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Addendum 2: Lower Hunter Land Development at Black Hill Traffic Implication of the Hunter Expressway

1 Overview

Hyder Consulting has previously assessed the network impact from the Black Hill site in support of the Concept Plan application that was lodged with the Department of Planning on April 2009. Six access options were modelled in support of a concept plan for employment land development at Black Hill. The impact of each access option to the F3 Freeway and John Renshaw Drive was assessed. The analysis determined that the preferred access option comprised a left in only from the F3 Freeway and a full access on John Renshaw Drive via a signalised T junction (previous option 6). The preferred access option demonstrated greater efficiency over the broader network.

The analysis also recommended that a left turn out to the F3 Freeway should be reconsidered when the RTA finalises the concept plan for the proposed F3 to Raymond Terrace Link.

Detail modelling assumptions and results for the Black Hill site access options are documented in the following Hyder traffic reports:

1 *Lower Hunter Land Development, Traffic and Transport, Northern Estate, Black Hill,* Hyder Consulting, December 2008.

2 *Addendum 1: Modelling of additional access options on the John Renshaw Drive, Black Hill*, Hyder Consulting, March 2009.

During 2008 and March 2009 Hyder undertook the traffic analysis in support of the Black Hill site concept plan without the Hunter Expressway (previously known as F3 to Branxton Link). During May 2009, the Federal Government approved the funding for the Hunter Expressway. RTA has now asked Hyder to remodel the network impact from the Black Hill site in conjunction with the Hunter Expressway. During May and June 2009 RTA commented on Hyder's traffic report *Addendum 1* which was submitted as part of the assessment of Black Hill access options. RTA advised Hyder to revise the traffic modelling assumptions, including the trip generation rate, and deleting unfunded future projects. Following confirmation from the RTA, we have summarised modelling assumptions which form the basis of this traffic modelling investigation:

- Inclusion of Hunter Expressway in all modelling scenarios;
- Deletion of RTA unfunded future roads as per Table 3.1 of Hyder's traffic report, December 2008;
- Inclusion of the proposed F3 to Raymond Terrace Link bearing in mind that construction of the F3 to Raymond Terrace Link is not expected until after 2026;
- Traffic generation rate for Black Hill to be 0.58 (AM Peak) and 0.70 (PM peak) trips per 100 square meters GLFA, this being consistent with other industrial developments planned in the Hunter;
- Removal of trip generation discount factors of 25% to account for the conversion from GFA to GLFA; and

- Removal of self-contained (internal to internal) trips i.e. no reduction in the above trip generation rate.

This addendum 2 provides an overview of our modelling investigation on the following issues:

- Future traffic impact on the Black Hill site access with the Hunter Expressway in place. Following the Hunter Expressway approval, RTA is now proposing to construct the new freeway from the Newcastle interchange on the F3 Freeway, to the New England Highway at Branxton. The project involves 40 km of new high standard dual carriageway road. The project will be delivered under two separate packages of works, and will be opened as one project on completion of both packages of works. It is anticipated that this new freeway will open to traffic by 2013. The construction of the Hunter Expressway will redistribute traffic on the John Renshaw Drive, F3 Freeway and Newcastle Link Road corridors. Figure 1 shows the Black Hill site with respect to the Hunter Expressway.
- Revised trip generation rate for the Black Hill site and its impact on the access performance; and
- Delete RTA's unfunded roads which may influence traffic on the F3 Freeway and John Renshaw Drive. The F3 to Raymond Terrace Link was assumed in place from 2026.

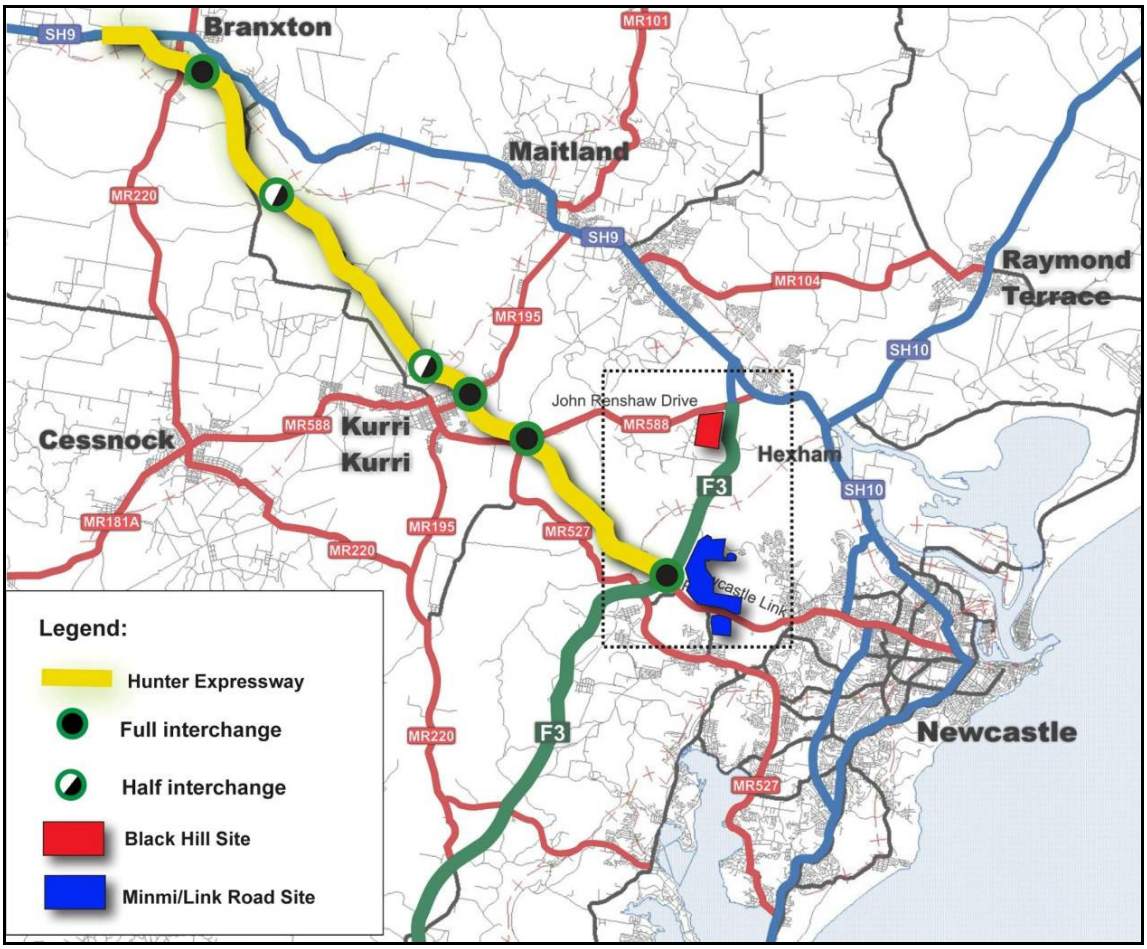

Figure 1 Coal and Allied Northern Developable Lands and Hunter Expressway

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2 Traffic Modelling Approach

In assessing the Black Hill site access with the Hunter Expressway in place, Hyder adopted a similar modelling technique and methodology to that documented in Chapters 3 and 4 of traffic and transport report, *Lower Hunter Land Development, Traffic and Transport, Northern Estate, Black Hill*, Hyder Consulting, December 2008. The traffic model was run for future years with the Hunter Expressway assuming a staged development of the Black Hill site. We ran three traffic models (viz TransCAD, Paramics, SIDRA) for future years assessing the impact of the Black Hill site development.

The Black Hill site concept plan included a six stage development program (see Table 1). The gross leasable floor area (GLFA) is estimated to be approximately 800,000 square meters with the ability to create at least 2,500 full time jobs. The site is projected to commence operations in 2016. Approximately 50% - 60% of the site is anticipated to be developed by 2026. Full development may be achieved by 2031 depending on market expectations for employment land in the Hunter.

Table 1 Staging of Black Hill Site

Stage	Location/Sector	Total GLFA Area / Stage [m2]	Progressive Total Development Area [m2]
1	North East	171,139	171,139
2	Central East	153,433	324,572
3	North West	99,989	424,561
4	Central West	122,518	547,078
5	South East	148,604	695,683
6	South West	94,534	790,216

Figure 2 shows broader staging plan for Black Hill site.

Figure 2 Staging plan for Black Hill site

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3 Traffic Generation

Hyder revised the traffic generation rate for the Black Hill site on the basis of advice received from the RTA. A copy of RTA's comment on Hyder's traffic report is included in Appendix A. The new traffic generation rate for the Black Hill site is proposed to be 0.58 (AM Peak) and 0.70 (PM peak) trips per 100 square metres GLFA respectively. This new trip rate is about 23% to 25% higher than the previous trip generation rate which was 0.47 (AM Peak) and 0.56 (PM peak) trips per 100 square metres GLFA. Table 2 shows the estimated trip generation from the Black Hill site for the critical AM and PM peak hours based on new the trip generation rate. The result shows that the Black Hill site could generate between 4,600 and 5,600 peak hour trips when the site is fully developed.

Table 2 Traffic Generation for Black Hill

Black Hill Yields (GLFA, m^2)	**Peak Hour Trip Rate/100 m^2 GLFA**		**Total Trips (One Hour)**	
	AM	**PM**	**AM**	**PM**
800, 000	0.58	0.70	4,640	5,600

Hyder assessed the implication of the revised traffic generation on the preferred access option to determine the maximum development capacity. The analysis adopted an iterative modelling approach which determined that the preferred access option (a left in only from the F3 Freeway and a full access on John Renshaw Drive via a signalised T junction) could accommodate a maximum of 500,000 square metres GLFA of Black Hill development. Section 5 of this addendum documents the model results for the access performance.

4 Traffic Distribution

Traffic distribution to/from the Black Hill site was a key input in determining the performance of the signalised T junction with John Renshaw Drive. Future growth and associated traffic distribution on the F3 Freeway and John Renshaw Drive from the Hunter Expressway was determined using the Lower Hunter Model (TransCAD model). The AM peak hour traffic distribution on the preferred access option is shown in Figures 3. The result suggests strong inbound distribution patterns from the south – F3 (33%), east – New England Highway / F3 to Raymond Terrace Link (23%), north –Weakleys Drive (22%), west – John Renshaw Dr (18%). With the Hunter Expressway, the model suggests strong inbound and outbound trips to and from the west of John Renshaw Drive providing access with Cessnock, Lake Macquarie, Maitland/Lochinvar, Branxton and the Upper Hunter.

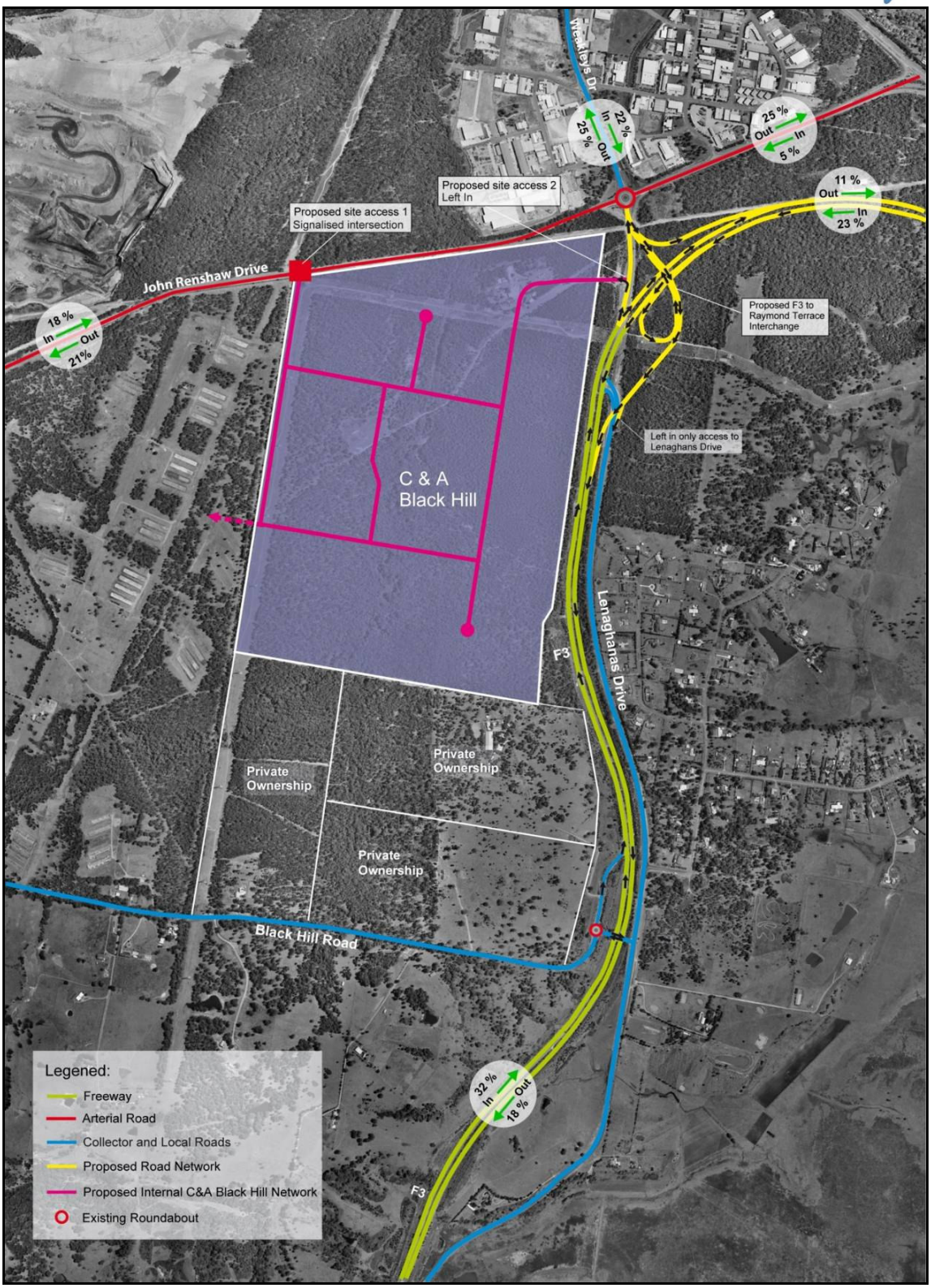

Figure 3 Forecasts AM Peak Traffic Distribution for year 2031

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5 Model Results

This section documents the operational performance of the signalised T-junction on John Renshaw Drive at the Black Hill site access. The modelling result suggests the need to revise the previous lane configuration of the signals due to the increased trip generation rate, and the traffic distributional effect of the Hunter Expressway. With 800,000 square metres of GLFA, the signalised T-junction on John Renshaw Drive showed LoS F, indicating that one egress from the Black Hill estate is inadequate, particularly for PM peak traffic.

The model also assumed expected background growth on John Renshaw Drive up to 2031 combined with other planned developments contained in the Lower Hunter Regional Strategy.

Hyder therefore adopted an iterative modelling process to determine the optimum lane configuration for the John Renshaw Drive signals. The signal configuration was tested with various combinations of Black Hill site GLFA assuming a new traffic distribution from the Hunter Expressway. The expected queue length on John Renshaw Drive was examined using the Paramics model (see Appendix A).

The modelling results suggest that a maximum of 500,000 square metres GLFA could be developed with one ingress on the F3 Freeway and one access/egress at John Renshaw Drive. An indicative layout of the proposed access/egress (signalised T-junction) is shown in Figure 4. A dual right turn (up to 200 metres) on John Renshaw Drive is proposed to facilitate increased Black Hill traffic movements from the west. This could be expected due to the Hunter Expressway which would provide alternative travel access with Maitland, Lochinvar, Branxton and Lake Macquarie.

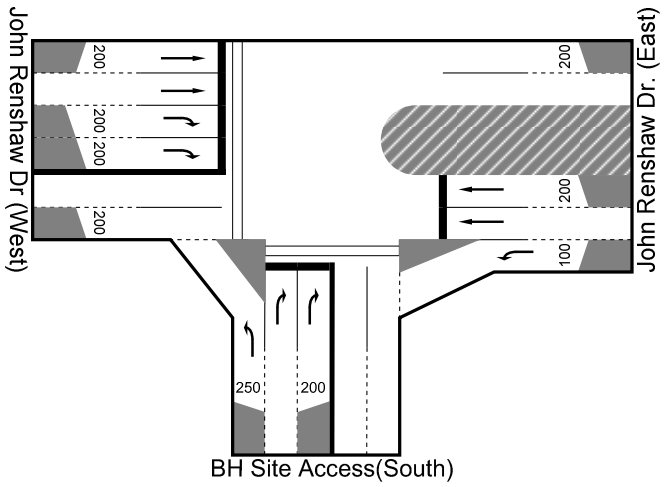

Figure 4 Proposed John Renshaw Dr / Black Hill Site Access/Egress (Upto 500,000 square meters GLFA)

Table 3 below summarises the predicted LoS for both AM and PM peak hour with 500, 000 square metres GLFA at the Black Hill site. The result shows that the intersection LoS is between B and D

during the AM and PM peak hours respectively. The signal capacity and LoS during the PM peak is forecast to reduce due to there being one egress from the Black Hill estate.

Table 3 Summary of LOS for John Renshaw Dr / Black Hill Access Road Intersection in 2031

Black Hill (m^2 GLFA)	AM Peak			PM Peak		
	DoS	Delays (Secs)	LoS	DoS	Delays (Secs)	LoS
800,000	0.92	40.6	D	2.07	401.5	F
500,000	0.73	21.1	B	1.01	52.9	D

Beyond 500,000 square metres GLFA, the model suggests the need for an additional egress onto the F3 Freeway. The Hunter Expressway is forecast to redistribute traffic across the regional network accessing the Black Hill site. In 2031, the model forecasts a traffic reduction of about 20% on the F3 Freeway near the Black Hill site. A similar traffic reduction is forecast on Weakleys Drive. The traffic reduction on the F3 Freeway is forecast to occur prior to any development on the Black Hill estate. The anticipated traffic reduction on the F3 Freeway will provide a further opportunity to the RTA to reconsider an additional egress onto the F3 Freeway. The current Boral site access on the F3 Freeway can be considered for such egress arrangement until RTA finalise the concept design of the F3 to Raymond Terrace Link.

The signal capacity on John Renshaw Drive is forecast to reduce beyond 500,000 square metres GLFA. One eastbound right turn lane on John Renshaw Drive is required to extend up to 400 metres to accommodate right turning vehicles accessing the site. Figure 5 shows indicative layout showing one eastbound right turn lane extended up to 400 meters.

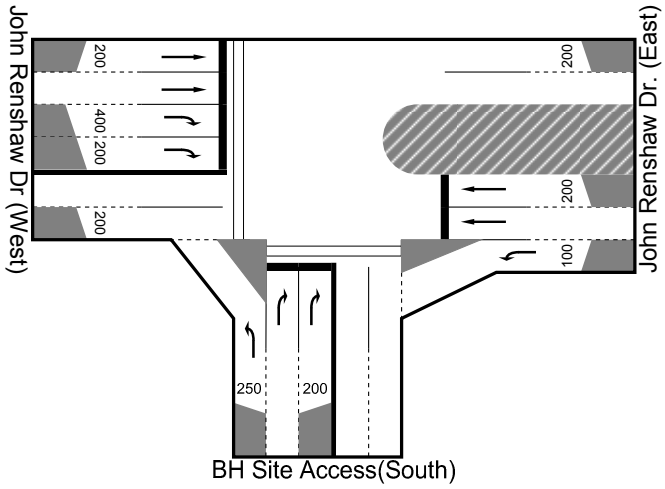

Figure 5 Ultimate layout for John Renshaw Dr / Black Hill Site Access/Egress

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6 Findings

The *Addendum 2* details the performance of the Black Hill access allowing for an increased traffic generation rate combined with the Hunter Expressway. The modelling results suggest that a maximum of 500,000 square metres GLFA could be developed with one ingress at the F3 Freeway and one access/egress at John Renshaw Drive. With the Hunter Expressway, the model suggests increased inbound and outbound Black Hill trips to and from the west via John Renshaw Drive, which will provide access to Cessnock, Lake Macquarie, Maitland/Lochinvar, Branxton and the Upper Hunter.

The proposed signalised T junction on John Renshaw Drive would have capacity to service up to 500,000 square metres of Black Hill GLFA accommodating both AM and PM peaks. The result shows intersection LoS between B and D during AM and PM peak hours respectively. The signal capacity and LoS during the PM peak is forecast to reduce due to there being one egress from the Black Hill estate. The signal capacity was determined assuming that background /other traffic on John Renshaw Drive would increase in line with the land use growth predicted in the Lower Hunter Regional Strategy.

Beyond 500,000 square metres of Black Hill GLFA, the model suggests the need for one additional egress on to the F3 Freeway. The anticipated traffic reduction on the F3 Freeway from Hunter Expressway will provide a further opportunity to the RTA to reconsider an additional egress onto the F3 Freeway. The current Boral site access on the F3 Freeway can be considered for such egress arrangement until RTA finalises the concept design of the F3 to Raymond Terrace Link.

The signal capacity on John Renshaw Drive is forecast to reduce beyond 500,000 square metres GLFA. One eastbound right turn lane on John Renshaw Drive is required to extend up to 400 metres to accommodate right turning vehicles accessing the site (See Figure 5). In the long run, this will provide additional capacity at the John Renshaw Drive signalised T junction.

Appendix A

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RTA

Director – Strategic Assessment
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Attention: Ms Caitlin Bennett

BLACK HILL INDUSTRIAL DEVELOPMENT – STATE SIGNIFICANT SITE LISTING AND CONCEPT PLAN (MP 08_0214)

Dear Ms Bennett

I refer to your letter dated 8 April 2009 (Your reference: MP 08_0214) regarding the subject development application which was forwarded to the Roads and Traffic Authority (RTA) for review and comment. I also refer to the Traffic Report and Addendum I submitted by Hyder Consulting in support of the development application.

The RTA has reviewed the information provided and requires an amended traffic report addressing the following issues:

- The traffic analysis assumes has various assumptions regarding road infrastructure. The F3 to Branxton road link has now been approved by the Federal Government for funding and therefore should be included in all analysis. The current analysis does not include this link which will influence future traffic impacts in the area.

  Additionally, although they are separated from the immediate area, the traffic study makes reference to the assumption that the particular road projects will be constructed at various stages (Table 3.1). The majority of these projects are unplanned and not funded and should be deleted from the assessment.

- Details of the intersection count of the F3 Freeway and John Renshaw Drive is required,

- The traffic generation rates for assessment of the business park (industrial) land uses shall be increased to 0.58 and 0.70 trips per 100 square metres GLFA in the AM and PM peak hours respectively. These rates were adopted by the RTA in the Hunter after review of the Maunsell report (February 2007) and further investigations undertaken by the RTA at the Cardiff Industrial estate.

- The trip generation rates shall not be discounted by 25% to account for the conversion from Gross Floor Area (GFA) to Gross Leasable Floor Area (GLFA) as this discount should only apply to retail land uses, not for industrial land uses.

- Applying a further 5-10% discount to simulate internal trips to be contained within the proposed development is not applicable as any internal trips have already been factored into this rates being applied.

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- Electronic copies of the revised traffic analysis (Paramics and Sidra) undertaken for the proposed development shall be submitted to the RTA for review.

- The timing of the staging of the intersection of John Renshaw Drive and the site access and the upgrade of the intersection of the F3 Freeway and John Renshaw Drive is likely to change as a result of the above comments. Accordingly, the timing/staging of any works should be reviewed and altered as required.

The RTA will provide further comments and respond to the concept plan application upon receipt of the revised traffic study. No approvals should be granted until the above issues are addressed.

Notwithstanding the above and consistent with the proponent's draft Statement of Commitments, the RTA will require the developer to enter into a Voluntary Planning Agreement (VPA) / Deed Containing Agreement (DCA) for contributions towards designated State public infrastructure (State roads) prior to any development / subdivision proceeding on the site. To avoid delays in the development of the proposed land, it is suggested that the Department of Planning advise the developer to commence negotiations with the RTA for the agreement. In this regard the outstanding issues to be resolved prior to subdivision include:

- Broader contributions to State road infrastructure will be required and will be consistent with other developments where contributions have been sought. The RTA has recently determined that similar development proposals should contribute $75,000 per developable hectare towards future State road infrastructure upgrades. The RTA considers that this proposed development should be contributing an equivalent amount.

- The RTA's preference is for a works-in-kind contribution to be determined in lieu of a cash contribution. These contributions to State infrastructure do not include any of the access requirements for the development and will be negotiated prior to any concurrence to the subdivision of the land.

In this regard the execution of an agreement should be considered as the general minimum requirements that need to be addressed with the RTA prior to satisfactory arrangements being agreed.

The RTA is willing to discuss these matters further with the Department of Planning and the developer, with the intention to establishing a Voluntary Planning Agreement or Deed Containing Agreement covering the above matters.

Should you require any further advice, please contact Brad Parkes on (02) 49240337.

Yours sincerely

Colin Nunn
Manager, Infrastructure Development
Hunter Operations & Engineering Services

22 May 2009

Figure A1 – Performance of John Renshaw Drive Signals with 500,000 square metres GLFA