engineering (Civil)

Level 3 Road Safety Auditor
(Auditor ID: 471)

Level 3 Road Safety Auditor
(Auditor ID:322)

5 May 2020

5 May 2020



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Snezana Bakovic

Associate / Principal Traffic Engineer

Bachelor of Engineering (Traffic &
Transportation)

(Auditor ID:470)
Level 3 Road Safety Auditor

5 May 2020