

Engineers Australia response to the Review of Environmental Factors for Newcastle Light Rail

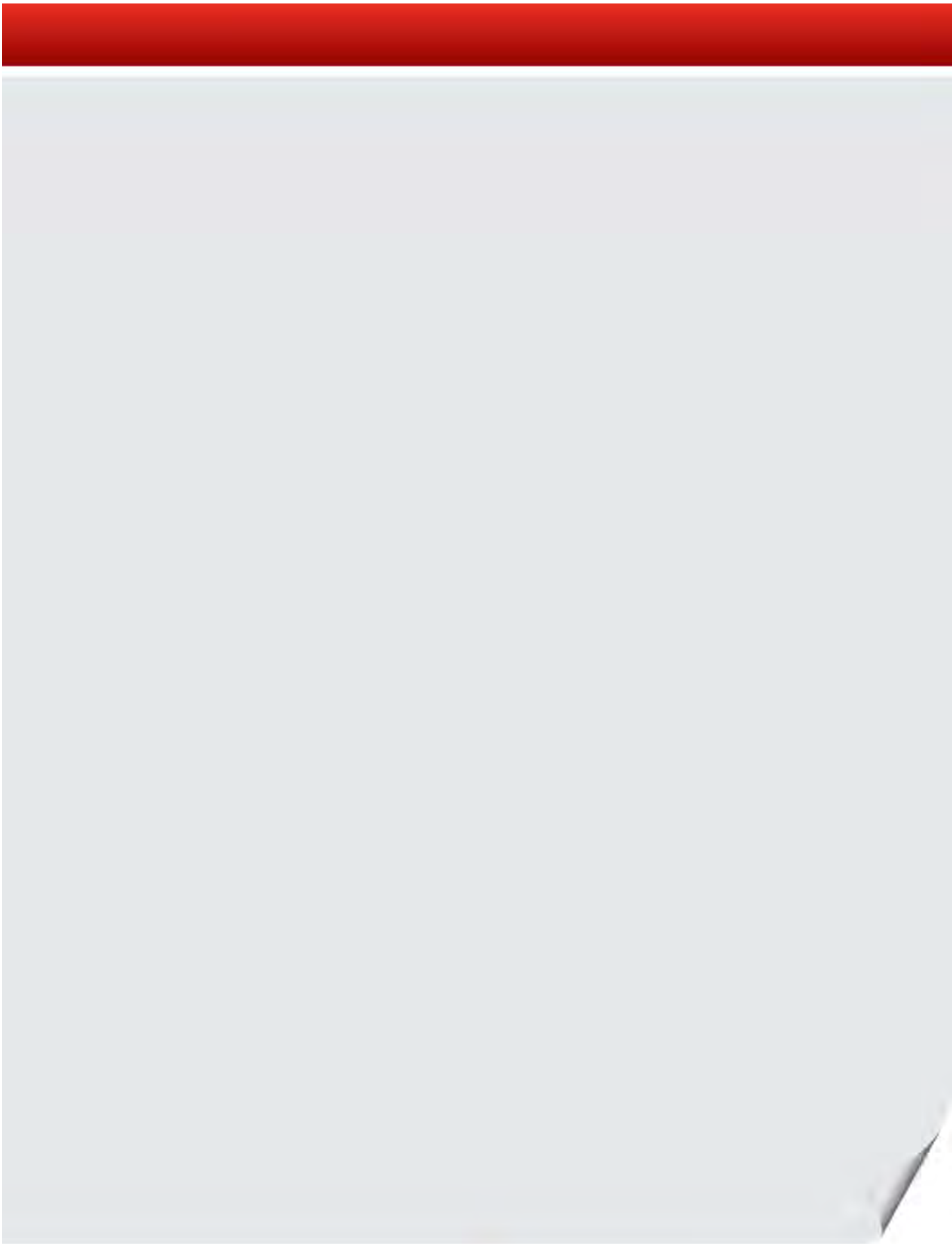
**NSW Government
Transport for NSW**

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Executive Summary

Engineers Australia met with the Minister's office in November 2015 to express our professional interest in and concerns about the delivery of the Newcastle Light Rail project (the NLR) and the broader long term transport planning for the Greater Newcastle area.

After reviewing the REF for the proposal we would like to discuss with you our significant concerns about the risks that we see with the proposal as it currently stands. These risks are both time and cost driven but also have implications for safety, efficiency and effectiveness of the NLR and the wider transport system.

From our review of the REF we have concluded that the Proposal does not satisfy the key transport and urban design objectives for which it has been planned, the Newcastle Urban Transformation and Transport Program (NUTTP), that it fails to deliver an integrated transport system and that alternatives are available which can meet these objectives and this integration.

Newcastle at present has very low public transport usage. This NLR project must be a strong positive agent to reverse that and bring higher public transport usage for travel to and within the city centre. It must also build stronger public transport usage within the inner and middle suburbs and to major travel generators; the University campuses, the two main hospitals and the several major sporting arenas and shopping centres.

Engineers Australia concludes that there are significant flaws in this proposal which will reduce public transport usage and will inhibit growth of the CBD. The present proposal fails the objectives in significant ways.

- Construction issues:
 - Constructing the NLR outside the existing rail corridor in Hunter Street places significant time and costs risks on the project because of unknown factors including underground services, archaeology and mine issues.
- Road (traffic) issues:
 - King Street east of Union Street, Honeysuckle Drive and Wharf Road will become congested and adversely affect the very urban vibrancy and amenity the NUTTP is aiming to achieve.
 - Poor levels of service at key intersections within and around the area of modelling.
 - Hunter Street will be segregated by the NLR track, creating another divider across the CBD at least as severe as the present Hunter Street and the previous rail track.
 - Road safety particularly for pedestrians and cyclists in Hunter Street, King Street and Honeysuckle Drive.
 - Emergency services access along Hunter Street.
 - Loss of up to 350 on street parking spaces, loading zones and disabled parking.
- Rail issues:
 - The single NLR track across Stewart Avenue will become a Tram and vehicle congestion point resulting in delays to both NLR operations and will also add to delays and congestion on the main inner city north-south road.
 - The REF does not address the issue of passenger demand analysis nor does it explain how passengers will interchange from other modes (heavy rail, bus, taxi, bicycle etc) to the NLR.
 - Interchange delays caused by the forced need to transfer modes.
 - Lack of justification for segregated or mixed running in different sections of Hunter Street.
- Planning issues
 - Lack of integrated landuse multi-modal transport network modelling, essential for significant structural changes.

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- Lack of consideration for future network extensions; the long term viability of this project will be at serious risk without future extensions.
- Traffic shedding implications for the urban design of King Street & Hunter Street in the Civic/Cultural Precinct (amenity, pedestrian and cycling safety, streetscape etc.).

Engineers Australia recommends that relatively straightforward changes to the proposal can make great improvements in its effectiveness, and can turn around a negative flawed scheme to one which will go towards meeting its objectives.

- The NLR track should remain in the old rail corridor from Worth Place to beyond Darby Street and potentially as far as the proposed Crown Street NLR stop. This would significantly reduce the potential time and cost risks to the project.
- The NLR track across Stewart Avenue should be double track into the rail terminus station which should also consider dual platforms for the NLR as part of the extension plans for the system.
- A strategic planning project using a land use / multi-modal transport model should be commissioned urgently to study and plan all future road, bus and light rail services for the whole city. This must consider land use, private and public transport (Train, NLR and bus) and freight using integrated land use multi-modal transport network models.
- Extensions to the NLR system must be planned urgently to ensure they can be accommodated through the new Train terminus station.

The final design should show how the project improves the transport system and, ultimately, the city overall, including better travel times, less congestion and improved service levels. It should show how the system integrates with other transport modes (Train, bus, ferry, cycles, pedestrian and road vehicles). The key for all of this to function safely and effectively will be the integration of this project into the broader transport system especially the Wickham and Store interchange. Transparent and open planning for this needs to happen now.

The funds that have been allocated to this project provide an opportunity for very significant transport improvements and urban revitalisation to Newcastle and the Hunter Region. There are risks with the project, as outlined in these comments, and failure to apply rigorous and appropriate processes to assessment and modification of the proposal will result in insufficient benefits from the investment and possible failure of the project.

Engineers Australia looks forward to the opportunity to discuss our recommendations for improving this project with the Minister for Transport.

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Introduction

Engineers Australia (EA) is the peak body for the engineering profession in Australia. With over 105,000 members across Australia, it represents all disciplines and branches of engineering. Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers Australia has examined the REF for the Proposed Newcastle Light Rail (NLR) and has concluded that the Proposal does not satisfy the key transport and urban design objectives for which it has been planned (the NTUPP), that it fails to deliver an integrated transport system and that alternatives are available which can meet these objectives and this integration.

EA has come to this conclusion after a rigorous examination of the REF documents by a group comprising professional engineers, urban design architects and transport economists all of whom have many years of relevant experience and strong knowledge of the urban issues facing the City of Newcastle.

There are major failures with the proposal detailed in this response and summarised below:

1. Very high risk to cost budget and timeline to bring to operation
2. Flawed travel analysis failing to recognise large travel delays to all existing bus and Train passengers expected to use the NLR
3. Disruption to NLR scheduling resulting from incidents at Wickham Terminus, Worth Place and in Scott Street
4. Flawed and inadequate traffic analysis not recognising severe traffic congestion around Newcastle CBD
5. Loss of amenity in the significant main public places at Civic: the Cultural Precinct around and south of Town Hall, the Legal/University precinct, and the Museum Precinct at Civic
6. Loss of an *urban street* spirit in Hunter Street from the traffic and NLR arrangements which will encourage higher speeds and greater impacts on the pedestrian/shopping environment
7. Failure to allow for improved cycle access and in fact a reduction in cycle accessibility
8. Loss of parking and servicing spaces close to the commercial premises being accessed.

The principal findings we make directly related to this NLR REF are:

1. The Light Rail should remain within the rail corridor for the maximum length possible and at minimum from Wickham to the proposed Crown Street stop.
2. Double tracks should be built across Stewart Avenue into the rail terminus area.
3. Future extensions of the Light Rail network west from Wickham must be planned immediately to detailed concept to include space within the rail terminus area for future track extensions and adequate Light Rail passenger areas.
4. The future Wickham transport interchange be planned now using all necessary land to provide for safe, efficient and attractive transfer areas for passengers using all modes of travel (rail, light rail, bus, coach, taxi) now and into the future.

The following is a list (not necessarily complete) of items that have not been fully addressed in the REF:

- Project Benefit/Cost Analysis
- Key Intersection deficiencies recognised and required upgrades planned and scheduled
- Identification and Costing of Enabling Works
- Detailed Traffic Model Assumptions and Outputs
- Traffic Modelling Sensitivity Analysis
- Bicycle Plan

- The New City Centre Bus Plan
- On-Street Parking Plan
- Off-Street Parking Plan
- Bus / Tram interchange arrangements at Wickham
- Train / Tram interchange arrangements at Wickham
- Regional Light Rail Plan extending to areas such as Charlestown, Rankin Park and Wallsend
- Special Event People Movement Plan
- Public Transport Incentives to increase patronage
- Rail and Tram Fair Structure

Risks to the Project

Route Infrastructure Issues

Services

The installation of the light rail infrastructure including the track structure, will require the relocation and or replacement of an unknown number of existing services. These will include gas, water, electricity, sewer and stormwater, copper and possibly fibre-optic communications. These services belong to both private and government organisations. They are the enabling works.

The location of services currently in the light rail route will impose a cost to the project if they have to be relocated, replaced or enhanced. The location and identification of services (conduits in the act) in both the street running section and the rail corridor section is required before a business case can be established. The services include above rail level, below rail level and longitudinal services.

The routes as shown with the general arrangement cross sections in the REF do not show any services or longitudinal conduits which are required for light rail operation (communications, power, etc). In many light rail projects these will have extra capacity installed so they can be of substantial dimensions. These new light rail conduits can come into conflict with existing underground services.

The REF does not indicate what is the time and cost, and what is the risk probability to the project budget and time line for service relocations (“conduits”).

The Transport Administration Act 1988 SECT104U Pertaining to Light Rail says in part, “that the TfNSW may serve a written notice that an alteration is required to be made in the position of a conduit owned by the person to facilitate the development of a light rail system.....notice must specify the work and must include an undertaking by the owner or operator of the light rail to pay the reasonable cost of carrying out the work”.

The Asset Standards Authority is compiling the light rail standards to be used in NSW. These standards have not been released to date. Australian standard AS4799 (Installation Of Underground Utility Services And Pipelines Within Railway Boundaries) may apply to this project. This standard for railway tracks sets a distance of 1600mm below rail level for conduits etc. This would seem for a light rail project a debateable number and it is thought that a risk based approach may be allowed by TfNSW under some circumstances. The current rules applied to the Sydney light rail in George Street would be a good guide but are not discussed within the REF.

The REF in section 15.10 Services and Utilities mentions the issue of service location but does not indicate in the REF any risk to the project on this issue. The unknown here is the extent and what else may be found when excavation is done.

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The investigations for services management on other Light Rail Project in Australia has been examined. There is reference from the Capital Metro (Canberra) project of a detailed service (utilities) location and inspection regime (Appendix 2) and indicates a risk based approach may be applicable for some of the services (Capital Metro tender documents). The Capital Metro Document, Construction and Utilities, states:

“... Capital Metro has undertaken an unprecedented level of investigations to establish the exact location of buried utilities along the 12 kilometre route. Working with utility owners, Capital Metro has conducted 1,312 pothole investigations, 432 hydraulic investigations and excavated 29 trenches along the alignment”. There has not been such detailed investigation for Newcastle NLR and risks of increase in construction time and cost are therefore high.

The Sydney Light Rail EIS Volume 1 Ch 5 states: “Transport for NSW has consulted with the major utility providers during development of the conceptual design for the CSELR. Desktop investigations have been undertaken including dial-before-you dig enquiries (for sections 5.2.11 and 10.8, Volume 1A of the EIS). Field investigations to locate utilities are currently in progress to inform the detailed design.”

“Interface agreements would be negotiated with utility providers in relation to protection, relocation, or upgrade of assets due to construction of the CSELR. Once finalised, these agreements would be incorporated into the design and delivery of the CSELR proposal. Securing active cooperation from all affected utility providers would help ensure relocation and/or protection of utilities can be designed, agreed and constructed in an efficient manner, and ongoing maintenance and access arrangements can be agreed for the construction and operation phases. These agreements would also clarify responsibility for affected assets.”

Infrastructure - Route Excavation

The REF Section 7 Main Construction works details the expected excavation and possible fill. “At this stage of the design process, it is estimated that about 18,500 cubic metres of material would be excavated during construction..”

The extent of service investigation requiring excavation (potholes, trenching etc) and then relocation excavations for this work is not referenced in the REF. There is likely to be impacts of service relocation on other environmental aspects of the REF including heritage, aboriginal and non aboriginal. The installation of Light Rail Service conduits is likely to require much more excavation than suggested.

The REF section 7.2.2 Main Construction Works should reflect these issues: Construction Risks, Services, who bears risk? Aboriginal and Colonial heritage are also at risk?.

Conclusion on Construction Matters

There is a high risk to the project budget and to project completion to the timeline as shown in section 7.

The extent of the service issue is unknown. The current acts and regulations are in place for enabling works to be undertaken at TfNSW direction and there appears some scope for a risk based approach to some of the enabling works.

The construction method outlined does not allow for excavation for services or installation of light rail services.

The business case will require funding for the search and investigation of services in and around the light rail path. The enabling works can then be costed for the business case.

The project timeline as shown in the REF Section 7 Construction of the Proposal will have to reflect the enabling works schedule and emphasis should be put on a detailed service search and investigation so as to minimise the risk to the project.

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Travel Analysis and NLR Passenger Facility

The REF has very little to say on public transport travel. It reports light rail demand forecasts from a PB/Aurecon 2014 report of 300 to 430 passengers per hour in 2021, to 370 to 530 in 2036, and states “... urban renewal activities being undertaken as part of the Newcastle Urban Renewal Strategy will increase the resident and employee population in the study area, which would ultimately support the increase in forecast patronage.”...These are assumed to be one-way peak hour trips.

This increase in patronage of 2.4% per year over 15 years brings the NLR patronage to a fraction of its overall capacity and raises questions over the system feasibility without considering extensions of the light rail to capture a wider natural patronage which does not require a mode transfer. No mention is made of passenger demand at major events which must be considered in the interchange design.

There is no reporting of light rail scheduling other than some frequency targets, nor the effect of interchange on Train and bus passengers to light rail.

Table 1 is an analysis of Train to light rail transfer using the present heavy rail timetable. The term “Tram” here represents the NLR and “Train” the existing heavy rail.

Tram Arrival Wickham	Train Depart Wickham	Minimum Wait Time *	Likely Delay	Train Arrival Wickham	Tram Depart Wickham	Minimum Wait Time ~	Likely Delay
0700					0705		
0710				0712s		3	13
	0715h	5	15		0715		
0720				0720h		5	5
	0723s	3	13		0725		
0730					0735		
	0730h	0	10	0739s		6	6
	0734s	4	14	0744s		1	11
0740				0744h		1	11
	0749h	9	19		0745		
0750					0755		
0800				0800h		5	5
0810					0805		
	0815h	5	15	0806h		9	9
0820				0808s		7	7
	0823s	3	13		0815		
	0827h	7	17	0823h		2	12
0830					0825		
	0834s	4	14	0830h		5	5
0840					0835		
	0849h	9	19				
0850				0839s		6	6
0900					0845		
0910							
	0915h	5	15				
	Delay	5 min	15 avg		Delay	5 min	8 avg

Table 1 Synthetic NLR - Rail interchange weekday AM peak.

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Notes:

- Train arrival and departure times were taken from the timetable at Hamilton plus or minus 2 minutes (h = Hunter line, s Sydney line).
- The Tram is based on 10 minute intervals at peak time as given in the REF.
- A significant number of passengers leaving the CBD will catch the earlier Tram to ensure that they don't miss the Train. Average delay for passengers leaving the CBD could extend to 15 minutes.
- Based on Surveys carried out at Hamilton Station passengers will require at least 4 minutes to transfer from the Train to the Tram.
- If the Tram runs to schedule it will be necessary for some passengers to wait for the next Tram. Therefore average delay experienced by passengers transferring to the Tram is likely to be 8 minutes.

The main conclusions drawn from this are:

1. Delay for passengers out of the CBD (Tram to Train) is likely to be 15 minutes, and into the CBD (Train to Tram) is likely to be 8 minutes, with minimum wait times of 5 minutes.
2. Stewart Avenue will be crossed every five minutes by a Tram, with consequential stopping of road traffic. This frequency is necessary to maintain a 10 minute service headway and is enforced by the single track access to Wickham Terminus station.
3. At times of unusual demand and into the long future with strong passenger growth, the crossing of Stewart Avenue will become more frequent, with consequential impacts on road traffic.

An analysis of bus-NLR transfers needs to be included but cannot be quantified until a strategy and plan for future bus routings and schedules is prepared. This should have been part of the REF as it is intrinsic to the proposal.

Impacts of Disruptions to NLR Schedules

Light rail operations can be disrupted in several ways which are not addressed in the REF. These include NLR vehicle breakdown on the track, road vehicle breakdown on the track through sections of mixed running and passenger delays at the Wickham Terminus such as accident. The REF makes no comment on how these may be ameliorated.

Clearly a major improvement will be achieved by placing the NLR track within the rail corridor for the maximum distance, and by laying double tracks across Stewart Avenue into the terminus.

Traffic Modeling and Traffic Analysis

Traffic modeling

The area modeled is shown in Figure 8.1 of the REF reproduced below. This is the area that will be directly affected by the proposed Light Rail service especially with the changes proposed for Hunter Street. It has then been assumed that any reassignment of traffic flows will also occur within this envelope. This is an erroneous assumption because the Newcastle road network has complexity and journeys are highly responsive to changes in conditions.

It is understood that detailed surveys were carried out on each of the major roads feeding into and out of this cordon and it is assumed that this data was used to establish external to external and external to internal trip patterns.

The REF acknowledges that the model was used to re-assign trips within this cordon. For example trips were transferred from Hunter Street to King Street and Honeysuckle Drive. However, there is no mention of any reassignment of trips outside the cordon. It is considered that the proposed restrictions to traffic flow in Hunter Street to make way for the Light Rail service will result in significant changes to

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the travel patterns to and from the CBD beyond the cordon area being modeled. These changes are likely to see increased traffic flows on alternative routes serving the CBD including Union Street, Darby Street, Watt Street and Scenic Drive. Failure to consider these broader network issues significantly compromises the analysis carried out.

The only substantial output model data reported in the REF is the predicted link volumes on 30 road sections within the study cordon. There will be changes, possibly highly significant on the road network across the whole urban area.



The only consideration of north-south matters is through some SIDRA modelling. It is incomplete, and it shows failures at key junctions with north south routes – Stewart Avenue and Union Street definitely with LoS 'F' in 2028. Even the two dimensional aspects (i.e. transfer of traffic from Hunter to King and to Honeysuckle/Wharf) are incomplete in their analysis and presentation. Traffic data on Honeysuckle East and Wharf Road are missing completely.

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Table 2 below provides an extract from Appendix C showing the predicted 2018 and 2028 traffic flows without the proposal. This table shows that the predicted 2018 PM traffic flows are identical to the 2015 PM flows. It is not reasonable that these 2018 figures are correct because of the significance of these roads serving the CBD.

These predicted traffic flows show that the REF assumes there will be less than 1% annual growth over the next 12 years on both of these roads within the CBD. Recent independent surveys suggest that 2016 counts already exceed the predicted 2028 flows.

The conclusion from the above two paragraphs is that the REF underestimates road traffic into and through the proposal study area, the service corridor for the NLR. Conclusions drawn in the REF on the impacts of road traffic are therefore considered to be questionable and underestimate the traffic interference to NLR operations.

		2015	2015	2015	2018	2018	2018	2028	2028	2028
		AM	PM	Daily	AM	PM	Daily	AM	PM	Daily
Stewart Ave between Throsby St & Honeysuckle Drive										
	Nb	1,500	1,620	19,001	1,500	1,620	18,997	1,531	1,667	19,472
	Sb	1,659	1,598	17,389	1,700	1,598	17,607	1,708	1,631	17,829
Hunter St between Wood St & Stewart Ave										
	Wb	365	482	4,659	372	482	4,698	388	542	5,114
	Eb	795	635	7,863	828	635	8,047	915	645	8,579

Table 2: Predicted 2018 and 2028 Traffic Flows with out the Proposal for two key Links.

Future traffic demand growth

Section 4.3 of the REF summarises the sources of data used to forecast future traffic demand. It appears that the data obtained from each of these sources had not been critically reviewed.

For example the REF states that ... *“BTS prepared the land use forecasts through the STM / PTPM models and created the sub-area car travel demand matrices for the Newcastle city centre. This model includes the change in mode share and patronage as a result of the proposal.”* The REF does not state what these predicted mode share and patronage changes are nor does it give any justification for the changes.

The REF goes on to acknowledge that ... *“The growth attributed to the city centre was provided by UrbanGrowth NSW.”* Again these predictions are not documented nor justified.

Accordingly it appears that the modelling completed for the assessment of the proposal is based on inputs and assumptions that have been prepared in isolation.

When modeling the future demand on the transport network for such a major infrastructure change as this NLR proposal, sensitivity testing of the assumptions used in the model is required to provide confidence in the model predictions. No sensitivity testing is reported and presumably none was done.

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The forecast traffic demand reported in Table 4.7 of the REF shows that the modeling of the AM peak period is based on very low growth in traffic demand to the CBD. Table 3 below provides further assessment of the data from Table 4-7 of the REF.

Year	AM Peak Hr 8:00 – 9:00 Predicted Demand	AM Increased Demand	AM % change	PM Peak Hr 5:00 – 6:00 Predicted Demand	PM Increased Demand	PM % change
2015	17990			18960		
		460	0.85%		560	0.98%
2018	18450			19520		
		1360	0.74%		1260	0.65%
2028	19810			20780		
		1820	0.78%		1820	0.74%

Table 3: Predicted 2018 and 2028 Traffic Demand within the Study Area.

Note: PM peak future traffic demands were synthesised by transposing the growth of car demands in the AM peak period and superimposing into the existing PM peak period matrices.

The note under Table 4-7 in the REF confirms that the network has been tested only for the AM Peak. The PM Peak is simply a synthesized version of the AM Peak. This is an inadequate technique for the assessment of such a major structural change to the network

These numbers show that the modeled forecast traffic demand within the study area will be less than 1% linear over the next 12 years in both morning and evening peak periods. These are very low growth forecasts for an area which is planned to have a large growth in residential accommodation and jobs and with associated increases in commercial and retail activity. Even with these low predicted growth factors the model predicts that several of the key intersection will fail or be at capacity in 2028.

The performance of other important intersections such as Workshop Way/Merewether Street and Darby Street/Queen Street are not reported.

The REF only presents overall intersection LOS as a measure of intersection performance. Average Delays and Queue Lengths are also important parameters for assessing intersection performance not just for the intersection but for individual approaches.

These queues and delays also need to be fed back into the micro-simulation model to properly consider the performance of the network and in particular the impact on Bus and Tram services.

In summary there are three road corridors serving the CBD; Honeysuckle Drive / Workshop Way / Wharf Road, Hunter Street and King Street and all three interact. Traffic changes on one will impact on the others. Earlier studies (the Honeysuckle Transport studies etc.) considered all three corridors with 10 lanes in total west of Union Street. The conclusions then were that this could be reduced to 8 lanes and still have enough capacity, a conclusion which led to the development of Workshop Way as a means of reducing the capacity through the Honeysuckle precinct. It also acknowledged the capacity constraint in King Street at City Hall/Civic Park to meet precinct amenity objectives.

The above required that Hunter Street remains as a key road corridor and retained its 4 lane capacity.

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The fact that the REF road modeling does not allow review of this interaction is one of the key shortcomings in the work.

Multi Modal Modeling

The REF does not refer to the use of any multi modal transport modeling tools to assess the performance of the proposed facilities. If they were used they do not report any of the outputs of this modeling.

Full network modelling with true network comparisons in terms of VKT, VHT would demonstrate technically the traffic impacts of the proposal. Such reporting based on scientific modelling is a minimum requirement for such a significant and costly proposal as the Newcastle NLR.

Section 4.3 of the REF includes the following statement “This model includes the change in mode share and patronage as a result of the proposal.”

The REF fails to provide any evidence that a major shift to public transport will be achieved. The predicted increased travel times and the likely removal of the Fare Free Zone cannot be seen as incentives. The only strategy likely to increase public transport patronage is the proposed removal of on-street parking spaces.

The REF clearly identifies that there will be a new City Centre Bus Plan with buses continuing to run down Hunter Street. However major stops at Civic, Market Street and Watt Street will be removed. The capacity of this Bus Plan to service the requirements of existing and projected passenger numbers is not reported.

The modelling tools used are inadequate and don't address some of the key network issues associated with travel to and from the CBD. The Paramics Model is not a land use model and it is dependant on adjustments that have to be coded in by the Modeller. This process of adjustment is contrived and results in a model which is of limited value as a tool to predict future travel patterns, and is thus unable to estimate changes which will occur following the land use and transport system changes as substantial as those proposed for Newcastle.

Provision for Cyclists

Cycle travel is formally accepted as part of the road transport system and is supported by State and Newcastle City policies to enable cycling to take a greater share of the transport task and is implicit within the NUTTP.

The REF lists roads on which cycle paths and lanes are available, and some cycle/pedestrian crossing places. It makes no comment on how cycle travel will be impacted by the proposal and its traffic arrangements.

There is no bicycle plan within the REF which will encourage cycle travel and the motor traffic proposal will make cycling more hazardous, reducing cycle use and possibly increasing cycle incidents (injury and death).

In this aspect the REF demonstrates that the proposal fails the objectives of the NUTTP.

Issues not answered by the REF

1. Are the population and employment predictions used to derive future traffic demand valid? There is no statement of nor any justification for these very significant assumptions in the REF.
2. Section 4.3 includes the statement “The growth attributed to the urban renewal projects in the city centre was provided by UrbanGrowth NSW. The proposed urban development is likely to be primarily residential that would not attract high private vehicle growth.” This statement includes no quantification and no risk analysis to test alternative futures.

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3. How will approvals for the proposed residential developments within the CBD be managed if on-site parking is not provided? This is a significant assumption and needs to be addressed in the REF.
4. What is the overall efficiency of the road network? It is standard requirement that this be reported in any traffic study but no reference is made in the REF.
5. There is no parking plan and an ambiguous Bus Plan.
6. The exceptionally low growth in traffic demand included in the model.
7. Recent traffic surveys at Hunter St and Stewart Ave show higher traffic flows than the model predicts for 2028.
8. The REF states that UrbanGrowth land use predictions are mainly for residential units which will have low private car use yet the LEP is for an additional 10,000 work places.
9. The reporting of network performance is selective with only 11 key intersections reported. Other key intersections such as Parry St/Stewart Ave, Darby St/Queen St and Merewether St/Workshop Way were excluded.

The REF states, in part ... "Traffic modelling indicated that most intersections would perform satisfactorily in the year of opening. A 10 year future traffic scenario was also modelled, with the results showing that traffic conditions in 2028 would be mostly influenced by other developments and associated traffic generation, and not the proposal. With the proposal operational, the road network would generally operate at a satisfactory level, with only two intersections experiencing potential issues – the intersections of King Street/Union Street and Honeysuckle Drive/Hannell Street in the PM peak period. The intersection of Honeysuckle Drive and Hannell Street currently performs at a similar level of service without light rail due to issues currently experienced at this intersection."

This review does not accept this claim and has demonstrated that the road network providing access into the CBD will suffer high congestion resulting in re-distribution of trips to other destinations over time. This review indicates that the objectives of the NTTUP will be severely compromised by the proposed light rail and road traffic arrangements in this REF.

Objectives of the NUTTP

The objectives of the NUTTP listed in section 1.1. are, in part:

The NUTTP is an integrated development and transport plan that comprises a number of urban redevelopment / renewal projects supported by a transport program of works. The transport program seeks to revitalise Newcastle by improving pedestrian and vehicle connectivity within the CBD and by promoting public transport usage and accessibility. The key public transport components of the NUTTP are:

- *Truncating and removing the existing Newcastle heavy rail branch line from Newcastle to Wickham.*
- *Constructing the new transport interchange west of Stewart Avenue at Wickham to facilitate the movement of people between transport modes including heavy rail, light rail, buses and taxis.*
- *Delivery of a new light rail system from Wickham to Newcastle.*
- *Investigating the potential to extend the light rail network in Newcastle.*

The transport components of the NUTTP are an important part of the wider renewal of the Newcastle city centre. The transport projects aim to reconnect the Newcastle CBD to its waterfront and make it easier to move around the city centre. The transport projects will drive the economic growth and renewal of Newcastle as part of an integrated land use and transport strategy.

These objectives are stated in full because the analysis of travel and traffic carried out by Engineers Australia has demonstrated that they are not met by the proposal.

Urban Design

Loss of urban street amenity

Newcastle is set on a peninsula with three main traffic service arteries. Hunter Street and King Street run the full length of the city and Honeysuckle Drive along part of the length of the city. Other major roads such as Stewart Avenue, Union Street and Darby Street also have significant roles in providing access to the City. If the light rail is to run down Hunter Street rather than the rail corridor there will be a shedding of traffic, not only, into King Street but also Honeysuckle Drive and other major access roads with their own problems of congestion.

The loss of car parking and the change to traffic flow will result in reduced traffic calming, bringing with it increased traffic speed, increased vehicle impact on footpaths and difficulties for emergency vehicles to gain access in the case of an accident, especially mid block.

Hunter Street is a long transport corridor which will be radically changed by the NLR proposal between Worth Place and Scott Street. It will carry one lane of through traffic in each direction, two NLR lanes, no specific provision for cyclists and no kerbside parking or commercial servicing. Concentration of vehicle traffic into one lane adjacent to the kerb will create a traffic route, inimical to pedestrians on the footpath and to shop and business activity along the frontage. It will not be a "people street" any more than it is now.

The resulting transport corridor with this proposal will create a psychological barrier across the CBD no more penetrable than the existing street. It will inhibit pedestrian crossing and concentrate it at designated crossing points. Though this is a safety advantage for pedestrians, of itself it does not add to north-south connectivity any more than just putting the crossings in with present kerbside uses in place.

The proposal will impose clearway conditions in King Street between Auckland Street and Darby Street. This is the principle cultural and civic square of the city, and will be bisected by a new main traffic route.

There will be considerable loss of amenity resulting from this traffic change.

Loss of Servicing and Parking Amenity

Loss of parking and commercial servicing described in the REF will reduce amenity to parts of the CBD. This is contrary to the stated objectives and is a significant negative of the proposal.

Provision for Cyclists

The REF lists roads on which cycle paths and lanes are available, and some cycle/pedestrian crossing places. It makes no comment on how cycle travel will be impacted by the proposal and its traffic arrangements.

There is no bicycle plan which will encourage cycle travel and the motor traffic proposal will make cycling more hazardous, reducing cycle use and possibly increasing cycle incidents (injury and death).

In this aspect the REF demonstrates that the proposal fails the objectives of the NUTTP.

Socio-economic impact

The socio-economic impact study (Technical Appendix 5) applies no recognised transport methodology. It is neither a cost-benefit study, nor a business case. At best it is a list of impacts with brief and casual notes. In the absence of either a cost-benefit study or a business case, the expenditure of public money on light rail has not yet been justified.

The baseline for comparison is not specified. Because the starting point is the Newcastle Urban Renewal Strategy 2012 and the government's total program expenditure of \$510 million, the baseline

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should be the service level for heavy rail prior to truncation. Nowhere is this mentioned. Implicitly the baseline is the status quo but using buses from Wickham instead of Hamilton.

'Potential impacts' are listed in Table 5.3 with positive or negative impact rates as 'minor' or 'moderate'. Nothing is quantified and nothing is weighted.

From a user viewpoint the REF says little about the crucial issues of extra travel time and extra fares. On p.18 of TA5 is a statement that light rail between Wickham and Newcastle Station will take about 3 minutes longer than the present rail shuttle bus. This is not explained but presumably is because the light rail will have more stops.

Transit time of 12 minutes plus 8 to 15 minutes waiting time (into CBD and out of CBD respectively at AM peak – Table 1) adds up to 20 to 27 minutes (REF 4.2.4) additional journey time. This differential of 16 to 23 extra minutes for rail passengers (as compared with the former 4-minute rail journey) is not a positive impact as stated by the REF (p.27), even if light rail is more reliable and more comfortable. This statement is clearly wrong. This crucial point is left to the end of the section 'Access and connectivity' and not mentioned at the outset under 'Changes to travel times'.

The cost of travel time in the Hunter is not zero. A simple calculation can be done: the adult rail fare from Maitland or Fassifern to Newcastle Station is \$3.37. Costing the extra journey time (16 to 23 minutes) at \$10/hour equates to \$2.67 to \$3.83 or an effective fare increase of 80% to 110%.

The true situation is even worse because rail passengers transferring to the light rail will pay an extra \$2.10 fare because of abolition of the fare-free zone (TA5, 4.2.4). Thus the effective fare at \$10/hour for travel time will be \$8.10 to \$9.26 (a 267% increase or more than doubling), that is almost triple what the through rail fare would have been.

These are massive increases in effective public transport fares.

There is also an issue of frequency. With a 5-minute transfer time, rail buses are presently in principle matched with Train arrivals and departures from Hamilton. If a regular 10-minute frequency is maintained, the implication is that it will fail to synchronise with the majority of arrivals and departures. If so, some connections will be shorter, some longer. This does not suggest greater reliability and, if so, is another negative, not a positive impact.

The introduction of light rail will involve reduction in bus services along Hunter Street from 30 to 4 (according to the REF, TA5). TA 4.2.3 suggests that the location of the new bus terminals is yet to be fixed so the impact is difficult to estimate. Nevertheless, it may be deduced that the majority of bus users to downtown Newcastle will also have either to transfer to the Tram or walk a greater distance. Since Trams will run only every 10 minutes (15 at weekend), this will impose waiting time, on average 5 minutes (7.5 at weekends) for each bus passenger across 26 services. This is a large negative impact that needs to be included as a cost in the analysis. The elasticity effect will be an accelerated reduction in bus patronage.

These findings are underlined by the change in travel speeds. The Train covered the 2.7 km from Wickham to Newcastle in 4 minutes, thus an average speed of 40 kmph. Tram will take 12 minutes, thus averaging only 13.5 kmph. But if the minimum 5 minute transfer time is also factored in for rail passengers, the average speed drops to just 9.5 kmph, barely double a good walking speed of 5 kmph. This will be an incentive for many more rail passengers to walk rather than wait for the Tram and may be a health benefit but it is not in any way a transport improvement. Notwithstanding the potential advantages of light rail, they will not be realised by the slow, infrequent and short-distance running proposed for downtown Newcastle.

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Conclusions

The weak presentation of benefits and costs of the Newcastle Light Rail and the failure to weight and quantify them, the disregard for some traffic impacts and the lack of comment on real integrated transport planning and system development demonstrate that the REF is significantly flawed.

A well-designed and well integrated system can incorporate light rail. Light rail does offer scope for a new spine to the Hunter public transport system with scope to run on existing alignments through to Calvary Mater Hospital, Callaghan university campus, Wallsend and also along the Inner City Bypass route to Jesmond John Hunter Hospital and possibly Charlestown.

This REF is an opportunity for applying international best practice. The funds originally allocated to planning public transport for Newcastle as the start of public transport re-vitalisation can still be applied to a comprehensive planning strategy and should be applied to this purpose before committing to further infrastructure.

Questions and matters not addressed

What is the predicted shift to Public Transport and can it realistically be achieved?

What are the consequences if the shift to public transport is not achieved?

Where is the Integrated Public Transport Plan that is essential to planning such a significant change and was promised when NLR scheme was announced?

Engineers Australia welcome the opportunity to discuss the suggested changes to the Proposal with the NSW Minister for Transport.



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