Northern Link

environmental impact statement
supplementary report

Appendix B:
Response to Submissions

Northern Link
Environmental Impact Statement

Supplementary Report

APPENDIX B

RESPONSE TO SUBMISSIONS

■ June 2009

Contents

B.Response to Submissions

This chapter of the Supplementary Report addresses to issues raised in the submissions to the EIS. The chapter is set out in parallel to the chapter headings and second level headings from the EIS Volume 1, Parts A, B and C. Issues and associated responses are numbered under headings used in the EIS. Unless otherwise referred to, statements in the issues are statements from the submissions as summarised in **Appendix A**.

Corrections and Clarifications of the EIS

The following corrections and clarifications of the EIS have been requested or raised in the submissions. **Table B-1** below identifies the submission number and associated sub number (Appendix A), the relevant reference in the EIS, including where relevant Volumes 2 and 3, the Technical Papers (TP), the matter to be corrected or clarified and the amendment to the EIS or clarification.

Table B-1 Corrections to and Clarification of the EIS

Submission (Sub-no).	EIS Reference	Matter for Correction or Clarification	Correction / Clarification
136 (14)	TP 11 (Planning and Land Use - p48	Page 48 of Technical Report 11 Planning and Land Use states "the project would require the acquisition of residential and commercial properties along the western end of Croydon Street". It is not just the western end that will be impacted but the whole western side of the street	Amend 3rd paragraph to read – The Project would require the acquisition of residential and commercial properties along the western ***side*** of Croydon Street. NOTE – Property acquisition along the western side of Croydon Street would not be required with the removal of the Toowong Connection.
149 (144)	11.1.4 (p11-2)	4th dot point under heading Regional Planning Framework – reference to the superseded "Integrated Regional Cycle Network for SEQ".	Replace 4th dot point with: ***SEQ Principal Cycle Network Plan***
149 (145)	11.1.4 Tab 11-1 p11-4	List of relevant Regional Policies derived from Table 11-1 is incomplete. Add "Economic Development". Reason - efficient transport systems/infrastructure are essential to achieve economic development.	Add new 5th dot point "Economic Development" Amend Table 11-2 to include ***Economic Development*** in column 1 and the following words in column 2 next to Economic Development – "***Efficient transport systems/infrastructure are essential to achieve economic development***."
149 (146)	11.1.4 Tab 11-2 pp11-4 to 11-5	The relationship of the Project with the SEQRP Desired Regional Outcomes (DROs) for Sustainability and Natural Environment is not described in the discussion in column 2 as it is for Urban Development and Integrated Transport. Amend EIS to include comments on the way in which the project relates to Sustainability and Natural Environment DROs.	No amendment is required The relationship of the Project with the SEQRP Desired Regional Outcomes (including Sustainability and Natural Environment) is identified in Table 11-5 of the EIS.

Submission (Sub-no).	EIS Reference	Matter for Correction or Clarification	Correction / Clarification
149 (147)	11.1.4 Tab 11-2 P11-5	4th paragraph under Regional Activity Centres. The focus of the centres efficiency argument is narrow around road network outcomes. Suggest amend to: "As major trip generators, these Centres need to be serviced by efficient transport networks to allow them to develop and operate to their desired potential."	Amend 5th paragraph to read – "***As major trip generators, these Centres need to be serviced by efficient transport networks to allow them to develop and operate to their desired potential.***"
149 (150)	11.1.4 11-7	1st sentence. - South East Queensland Infrastructure Plan and Program – minor change. Amend to "….(SEQIPP), which was most recently updated in June 2008".	Amend first sentence under the heading South East Queensland Infrastructure Plan and Program to read – "***The SEQRP is supported by the South East Queensland Infrastructure Plan and Program (SEQIPP), which was most recently amended in June 2008***"
149 (151)	11.1.4 p11-7	2nd sentence. - Integrated Regional Transport Plan for South East Queensland – amend for accuracy. Replace with: "There is a legislative requirement to prepare a regional transport plan under the Transport Planning and Coordination Act 1994. The Integrated Regional Transport Plan 1997 is currently under review. A new Integrated Regional Transport Plan will support the SEQRP and coordinate investments across all sectors of the transport system."	Amend 2nd sentence under Integrated Regional Transport Plan for South East Queensland to read – "***There is a statutory requirement to prepare a regional transport plan under the Transport Planning and Coordination Act 1994. The Integrated Regional Transport Plan 1997 is currently under review. A new Integrated Regional Transport Plan will support the SEQRP and coordinate investments across all sectors of the transport system***".
149 (157)	11.2.2 p11-24	Integrated Regional Transport Plan for South East Queensland. This is an incorrect statement about the status of Integrated Regional Transport Plan 1997. Delete 1st sentence -- the Integrated Regional Transport Plan has not been replaced by SEQRP. While the Integrated Regional Transport Plan is ageing, it is still policy which is standalone to the SEQRP.	Delete the first sentence under the subheading Integrated Regional Transport Plan (IRTP) for South East Queensland and replace with the following wording – "***The IRTP, while aging, remains part of south east Queensland's transport policy and is standalone to the SEQRP***."
149 (158)	11.2.2 p11-24	Regional Cycle Strategies. Incorrect reference to network plan. Amend heading to: "Regional Cycle Strategies – Cycle South East and the SEQ Principal Cycle Network Plan."	Amend the Regional Cycle Strategies sub-heading to read – "***Regional Cycle Strategies – Cycle South East and the SEQ Principal Cycle Network Plan***".

Submission (Sub-no).	EIS Reference	Matter for Correction or Clarification	Correction / Clarification
149 (159)	11.2.2 p11-24	Western Brisbane Transport Network Investigation. Reference this study to its origin as a recommendation of the Integrated Regional Transport Plan 1997. This section should appear immediately after the sections on the Integrated Regional Transport Plan and Transport 2007 as WBTNI originated from the Integrated Regional Transport Plan. Need to clarify the link to this project – through WBTNI – to Integrated Regional Transport Plan and Transport 2007	Amend the location of the sub heading Western Brisbane Transport Network Investigation and associated wording to appear following the IRTP sub-heading and associated wording. Amend the wording to include a new sentence between the first and the second sentences to read – "***WBTNI originated from the IRTP***".
149 (161)	11.4.1	Land Use Impacts – Western Connection. Land Acquisitions and Land Use Implications. Minor correction. Amend to: "The worksite and construction areas would be licensed by Council to the Public-Private Partnership Company (PPP Co) for the duration of construction."	No amendment required.
149 (162)	11.4.4 p11-41	Land Use Impacts – Northern Connection. Incorrect statement about the nature of Main Roads interest in land on which the ventilation fan station and outlet are proposed to be constructed at Victoria Park. Main Roads is the trustee of this reserved land, not the owner. Therefore the process of making the land available requires revocation of part of the reserve by the Department of Natural Resources & Water, an easement in gross, or a trustee lease issued by Main Roads subject to Ministerial consent under the Land Act 1994. Consent should be able to be obtained for a trustee lease because the purpose of the reserve is Departmental & Official (Transport & Developmental) purposes and the facility is required for transport purposes.	Amend 2nd paragraph, first and second sentences under Section 11.4.4 to read – "***The ventilation fan station and outlet are proposed to be constructed within Victoria Park. The land is State land, held in trust by the Queensland Department of Main Roads (QDMR). The process of making the land available would require either the revocation of part of the reserve by the Department of Natural Resources & Water, an easement in gross, or a trustee lease issued by QDMR subject to Ministerial consent under the Land Act 1994***".
149 (175)	14.5.10 Tab 14-3	Table 14-3 Potential Impacts: Northern Connection. Ventilation Outlet (VO) – Predominant Land Uses and Variety. "The VO would be located within Brisbane City Council owned Victoria Park Golf Course..." This is an incorrect reference to land ownership.	This reference to land ownership in Table 14-3 of the EIS is amended to read "The VO would be located within a Reserve for Departmental & Official (Transport & Development) purposes which is used as part of the Brisbane City Council operated Victoria Park Golf Course. The subject land is owned by the Department of Natural Resources & Water, with the

Submission (Sub-no).	EIS Reference	Matter for Correction or Clarification	Correction / Clarification
			Department of Main Roads as trustee."
192	11.2.2 (Table 11-5)	Table 11-5 states that the western end of the project traverses Brisbane Forest Park and Botanic Gardens which are mapped as Koala Sustainability Areas in maps of gazetted koala habitat areas. DTMR states that these areas are not mapped as Koala Sustainability Areas.	The claim that the western end of the study corridor near the Botanic gardens and including parts of Brisbane Forest Park had been proclaimed a Koala Sustainability Area was made in error and is withdrawn.
149	Figure 14-2 p14-10	Figure 14-2 Site Analysis: Northern & Kelvin Grove Connections. What are items 4-9 on the map.	The site analysis in this figure supplements the descriptions of the Kelvin Grove Road and Victoria Park Precincts provided in Sections 14.4.2 and 14.4.3. The goals and objectives identified in the description relate specifically to the numbered locations on the map so that the urban design and visual issues may be readily identified and understood.
148	TP 15 2.1.3	Reference to tidal flow along Coronation Drive is incorrect	The reference is removed

B.1 Introduction

B.1.1 Background

No issues raised in submissions.

B.1.2 Brisbane's Transport Challenge

No issues were raised directly in relation to this section of the EIS in submissions.

B.1.3 Detailed Feasibility Study

B.1.3 Issue 1 – Study Corridor

A number of submissions raised concerns regarding the assessment of issues beyond the boundary of the study corridor, particularly with regard to the area of West Toowong. Concern was raised that the area of West Toowong is in very close proximity to the ventilation outlet and is also affected by the Western Freeway connection. The study has ignored residents who live within these areas. Their absence from the study corridor is a significant omission from the EIS and the study is incomplete. The potential impacts in these areas need to be quantified, understood and made subject to necessary controls. Concern was also raised regarding the area to the east of Croydon Street, on one hand that they were not in the study corridor, yet would be affected and the other that members of the Toowong community would be comforted if Council and the government would reduce the Study Corridor area in Toowong and unequivocally rule out the possibility of moving the Toowong local connection further to the east.

Response

As identified in the Northern Link Terms of Reference (ToR), the study corridor is the area subject to primary investigation for the EIS. The study corridor was presented in the Draft ToR which was made available for public and agency comment in accordance with the requirements of the Queensland *State Development and Public Works Organisation Act 1971* (SDPWO Act). When finalising the ToR, the Coordinator-General (CG) considered all properly made submissions and the finalised ToR were presented to the proponent for the preparation of the EIS. Other areas of the city, beyond the study corridor boundaries and potentially affected by the Project, have been investigated to the level of detail commensurate with the degree of the Project's influence, as required by the ToR. The potential impacts from the Project in these areas are addressed in the relevant sections of the EIS and also within relevant sections of this Supplementary Report (such as noise monitoring locations beyond the extent of the study corridor).

B.1.3 Issue 2 – Project Delivery

A number of submissions raised issue with the proposed project delivery, such as a Public Private Partnership (PPP), and its ability to provide improved solutions or bring innovation through the detailed design stage, particularly in regard to the Toowong Connection. Concerns included that the project's completion will rely on further government funding and that it will be the residents of Brisbane and Queensland who will pay by public funds having to be diverted from other programmes or projects, borrowing or deducting from budget surpluses. The justification for seeking innovation through the PPP tendering process is problematic. Given the current economic climate, the PPP process cannot be relied upon to create an innovative improved design. The EIS creates room for the private sector to potentially override the consensus reached between the community and local government and will increase the scope for rent-seeking behaviour (i.e. traffic funnelling, imposition of legal limits on Council Roads, introduction of T3 lanes on Milton Road and/or Coronation Drive) by the consortia expressing interest. The proposal for local connections in the EIS Reference Project is intended only to make it more attractive for private investment and the significant costs have been externalised from the financial impact of the proposal. Innovation is unlikely in a monopolised market. Statements that imply that the tendering process may find improved solutions hardly inspire confidence in the thoroughness of Northern Link's evaluation. Given the current worldwide financial situation, it would seem financially inappropriate for the PPP to undertake the more costly of the two options. This could lead to failure of the PPP and the public sector having to take on the burden of construction.

Response

The project delivery mechanism is not considered a matter that will impact on the technical issues considered by the EIS and further with this Supplementary Report. In terms of the procurement program, Council would only proceed with the Project where proposals from consortia are acceptable to Council. In the event that changes are proposed by the preferred bidder, those identified changes may require approval from the Coordinator-General. The SDPWO Act provides a process for requests for changes to an approved EIS project to be assessed by the Coordinator-General.

Based on any changes resulting from the procurement process, as well as the conditions set by the Coordinator-General, Council would make a final decision whether or not to proceed with Northern Link.

B.1.4 The Reference Project

No issues were raised directly in relation to this section of the EIS in submissions.

B.1.5 The Proponent

No issues raised in submissions.

B.1.6 Environmental Impact Statement

B.1.6 Issue 1 – Detailed Design – Alternative Design and Delivery

It was submitted that representatives of the Proponent made it clear that alternative designs for the Toowong connection were eliminated at an early stage. No details have been provided for these deliberations. The EIS does not provide any detail of the rationale behind the project design, including any engineering limitations on design of the Toowong connection. No alternative designs are provided, nor are alternatives suggested through the community consultation process mentioned. These alternatives should then be subject to a detailed assessment against the current reference design.

Response

Chapter 3 of the EIS addresses Section 3.1 of the Terms of Reference requiring a description of the various design options that were addressed in the development of the Reference Project. The description provided included the initial development of the EIS Reference Project contained in the *TransApex* Prefeasibility Study of March 2005, followed by a preliminary assessment in accordance with the Queensland Government's Value for Money Framework. The preliminary assessment included the development of strategic options containing precinct connections from the mainline corridors shown in Table 3-1 of the EIS. These precinct connections via the local road network were considered in the development of the strategic layouts.

Twenty five strategic options shown below in **Table B-2** below were developed using the three mainline corridors and precinct connections, with consideration of the key physical and non-physical constraints and engineering limitations, in combination with the design parameters.

- **Table B-2 Strategic Options**

Option No	Mainline Connection	Precinct Connection
1	WF to ICB	Kelvin Grove Road / Frederick Street (Prefeasibility)
2	WF to ICB	No ramp connections
3	WF to ICB	Kelvin Grove Road
4	WF to ICB	Frederick Street
5	WF to ICB	Kelvin Grove Road / Croydon Street
6	WF to ICB	Kelvin Grove Road / Jephson Street
7	WF to ICB	Kelvin Grove Road / Benson Street
8	WF to Hale Street	Croydon Street
9	WF to Hale Street	Jephson Street
10	WF to Hale Street	Benson Street
11	WF to ICB	Kelvin Grove Road / Countess Street
12	WF to ICB	Frederick Street / Kelvin Grove Road / Countess Street
13	WF to ICB	Croydon Street / Kelvin Grove / North Quay (via Countess Street)
14	WF to ICB	Kelvin Grove Road / Jephson Street / Countess Street
15	WF to ICB	Kelvin Grove Road / Benson Street / Countess Street
16	WF to ICB	Frederick Street / North Quay

Option No	Mainline Connection	Precinct Connection
17	WF to Hale Street	North Quay
18	WF to Hale Street	Frederick Street
19	WF to Hale Street	No ramp connections
20	WF to North Quay	Hale Street
21	WF to North Quay	Frederick Street / Hale Street
22	WF to North Quay	Hale Street / Croydon Street
23	WF to North Quay	Hale Street / Jephson Street
24	WF to North Quay	Hale Street / Benson Street
25	WF to Hale Street (Milton Road)	No ramp connections

An initial review of the twenty five strategic options was undertaken based on broad technical and design constraints and function of connections. This initial evaluation removed some options from further review where precinct connections provided a duplication of function or connectivity. As a result, fifteen strategic options remained as shown in **Table B-3**. These fifteen strategic options were then reviewed against a criteria framework to provide an overview of the effects of each strategic option. The unranked criteria used included:

- functional role of Northern Link in the road hierarchy;
- complexity of construction;
- construction method flexibility;
- delivery program;
- cost effectiveness;
- impacts on existing infrastructure;
- property impacts;
- liveability, connectivity and amenity; and
- likely community acceptance.

Table B-3 Strategic Options Traffic, Engineering and Environment Summary Review

Option	Traffic Volumes	Construction Risk	Property Impacts	Community Acceptability	Cost Comparison
1 – WF to ICB	Lower range	Medium	Low	High	100%
2 – WF to ICB	Lowest range	Low	Low	High	80%
5 – WF to ICB	Mid range	High	Medium	Medium	115%
6 – WF to ICB	Lower range	Medium	Medium	Medium	120%
7 – WF to ICB	Lower range	High	High	Medium	125%
8 – WF to Hale St	Mid range	High	High	Low	80%
9 – WF to Hale St	Mid range	High	High	Low	90%
10 – WF to Hale St	Mid range	High	High	Low	105%
14 – WF to ICB	Higher range	High	Low	Medium	140%
15 – WF to ICB	Higher range	High	High	Medium	145%
16 – WF to ICB	Mid range	Medium	Medium	Medium	130%

Option	Traffic Volumes	Construction Risk	Property Impacts	Community Acceptability	Cost Comparison
17 – WF to ICB	Lower range	High	Low	Medium	100%
22 – WF to North Quay	Highest range	High	High	Low	95%
23 – WF to North Quay	Highest range	High	High	Medium	105%
24 – WF to North Quay	Highest range	High	High	Medium	105%

From the preliminary assessment, five strategic options were identified for further development as described in Chapter 3 of the EIS. These were:

- Option 1 – the Bored Option from the TransApex Prefeasibility Study;
- Option 2 – the Direct Connection or "Straight Through" option;
- Option 5 – enhanced Kelvin Grove Road Connection with a Toowong Connection from Croydon Street over Milton Road;
- Option 8 – Hale Street Connection with local connections at Croydon Street; and
- Option 16 – Countess Street Connection with local connections to Croydon Street.

The preliminary assessment of these five options, as summarised in Tables 3-3 and 3-4 in Chapter 3 of the EIS, concluded that Northern Link should proceed to the Detailed Feasibility Study with further detailed investigations to be undertaken for Options 1 and 2. Option 1 was consequently taken forward as the EIS Reference Project while noting that Option 2 was also capable of meeting many of the strategic needs of the project.

Council has now considered the submissions and further detailed assessment of the Project without local connections. Council has now decided to proceed with the Project without the local connections.

B.1.6 Issue 2 – Detailed Design – Project Change

A number of submissions questioned that the EIS does not address the possibility of a 'straight through' design and many further queried how re-evaluation of the project would be sought from the Coordinator General for amendments during the tender process and subsequent final design and construction stages.

It was submitted that the rationale given for providing local connections is "patronising in the extreme, ignoring both Council and community sentiment". Seeking further design of the local connections at Toowong will only attract a design to maximise toll and not optimise traffic flow or community amenity. The EIS cannot be valid, where no final designs can be described until after the completion of the Tender Process for private involvement in the project, as it cannot assess the specific impacts of an unresolved design proposal that has a high probability of varying significantly from that published. It is not a preliminary or reference design rather it is one of several possible options.

The community would not have adequate input into alternative designs of the project [as developed in the tendering process]. In this regard it was submitted that the Coordinator-General should mandate a set of criteria whereby the Coordinator-General and the public are able to examine and make submissions on proposed changes which lie outside of the rulings and spirit of previous 'approvals', and

that all such proposed changes must be submitted for evaluation as for as original EIS and consequently treated as such with public invitations and submissions.

A concern was also raised that the reference design is not feasible because it did not consider the mitigation measures as part of the reference design.

Response

The EIS was prepared on the basis of the fully connected reference design for the EIS Reference Project. In response to the submissions on the EIS and in order to avoid many of the issues of concern raised in the submissions and based on outcomes of further studies, the Project will no longer include local connections at Toowong and Kelvin Grove.

The Council is now intending to seek bids for the delivery and implementation of the Project without local connections. The potential for innovation in detailed design and project delivery would remain through the tendering process for the approved Project, provided any such changes are consistent with and meet the objectives of the Project.

The SDPWO Act provides a process for the Coordinator-General to evaluate changes to a significant project, previously the subject of an evaluation report by the Coordinator-General.

The strategic benefits of the connections at Toowong and Kelvin Grove would not be captured, whereas the strategic benefits of the main alignment, connecting the Western freeway with the Inner City Bypass would be retained by the Project. The linkages to the motorway network for the designated activity centres at Kelvin Grove, Toowong and the University of Queensland would be less direct and less efficient than they would have been with the EIS Reference Project. The effects of the Project are considered in Chapter 4 of this Supplementary Report.

The EIS identified a range of mitigation measures for both the delivery (construction) and implementation (operational) phases of the EIS Reference Project. Since the EIS, these mitigation measures have been revised and updated to reflect the impacts of the Project. The mitigation measures that are part of the Project are contained in the Draft Outline Environmental Management Plan identified in Section 2.4 and Appendix D of this Supplementary Report.

B.1.6 Issue 3 – EIS Process and Independence

The integrity, independence and impartiality of the EIS process were the subject of a number of the submissions. It was submitted that the EIS used biased non-objective language. Concern was expressed regarding the appropriateness of the same organisation conducting the design and the EIS, including a perceived bias that the project would proceed.

Of particular concern in this regard was the fact that valuations were made of potentially affected properties prior to the consideration of the EIS by the Coordinator-General.

The submissions included the comment that it would be fairer to fund Citizen Action Groups to allow them to obtain their own experts on subjects such as noise and air pollution, than two consulting companies working with the BCC (who are committed to the project proceeding).

There should be an opportunity for a "no" case to be presented, drawing attention through expert opinion of serious misgivings about the validity of the opinions which form the basis of the current feasibility

study. The Coordinator-General should be mindful of what communities are asking for, make statutory provision for what they ask and give them access to public funding for independent professional advice to present their case at all stages of the design, construction and operation.

Response

Section 32 of the SDPWO Act provides that for a declared "significant project for which an EIS is required", the EIS would be prepared by the proponent of such a project.

The rigour of the EIS process is enhanced if undertaken in combination with and integrated with the design development process. In this way, many impacts from both the delivery (construction) phase and the implementation (operational) phase are able to be avoided, or minimised mitigated and managed more effectively than if the two processes ran in isolation. The rigour of the process was further enhanced with the regular input of feedback and commentary received from the community during the preliminary consultation process which included information sessions and continuous input through the EIS telephone and email services (refer also to B.1.7 Issue 1 response).

Some valuations of potentially-affected properties were conducted prior to the consideration of the EIS to identify the potential impacts. Such valuations and associated notifications to potentially-affected property owners did not indicate that the Project would proceed but were considered necessary to inform the development of the Project and related cost estimates.

The "independence" and objectivity of the EIS process is assured by the Coordinator-General's evaluation of the Project, the EIS and the community submissions. Council carried out the assessment in accordance with the process under the SDPWO Act to ensure the robustness of the assessment and to optimise community access to the process. The terms of reference were open to community comment, and provided the binding framework for the EIS and for the Coordinator-General's evaluation of the EIS. The EIS was available for public comment, and this supplementary report provides further information in response to submissions. The Coordinator-General also requests review of these environmental documents by relevant government agencies that have expertise in matters raised by the Project and provide their comment and advice in this regard to the Coordinator-General.

Some submissions were very thorough in their exploration of most aspects of concern to communities living adjacent to the likely extent of Project works. Some submissions have presented a vigorous rebuttal of the EIS Reference project. In the circumstances, it is concluded that the EIS process has met the public accessibility requirements in accordance with the terms of reference.

B.1.6 Issue 4 – EIS Guidelines

Submissions have referred to the information and advice on the preparation of the EIS contained in Part A of the Terms of Reference (ToR) with concerns that the key principle for the preparation of the EIS, that it should enable readers to identify and understand the benefits and to balance those against the impacts of the EIS Reference Project, has not been met. It has been submitted that the EIS has played down the impacts of the EIS Reference Project, failed to consider relevant and important issues, and chosen not to consider significant negative impacts to ensure that the project is always seen in a positive light. It addresses the local access impacts associated with the Toowong Connection as if they are of no importance. Factors that made swift analysis of the EIS more difficult and cumbersome were several errors, frequent omissions and even conflicting information.

Response

The EIS Guidelines within the ToR are provided for information and advice to guide the preparation of the EIS.

The assertions that the EIS sought to present the Reference Project only in a positive light, or failed to consider relevant matters, are not accepted. The EIS concluded, Section 22.8, that while the EIS Reference Project would lead to a wide range of transport, socio-economic and community benefits for the city, there would also be some likely adverse impacts for local communities residing in close proximity to the Toowong and Kelvin Grove connections. The adequacy of the EIS will be determined by the Coordinator-General in his evaluation of it, also considering the Supplementary Report, the submissions received, and the terms of reference.

B.1.7 Consultation

A number of submissions were made in relation to community consultation. These issues have been summarised into broader issues categories, described below.

B.1.7 Issue 1 – Purpose and Scope of the Consultation Process

The level of community engagement undertaken for the EIS did not satisfy the Terms of Reference. The consultation process did not provide opportunity for community input to have a meaningful influence on the reference design and there was no refinement of the design based on community comment. It is obvious that other options were discarded before the community could comment on them. Consultation should have been undertaken during the development of the design options. It was submitted that community consultation, rather than providing a legitimate voice for the community, was a source of information whereby flaws in the Reference Project could be examined and given a marketing spin.

Response

The Northern Link Terms of Reference (ToR) specified that the community engagement process was required to reach a consultation level, as defined within the Queensland Government's *Engaging Queenslanders* guide to community engagement methods and techniques. Specifically, the project team was required to fulfil the requirements for the first two levels of engagement detailed in the guide, these being:

- inform - to provide the community with information about the Project; and
- consult - to obtain feedback from the community on the Project.

The consultation conducted for Northern Link employed a number of engagement techniques/activities that the *Engaging Queenslanders* guide recommends as appropriate to the 'consultation' level of engagement including 'open days' (community information sessions), 'road shows' (staffed displays), 'discussion groups' (community reference groups) and 'web-based consultation' (interactive website and email).

Community concerns and suggestions raised through community consultation were considered and, where consistent with project objectives and technically feasible, addressed in the design and urban mitigation plans. It was not feasible for all suggestions to be incorporated into the design. Not all inputs were reasonable, nor were others consistent with the project objectives. Examples of changes to the EIS Reference Project that were brought about as a direct result of feedback from the community are:

- the realignment of the access to Westbury Street, Red Hill, from Lower Clifton Terrace to Victoria Street;
- extension of the cut-and-cover works for the Inner City Bypass (ICB) portal to maintain access from Victoria Park Road, Kelvin Grove, to the ICB;
- the alignment of Kelvin Grove Road, near Blamey Street, was moved to the east to reduce impact on Marshall Park and the fig trees; and
- the vertical alignment of the mainline tunnels was changed to maximise the distance between the crown (top) of the tunnel and the surface.

B.1.7 Issue 2 – Communication and Consultation Methods

Communication and consultation about the EIS Reference Project and its impacts was not effective. Specific issues related to:

- an over-reliance on the website to disseminate information;
- scheduling of the staffed displays during working hours;
- lack of information, personalised correspondence and face-to-face consultation/dialogue for those residents close to works, but not directly affected (i.e. those in Valentine Street, Croydon Street, Milton Road and Morley Street);
- delivery of project brochures and letters in plain, unsealed envelopes addressed "to the resident", such items may have been mistaken for junk mail;
- appendices A and B for Technical Report No 15 - Economics were omitted from the website version of the EIS;
- a timeline displayed that information on filtration would be available, which misled the community to believe that filtration would be included as part of the project;
- no response being provided to feedback forms that we provided;
- the information provided during consultation was not always consistent, correct or adequate. Some consultation team members were evasive and did not appear conducive to receiving community feedback; and
- the artist's impressions shown at the community consultation were misleading and failed to show the community what the ramifications of the EIS Reference Project could be.

Response

The consultation process included a preliminary phase and a formal phase during which submissions to the EIS were invited. During both phases, the consultation process sought to and, it is considered, achieved a balance across a range of media for the dissemination of information about the project. The range of media included printed material such as letters and newsletters, published advertisements in local papers, internet-based information on the Council website and the EIS website, a toll-free telephone service, a letter service and an email service.

Copies of project newsletters and the EIS were available at community information sessions, Council libraries and the offices of elected representatives close to the study corridor. Information about how to access the EIS was advertised in public notices and in the project newsletter. Letters regarding sensitive topics, such as potential property acquisition, were individually addressed and posted to property owners.

In addition, a number of staffed and un-staffed displays at community centres, community meeting places and libraries were provided and well attended by the community. Community reference groups were convened and encouraged to share information within the community, and several stakeholder groups and peak industry bodies were briefed as soon as practicable after information about the project was updated. Members of the consultation team, including technical staff, were present at community information sessions to address specific concerns of those attending.

Timelines were displayed at community information sessions to give the community an indication as to when information regarding specific technical topics, including project design updates, construction, traffic, air quality, noise and vibration, would be available.

Community consultation activities were held both during and outside of working hours, and in a variety of locations, to maximise community members' opportunities to attend a session.

Overall, it is considered that the communication and consultation tools used were appropriate for the project and the need to meet the ToR guidelines in an effective and balanced manner.

The appendices to Technical Paper No. 15 – Economics were accidentally omitted from the Northern Link EIS website; however, they were provided to those people who requested them. The information contained in the appendices was incorporated into the main body of the Technical Paper.

The artist's impressions presented at the community information sessions were derived directly from the reference design drawings, and sought to demonstrate the extent and nature of the infrastructure, should the EIS Reference Project proceed. The impressions provided an accurate representation of the EIS Reference Project.

B.1.7 Issue 3 – Stakeholder Levels

The stakeholder levels identified for community consultation do not correspond with the level of impacts that residents will experience if Northern Link proceeds in line with the EIS reference design. Specific issues related too:

- the lack of consultation with residents of West Toowong before the tunnel design;
- only those whose houses were "of interest" were shown plans in the first week of May 2008, while close neighbours were not permitted by Council to see the plans for an additional three weeks; and
- many residents of Toowong were included as Level 2 stakeholders as they would not be directly impacted by construction or operation of the EIS Reference Project. However, the EIS shows that these same residents would be affected by noise and dust during construction and on-going air quality impacts during operation.

Response

A number of community and industry groups, including the West Toowong Community Association, were contacted in early 2008, to offer a representative from their group a position on the Northern Link Community Reference Groups (CRG). Several groups took up this offer, though a response was not received from the West Toowong Community Association.

Council sought to inform as a priority the owners of those properties that would be directly impacted by construction of the EIS Reference Project so that such information was distributed to directly affected

owners prior to informing other residents or making the plans publicly available. This was the appropriate course of action.

Residents of areas that were identified as being potentially affected by construction dust and noise were identified as Level 1 stakeholders.

B.1.7 Issue 4 – Community Reference Groups

The Community Reference Groups (CRGs) had minimal impact on design and were used as a means of selling the project. Membership of the CRGs was not representative of the worst-affected areas, despite requests to include additional members. Information regarding the CRGs (i.e. member contacts and meeting notes) was not provided in a timely manner. A number of issues and questions raised were also omitted from the notes.

Response

Nominations for membership of the CRGs were called for in December 2007 in Quest newspapers, project newsletter and at community information sessions. Applications closed on 18 January 2008 and meetings were held in early February, April and May 2008. The purpose of the CRGs was to provide feedback on the Reference Project and the material provided to each group, as well as to provide a resource for disseminating information between meetings. The composition of each group was derived from the expressions of interest.

As specified in the Community Reference Group Charter and Procedures, which was disseminated to potential members in the application phase, the CRGs were not decision-making bodies. This approach is consistent with the 'consultation' level of engagement specified in the *Engaging Queenslanders* guide. The role of each CRG was to provide feedback and timely advice on a range of community-related issues, concerns and values during the detailed feasibility study for Northern Link, including input into the EIS and reference design.

Notes from CRG meetings were emailed to members prior to the next meeting, where it was discussed if these provided an accurate reflection of the issues discussed. Following further input from CRG members, the notes were uploaded to the Northern Link EIS website for wider community access.

B.1.7 Issue 5 – EIS Submission Process

The EIS submission process was rushed and there was insufficient time to obtain the advice of independent technical experts on the material presented in the EIS. The EIS advertising period officially commenced on Saturday 25th October 2008, yet printed hard copies were not generally available until over a week after this date. Local libraries and ward offices did not have copies available until about 3rd November 2008. Technical Reports were still not available at the Toowong Library or Toowong Ward Office on 6th November 2008. The EIS submission deadline around the December-January period of 2008/2009 was not fair.

Response

The EIS submission period was established by the Coordinator-General. The original submission period spanned seven weeks from 27 October 2008 to 15 December 2008. However, due to community feedback, Council requested that the Coordinator-General extend the period by a week, to 22 December 2008. The EIS submission period ran for eight weeks.

The EIS documents were displayed in hard copy at 14 locations in the vicinity of the project, including libraries and elected representatives' offices from 27 October to 23 December 2008. These documents were also available to be downloaded from the Northern Link EIS website (www.northernlinkeis.com.au) and through the Department of Infrastructure and Planning website (www.dip.qld.gov.au) for the whole submission period.

Volume 3 of the EIS, the Technical Papers, was available to view electronically at public display locations from 27 October 2008.

B.1.7 Issue 6 – Reporting of Community Consultation in the EIS

The EIS does not contain evidence that the feedback given by the community resulted in any change to the design, or was even considered, suggesting that submissions made in protest prior to the EIS release were ignored. Community issues listed in EIS represent high-level summaries that "gloss over" and obscure the actual content and concerns identified in community feedback. Specific issues raised by the community should have been considered and responded to individually so as to achieve greater transparency and accountability in the consultation and decision-making process. The consultation process has not been evaluated, nor has satisfaction with the EIS Reference Project been measured longitudinally.

Response

A comprehensive summary of the community consultation conducted for the Northern Link EIS was presented in Appendix B of the report. The issue summaries in the EIS were not intended to "gloss over" or obscure the content of the feedback, but to provide a summary of the issues that were raised during consultation. Due to the magnitude of community comments that were received between December 2007 and September 2008, it was not feasible to report on and respond to each one individually in the report.

Community consultation was continuously evaluated and changes were made to process, within the scope of the study, to engage the community effectively with the Reference Project.

B.1.8 Submissions to the EIS

B.1.8 Issue 1 – Silent Majority

There is a silent majority of people who support Northern Link. Ensure that you do not just listen to the vocal minority but take heed of the silent majority who want this tunnel to proceed as soon as possible.

Response

This submission is noted.

B.2 Project Rationale

Submissions included a wide range of general comments ranging from one case offering encouragement and strong support for the project, to opposition to the local connection at Toowong. Most submissions, being those from the Toowong community, stated that the Project with a local connection in the Toowong residential area is inappropriate and requested a wide range of alternatives, particularly for the local connection in Toowong.

B.2.1 Strategic Context

B.2.1 Issue 1 – National Transport Context

It was submitted that the EIS needs to clearly identify and justify the project need by identifying how it fits into the larger more complex road/ rail and intermodal freight and people connectivity. Simply arguing that these strategic policies support the need for this particular solution is simplistic and does not deal with the broad and contradictory nature of these policies. Northern Link is identified as a lesser element of the AusLink road solution within the larger complex road/rail and intermodal connection solution for people and freight connectivity. Northern Link and the other AusLink road projects will only provide part of the transport solution.

Response

The role of the EIS prepared under the *State Development and Public Works Organisation Act 1971* (SDPWO Act) and the ToR issued in February 2008 by the Coordinator-General in respect of Northern Link should not be confused with the wider role of the Coordinator-General established under section 10 of the SDPWO Act and the role of the State and Council in formulating transport policy.

The South East Queensland Regional Plan 2005 - 2026 (SEQRP) and the South East Queensland Infrastructure Plan and Program 2008 – 2026 (SEQIPP) is considered the contemporary expression of State government policy towards infrastructure planning and investment.

The AusLink strategy must be read in the context of the National Land Transport (AusLink) Network[1]. The road transport network initiated under the AusLink program is "… *based on national and inter-regional transport corridors including connections through urban areas, links to ports and airports, rail, road and intermodal connections that together are of critical importance to national and regional economic growth development and connectivity*."[2]

The EIS ToR relate to a specific project and do not require, nor should they, an action of policy analysis and resolution that is more properly conducted by the State Government. It is not the role of the proponent to resolve policy issues, rather, the EIS is required to describe the project and the policy context within which the project has been promulgated. The EIS has done this. The EIS has demonstrated how the project is consistent with strategic infrastructure planning, as expressed in the

[1] Dept Infrastructure, Transport, Regional Development and Local Government, 2008, *National Land Transport (AusLink) Network*, DoTARS, Canberra
[2] http://www.auslink.gov.au/whatis/network/index.aspx

SEQRP and SEQIPP. It is important to note that the more recently released draft SEQ Regional Plan 2009 – 2031 provides for the delivery of Northern Link as part of the transport network 2009 – 2031[3].

B.2.1 Issue 2 – Relationship with SEQRP and SEQIPP

It was submitted that section 2.1.2 of the EIS implied that Northern Link is crucial to delivering SEQIPP and SEQRP rather than suggesting that Northern Link is consistent with and complements the SEQRP and SEQIPP.

Response

Section 2.1.2 of the EIS concluded that Northern Link is consistent with and complements the SEQRP and SEQIPP rather than implying that it is crucial. As stated in section 2.1.2 of the EIS, Northern Link would complete a high-quality regional transport route and would complement other investment in transport infrastructure by the Queensland Government in Airport Link and the Airport Roundabout Upgrade, and by Brisbane City Council in the Clem Jones Tunnel (Clem7). In relation to the SEQIPP the EIS concluded that Northern Link would satisfy the criteria for priority infrastructure by reducing traffic flows on Coronation Drive, while also managing congestion and travel demand, and by increasing road capacity to cater for growth. Northern Link would enhance public transport capacity on Coronation Drive, with consequential strategic benefits in public transport connections and services to the University of Queensland at St Lucia. The objectives for Northern Link are therefore consistent with the intentions of SEQIPP and other relevant planning and infrastructure.

B.2.1 Issue 3 – Criteria for Priority Infrastructure

It was submitted that while Northern Link would satisfy criteria for priority infrastructure by improving bus services linking Toowong Centre with the CBD, Brisbane City Council makes no commitment to bus priority on Coronation Drive in the EIS. The submission provided that the State is seeking bus priority measures on Coronation Drive as part of a balanced approach towards addressing the impacts of high traffic growth in urban centres. The submission recommended an EIS Condition "That Brisbane City Council develop and implement a Public Transport Plan, in consultation with Queensland Transport to support the enhanced public transport outcomes derived from the implementation of the Northern Link project and to satisfy the State that the public transport benefits of the project have been realised. This plan is to include the provision of bus priority measures on Coronation Drive. ”

Response

Brisbane City Council, as the proponent for Northern Link, supports the need to implement a Public Transport Plan, in consultation with QT, to support the enhanced public transport outcomes derived from the Project. The specification of the assumed outcomes of such a Plan, such as to include bus priority on Coronation Drive, is considered premature until all aspects of such a Plan are developed.

The responsibility for developing and maintaining a public transport system rests with QT, and TransLink in particular. The Brisbane City Council’s role is to provide and operate the bus services within that system.

Any condition imposed on Northern Link for bus priority lanes on Coronation Drive or elsewhere would be neither reasonably required by, nor relevant to the predicted project impacts. The Project does

[3] Dept Infrastructure and Planning, Nov 2008, *Draft South East Queensland Regional Plan 2009 – 2031*, map 22 –

however provide the opportunity to lock in the benefits of reduced traffic demands on the surface roads, in particular on Coronation Drive, for the provision of an inbound transit lane or bus lane. As identified in Section 4.1 of the Supplementary Report, while a policy decision has yet to be made on the provision of an inbound bus lane or T3 lane, the opportunity to re-introduce such bus priority on Coronation Drive has been included in the surface road network assumptions of the updated traffic modelling undertaken for the Supplementary Report.

B.2.1 Issue 4 – Western Brisbane Transport Network Investigation (WBTNI)

A range of issues associated with the relationship between the Project and the State Government's WBTNI project and also the upgrade of the Centenary Highway/Western Freeway (Centenary Motorway) were raised in a submission. These issues included:

- The EIS does not reflect the need for the "Inner Orbital" linkages and priority, understood to be promulgated in the WBTNI[4]. The EIS text requires identification of the Inner Orbital linkages and associated issues. A condition is recommended on the Project's approval that the Inner Orbital and Centenary Motorway connection be planned as a continuous motorway route. The submission requires the Northern Link interchange to be planned as a system interchange with that continuous route. The planning should also demonstrate consideration of the TransApex East West Link. The proposed planning, design and procurement for the Northern Link connection to the Centenary Motorway must show, to the satisfaction of the State, that the Inner Orbital connection as described can be both designed and constructed with Northern Link in place.
- Clarification is sought on the relationship between the Northern Link Project and its connection with the Centenary Motorway, referred to as the Centenary Motorway Northern Link Interface (CMNLI). The EIS assumes the CMNLI to be a committed project by the State. It is submitted that this project is not confirmed. A condition is recommended on the Project's approval that the Northern Link Project must be viable on an assumption of no CMNLI upgrade by the State;
- In reference to Northern Link completing a missing link in the motorway network, it is submitted that the Centenary Motorway to Inner Orbital linkage should be a continuous motorway route, with other routes, including Milton Road, Northern Link, East West Link being part of a lower road hierarchy. In reference to Northern Link being consistent with an overall, co-ordinated response to the transport challenges in the Western Brisbane Corridor in the short term, it is submitted that Northern Link doesn't recognise the role of the Inner Orbital and it is requested that the impact of the Inner Orbital on Northern Link should be recognised and reflected in the consideration of the EIS. The Inner Orbital would provide for movements between western suburbs and the northern suburbs, claimed by the Project, and Northern Link must be defined in conjunction with other infrastructure being considered by the State.

Response

As reported in Section 2.1.2 of the EIS, Northern Link is presented in the WBTNI consultation material as one of a number of road proposals for conveying traffic through and around the WBTNI study area.

Transport infrastructure – Greater Brisbane and the Western Corridor, Qld Govt, Brisbane.

[4] At the time of preparing both the EIS and this Supplementary Report, the Western Brisbane Transport Network Investigation report and findings had not been released by the Queensland Government for public consideration. The Council has no sound knowledge of the particulars of the 'Inner Orbital" road.

The WBTNI consultation material indicates that Northern Link might be a medium-term project delivered in the next 15 years. Similarly, WBTNI indicates that an upgrade of the Centenary Highway and Western Freeway (Centenary Motorway) linking Darra with Toowong would also be undertaken in the same period, consistent with the regional planning intention of linking economic activity centres and providing for motorway-standard transport routes for intra-regional and cross-city travel.

Consultation in relation to the WBTNI proposals concluded on 31 May 2008 as the investigation moved into the reporting stage. The final report for WBTNI was expected to be released in late 2008. At the time of exhibiting the EIS and of preparing this Supplementary Report, the final WBTNI report has not been released. There has been no public release of the WBTNI strategy or outcomes since public notification of the Northern Link EIS concluded.

As a result of consultations with State agencies, including DTMR, the upgrade of the Centenary Motorway to include transit lanes between the Ipswich Motorway and Toowong, was included in the base modelling assumptions for the traffic and design studies undertaken to support the development of the Reference Project. The Northern Link Project allows for the delivery of a future Centenary Motorway upgrade works but does not commit the State to such works. Northern Link is considered to be necessary, and viable, for enhanced network performance with or without the implementation of the Centenary Motorway upgrade. The Centenary Motorway upgrade is identified in the SEQIPP 2008 – 2026 as Map 3a and 3b reference 3.20 – Centenary Highway bus priority/transit lanes Ipswich Motorway to Toowong with a pre-project estimated investment of $310 million. There is no commitment in the SEQIPP to a delivery timeframe for this project.

It is noted also that while the 'Inner Orbital' project is not committed in the SEQIPP 2008 – 2026, both the Centenary Motorway upgrade and WBTNI are included in the draft SEQ Regional Plan for the period 2009 – 2031, including the Centenary Motorway as a road with public transport infrastructure and the Toowong to Everton Park Road Tunnel (the 'Inner Orbital').

The Northern Link Project would accommodate connections with a possible future 'Inner Orbital' and the Centenary Motorway upgrade or CMNLI should there be a delivery timeframe commitment by the State to deliver these projects.

In the circumstances, there is no reasonable nor practical means of addressing the request expressed in the submission until such time as sufficient information has been provided by DTMR to allow an analysis of the effects. It is unreasonable to require Northern Link to be delayed until such time as DTMR has completed design studies for either the Centenary Motorway upgrade or the possible future 'Inner Orbital', particularly in the absence of any funding commitment by the Queensland Government.

B.2.1 Issue 5 – Funding

It was submitted that while Federal funding is mentioned in the strategic context summary, it is not discussed in the body of chapter and has requested that the funding commitments and timing from the Federal Government should be identified. It was also submitted that the Project local connections are inconsistent with the request for AusLink funding and will not stand up to cost/benefit scrutiny without the benefit of the AusLink funding.

Response

The Commonwealth has committed $500M towards the implementation of Northern Link, as described in the EIS. The Council also made application to the Commonwealth through Infrastructure Australia

for additional funding. Both applications were revised on the basis of Council's decision to proceed with the Project without local connections. The National Infrastructure Priorities were released by Infrastructure Australia in May 2009 and while the Northern Link Project did not receive additional funding it was recognised as a project which would make a clear and positive contribution to Australia's transport infrastructure policy goals.

The funding arrangements for Northern Link are not matters to be addressed in the EIS or the Supplementary Report to the Coordinator-General. Such matters are being resolved between the Commonwealth, the State and Council elsewhere.

B.2.1 Issue 6 – Planning Rationale for the Toowong Connection

Many submissions raised concerns that the EIS does not clearly articulate the need for the Toowong connection. The planning rationale based on facilitating traffic movements to and from the Toowong Regional Centre and the University of Queensland is not supported by these submissions, particularly given the general planning intent to reduce the need for private vehicular travel and where parking at the University and the Toowong activity centre is constrained. It was submitted that even if you include the 'draft CityShape Implementation Strategy' and the location of local growth management strategy areas (LGMS) of Toowong and Indooroopilly, it does not support the need for a local connection at Toowong via Croydon Street. It was also raised in various submissions that Indooroopilly is the 'Principal Activity Centre', and while Toowong may be classed as a 'Major Activity Centre', it would be far more logical to have the optional connection connect to Indooroopilly such as through the upgrading of the Moggill Road Western Freeway access ramps. This would also link cross river traffic from the Walter Taylor Bridge as well as University of Queensland traffic via Swann Road.

Response

The submissions correctly identify the underlying planning principles for integrating land use and transport planning, including the provision of high-quality, multi-modal transport access to designated activity centres, such as Indooroopilly and Toowong. While the Toowong connections for Northern Link would have facilitated enhanced accessibility to and from the mainline tunnels for both Toowong and the University of Queensland, a designated specialist centre, they have been removed from the Reference Project due in part to their environmental impact and the impact of providing further satisfactory mitigations, such as additional property acquisition, within the existing affected residential and commercial precincts.

Indooroopilly is presently well-served with commuter rail services, a bus interchange and arterial road access in close proximity to the Western Freeway. There is no need for an additional connection to the motorway network for Indooroopilly to that already provided by the Western Freeway. Neither Toowong nor the University are conveniently accessed from the motorway network although both are served by public transport (Toowong - rail, bus, ferry; University of Queensland – bus, ferry).

B.2.1 Issue 7 – Increasing the Use of Private Vehicles

It was submitted that the Project would encourage the use of private vehicles and discourage cycling and other active and public transport alternatives, leading to increased congestion. This would conflict with Council's Brisbane City Plan 2000 desired environmental outcomes for transport and mode share as well as destroying the aesthetics and community values of the region. Northern Link will only increase cars on the road, resulting in heavy pollution, more environmental damage, increase in accidents and higher

risk to children crossing roads. It was submitted that investing in roads as a long term solution to congestion is futile as numerous studies have shown that within a few years the traffic becomes just as congested. Increased capacity just leads to increased usage. Traffic including freight would increase in suburbs such as Indooroopilly, Kenmore, Fig Tree Pocket, Taringa and St Lucia. The assumptions stated in the EIS are old fashioned and go against modern climate change inspired thinking.

Response

The EIS, in chapter 5, presents a comprehensive assessment of the consequences of doing nothing to address the increase in travel demand arising from a combination of population growth, demographic change and economic development. The EIS also recognises the importance of promoting a balanced approach to the transport needs of both the city and the region.

Transport planning at the national, regional and local levels, is generally consistent in seeking to increase the mode share for both public transport and active transport. The EIS analysis, presented in chapter 5, demonstrates that even with a quantum change in mode share to public transport and active transport, the forecast travel demand will not be addressed. In such circumstances, the city's liveability and economic competitiveness will decline as congestion increases.

Northern Link is proposed as a tolled road. Traffic modelling undertaken for the EIS, presented in chapter 5, indicates that the payment of a toll acts as an effective suppressant on demand.

The traffic modelling of the Project, without local connections, as presented in Chapter 4 of EIS Supplementary Report, shows that there would be an overall decrease in accidents with the Project in the inner west (3.1% in 2014 and 1.1% in 2026). Usage of local and surburban roads by commercial vehicles would reduce markedly with the Project, with freight vehicles diverted to use of the higher standard roads as shown in Figure 4.8 in Chapter 4 of the EIS Supplementary Report.

B.2.1 Issue 8 – Revenue from Connections

It was submitted that the need for the local connections was to make the project more attractive to the toll concession holder rather than for genuine traffic flow needs. Milton Road and Coronation Drive would be available for city-bound traffic without the need for the local connections. The connections will add significantly to the cost of the project for little benefit to road users and enormous detriment and risk to thousands of local citizens. The Toowong community would be profoundly impacted upon for what is a marginal benefit to future traffic conditions on Milton Road and Coronation Drive and within the typical range of modelling error. The Council is pursuing the local connectors to attract more traffic through the tunnel to attract private sector funding.

Response

The local connections have been removed from the Reference Project and the issues associated with these submissions are no longer relevant.

B.2.1 Issue 9 – Airport Link a State Project

Section 2.2.1 referred to the Airport Link Project as the second component of TransApex. It was submitted that Airport Link be noted as a State project.

Response

Section 2.2.1 of the EIS notes that Northern Link would complete a high-quality regional transport route, and would complement other investment in transport infrastructure by the Queensland Government including the Airport Link and the Airport Roundabout Upgrade, and by Brisbane City Council in the Clem Jones Tunnel (Clem7). Prior to the procurement of Airport Link by the State in 2008, Airport Link was identified in Council's TransApex policy and Pre-feasibility Report in March 2005. It was during the detailed feasibility stage of the project that the State took over its procurement and subsequent delivery. This does not affect the project still remaining as the second component of Council's TransApex strategy.

B.2.2 Traffic and Transport Need for Northern Link

B.2.2 Issue 1 – Travel Demand

Submissions, including from the Australian Association for the Study of Peak Oil and Gas (ASPO), challenged the methodology used to develop the future transport rationale, particularly being based on perpetual growth in motor vehicle traffic. It was submitted that the Four Step Transport Model (FSM) used by the Proponent does not adequately address Brisbane's changing transport needs. Growth in motor vehicle traffic in the EIS is based on observed data to 2004 with the assumption that historic land use, travel behaviour and mode share, and car ownership trends will continue. These assumptions are invalid based on recently published data. The assumptions about perpetual growth in population, economic activity and employment are very unlikely to eventuate in light of the emerging economic outlook. Also there has been failure to achieve forecast traffic levels with similar recent projects in Australia.

Response

The EIS, in Chapter 5, presented an analysis of travel demand in the Brisbane metropolitan area for a range of circumstances, out to the year 2026. The assumptions, on which the traffic analysis is based, are stated in chapter 5 and in Technical Paper No 1 – Traffic and Transport.

The traffic model adopted for the EIS continues to be widely used for transport planning and impact assessment in Brisbane by both State and local government agencies. The model also takes into account the planned changes in land use, population and employment distribution, car ownership and variations in transport mode shares across the metropolitan area promulgated in the SEQ Regional Plan. The regional plan encapsulates the Queensland Government's strategy for achieving and managing a sustainable growth pattern for the SEQ region. The modelling and the underlying assumptions and strategies are sound and based on the Queensland Government's published strategies for growth management and travel demand management.

Northern Link is proposed as one part of a balanced solution to Brisbane's growing travel demand managed at the State and local government levels. Comparison with the performance of other similar projects in Australia is inappropriate owing to the wide range of factors influencing their utilisation.

B.2.2 Issue 2 – Traffic Demand for the Toowong Connection

Submissions stated that the EIS did not clearly articulate the need for the Toowong connection based on traffic demand and congestion relief. It was suggested that an assessment needs to be undertaken, taking into account the strategic plans and needs of major traffic generators such as the University of Queensland. This assessment should include consideration of alternatives using the same road network

and assessment of alternative road infrastructure networks that are expected to achieve the same outcomes. The Toowong connection will inevitably add substantially to local traffic on Toowong feeder routes such as Croydon Street and Jephson Street, and in local streets while the net benefit in terms of reduced traffic on Milton Road and Coronation Drive is marginal. There is no evidence to support the claims in the EIS that the Toowong connection will facilitate traffic movements to and from the Toowong Regional Centre and the University of Queensland. The suburbs of Toowong, Taringa, St Lucia and part of Indooroopilly would have better and faster access to the city via Coronation Drive and Milton Road based on the mainline tunnel without local connections. The current congestion problem originates from the freeway, so there is no point in having the Toowong access.

Response

Chapter 2, section 2.5 of the EIS presents a qualitative evaluation of a number of alternatives to Northern Link, as required by the ToR. The alternatives, required by the ToR, included a 'do minimum' option, an option to optimise travel by non-private transport, and an option to upgrade or enhance the existing road network. None of these options was able to meet the strategic transport objectives to the level attained by Northern Link. For example, the public transport option would not respond to the strategic freight task at all, whereas the road network upgrade would contribute to unacceptable impacts on property, communities, businesses and other important land uses.

With the removal of the Toowong connection from the Reference Project as recommended in this Supplementary Report, Croydon Street and Jephson Street will no longer be impacted by increased traffic flows as a consequence of that connection. As reported in Chapter 4.1.5 of this Supplementary Report, Croydon Street traffic volumes without the local connections are forecast at 31,000 vpd by 2026, in comparison with volumes of 44,900 vpd forecast by 2026 with the local connections. This is still some 4% higher than without the project (29,700 vpd) by 2026 due to a combination of factors - re-distribution of some local traffic from Moggill Road-Coronation Drive to Milton Road (via Croydon Street) due to reduced congestion on the surface network and the assumed implementation of an inbound bus/transit lane initiative on Coronation Drive with Northern Link. Unlike the EIS Reference Project, traffic reduction would be experienced on Jephson Street (-4%) and Burns Road (-4%).

Chapter 5 of the EIS presents an assessment of the benefits and impacts of the EIS Reference Project on the surface road network, including Coronation Drive, Milton Road, Croydon Street and Jephson Street, to name a few. The claim that the current level of traffic congestion on these roads is caused by the Western Freeway does not recognise the travel demand originating from the University of Queensland, the CSIRO St Lucia and Indooroopilly campuses, the Toowong business centre and the residential populations in the suburbs of Toowong, Taringa, St Lucia and Indooroopilly. Without the local connections, as reported in Chapter 4.1.5 of the Supplementary Report, the Project would provide sound levels of traffic relief across the surface network. The level of overall reduction in traffic on the surface network would not, however, be as great as it would be for the EIS Reference Project. For example, by 2026, the Project is forecast to result in a reduction of 26,000 vpd across the surface network at Toowong and Milton, whereas the EIS Reference Project yielded a further 14,000 vpd reduction with the diversion of trips via the local connections. Traffic on Moggill Road through Toowong, with the Project, is forecast to reduce by 18% in 2026 to 40,800 vehicles per day, although there is a small increase at Indooroopilly (4%) as traffic from suburbs such as Indooroopilly and Taringa could access the Project via Moggill Road and the Western Freeway.

As reported further in Chapter 4.1.7 of the Supplementary Report, the significant time savings offered by the EIS Reference Project for trips between Toowong (including areas of Taringa, St Lucia and sections of Indooroopilly) and other destinations such as the Airport and Central Brisbane via Northern Link are not available due to the lack of connection to the tunnels. Some travel time savings provided by the Project in 2026 are however offered due to reduced congestion on the surface network in the inner west, with time savings of around 5 minutes on the surface network, compared to the scenario without the Project, via both Milton Road and Coronation Drive. These surface route travel time savings are slightly less than for the EIS Reference Project due to the different level of surface traffic relief.

B.2.2 Issue 3 – Road Network

A submission has requested clarification regarding the forecast decline in traffic speed on key routes and for the assumptions to be clearly stated with regard to data and supporting conclusions. In particular, is the without Northern Link case based on a 'do-nothing' scenario, with or without SEQIPP?

Response

The "without Northern Link" scenario assessed in the traffic modelling, and used as the basis for Figure 2-4 in the EIS, showing decline in traffic speeds on key routes between 2007 and 2026 without Northern Link, incorporates a range of assumptions about the traffic and transport network at future dates. Details of planned or potential future projects and their timing were compiled in consultation with DTMR and BCC from anticipated capital works programs including SEQIPP, Council's Transport Plan and Road Action Plan. A comprehensive listing of the projects included in the base future network for the years 2014, 2016, 2021 and 2026 is included Appendix C.10 of the EIS Technical Paper No 1 – Traffic and Transport.

B.2.2 Issue 4 – Road Freight Network

A submission questions whether the freight benefits of the project are overstated as most freight would travel via Logan Motorway to the Australia Trade Coast (ATC) and not use Northern Link. Logan Motorway is the primary freight route from the Western Corridor to ATC and together with Brisbane Urban Corridor (BUC), would alleviate congestion on key cross city road links. The scope of freight issues needs to be broadened to include the role and function of the Gateway Motorway together with a forecast of the amount of traffic diversions (commercial and non-commercial) to Northern Link from Logan Motorway, Milton Road and Kessels Road. The submission is concerned that additional freight traffic would use Milton Road rather than Northern Link.

It was also submitted that freight traffic should be directed onto ring roads around the inner suburbs. It is inappropriate to encourage heavy freight traffic into or through the well developed inner Brisbane Suburbs and to within 1 km of the CBD. Even if it is argued that Northern Link, as part of the AusLink road network is essential for freight movements from the western corridor to the trade coast, this does not stack up when assessed against the projected increases in Brisbane freight movement.

Response

Chapter 5 of the EIS presents an analysis of the likely redistribution of commercial vehicles around the network with the introduction of Northern Link. Northern Link would provide an attractive alternative to the State freight route comprising the Ipswich Motorway, the Logan Motorway and the Gateway Motorway, thereby providing enhanced network performance overall, including travel time reliability on

key routes. The EIS does not anticipate that Northern Link would overtake the role of the State freight corridor, but rather, would complement it. It is noted that for some classes of freight, such as dangerous goods and heavy vehicles ('B-Doubles'), the State corridor would provide the only route from the west to the Australia Trade Coast. Northern Link would not accept hazardous goods or B-Double traffic for safety reasons.

Northern Link is also considered to present an attractive freight route alternative to Milton Road. Underlying the assertion in the submission that Milton Road would be impacted by additional freight movements is the recognition that Northern Link would relieve congestion on that route, as predicted in the EIS (chapter 5).

While heavy freight vehicles would remain on the State freight corridor, local freight would continue to use the major routes around the city as designated in the Transport Plan for Brisbane (ie Intra-State, Regional Radial, Regional Ring and City Distributor roads). The Transport Plan for Brisbane intends that each of these levels in the road hierarchy convey freight for different and appropriate types of trips.

B.2.2 Issue 5 – Freight Traffic and the Toowong Connection

Two issues were raised in submissions regarding the relationship between the Toowong connection and the use of the tunnel for freight. While the identification of Northern Link by AusLink as a secondary freight route may support an argument for the Northern Link optional connection to the CBD, it does not support the need for a Toowong connection at Milton Road into Croydon Street. Secondly the local access at Toowong may impact on Northern Link's function as a freight corridor by mixing through traffic with local traffic.

Response

The primary thrust of the AusLink strategy could be paraphrased as supporting the efficient movement of people and freight across regions to enhance commerce, employment and quality of life. The transport function for the Toowong connection was to support the activity centres at Toowong and the University of Queensland, by linking them to other activity centres in the metropolitan area via a high-quality motorway network. Some light freight would have been expected to use the Toowong connection, whereas it would be most unlikely for heavy freight to use the connection.

The EIS Reference Project was intended to accommodate a mix of traffic originating from sources served by the mainline route, as well as the connections at Kelvin Grove and Toowong. The removal of the Toowong connection will alleviate the potential for local traffic using the connection to conflict with the significant freight corridor function of the Project.

B.2.2 Issue 6 – Centenary Highway Upgrade

A submission noted (see issue 3 above) that the EIS refers to capacity enhancements and extension of the Centenary Highway. It was stated that capacity enhancements are not part of the current SEQRP and request that the Project is feasible without such capacity enhancements.

Response

The Queensland Government is currently investing in substantial road infrastructure schemes in the Western Corridor including major capacity upgrades to the Ipswich Motorway and capacity enhancements and extension of the Centenary Highway through Springfield and Ripley to join with the Cunningham Highway to Yamanto. Contrary to the submission, these capacity enhancements are part

of the current SEQRP and are further included in the draft SEQ Regional Plan 2009-2031.[5] As reported in the EIS (section 5.6.2), over half of the Western Freeway users of Northern Link would have travelled from the Western Corridor via the Ipswich Motorway or Centenary Highway.

For the purposes of modelling within both the EIS Reference Project and for the Supplementary Report, the Centenary Highway and Western Freeway has been modelled assuming an upgrading from 4 to 6 lanes inclusive of a single T2 lane each way between Mt Coot-tha Road and approximately at Warrender Street, Darra, as identified in SEQIPP and noted in the Draft SEQ Regional Plan. In both cases the delivery of this Centenary Highway and Western Freeway project was assumed by 2016, and no widening of the Centenary Bridge was assumed.

For the EIS Reference Project, at the four lane Centenary Bridge, average weekday traffic demands with Northern Link were forecast to rise to 137,400 in 2026. As reported in Chapter 4.1.4 of the Supplementary Report, at the Centenary Bridge, the traffic average weekday traffic demands, including under updated traffic modelling, was forecast at 139,200 in 2026 for the EIS Reference Project and at 135,300 for the Project. The Project was forecast to be 2 to 3% lower than the impact forecast with the EIS Reference Project.

As identified in the EIS, increases of this magnitude were reported be within the anticipated traffic lane capacities along this route. By 2026, the traffic flow conditions on the Western Freeway were forecast as LOS C. With peak spreading in the network over the next 20 years, it was considered not unreasonable to assume that a four lane cross-river facility could carry an AWDT of up to 140,000 vehicles per day.

B.2.3 Project Objectives

B.2.3 Issue 1 – Project Objective for Freight

It was submitted that the Draft Regional Plan 2009-2031 does not identify the Project as either a priority one or a priority two freight route which suggests that the project objective of cross-city movement of freight is not a high priority.

Response

The project objective of supporting the movement of people and goods across the metropolitan area is consistent with the AusLink strategies, expressed through the National Land Transport Network Plan, and is consistent with the broad strategies of the SEQ Regional Plan. The Draft SEQ Regional Plan would appear to be flawed with regards the road freight network for a number of reasons, including the following which are relevant to Northern Link:

- The Brisbane Urban Corridor route incorporating Kessels Road and Mt Gravatt-Capalaba Road is shown as a Priority One route, despite the many constraints and limitations which led to a moratorium on its use by heavy freight;
- The Priority Two route incorporating the Centenary Highway and the Western Freeway terminates at a location most likely to be the Mt Coot-tha roundabout, allowing for the scale of the mapping.

[5] Refer to page 145 Draft SEQ Regional Plan 2009-2031, including Map 22 (page 148).

The route then re-emerges at the Inner City Bypass. There are several conclusions that could be drawn from this:

- the mapping is intended to show the underground route (ie Northern Link);
- the route serves no freight-generating land use at Mt Coot-tha or at the Inner City Bypass and is inaccurate therefore; or
- the strategy sought to avoid any indication or support of Northern Link.

The indecision about the freight role and function of Northern Link does not arise from either AusLink or the Transport Plan for Brisbane. It arises from Northern Link's omission from priority freight routes identified on Map 20 of the Draft SEQ Regional Plan. The termination however of the Priority Two freight route of the Centenary Highway / Western Freeway at Toowong would rather suggest that Northern Link is a high priority by reason of the obvious gap in the freight connection between Toowong and the ICB.

B.2.3 Issue 2 – Project Objective for Public Transport

A submission questions where and how the secondary objective to provide opportunities for additional public transport capacity is provided for in the Project.

Response

The opportunities for the EIS Reference Project to provide for additional public transport capacity were identified in chapter 5, section 5.6.11, and also in Technical Paper No 1 – Traffic and Transport and included:

- Congestion relief along the Coronation Drive corridor, including travel time savings with an overall speed improvement for commuters of around 25% in the peak periods improving travel time reliability for bus passengers.
- Congestion relief along Milton Road leading to increased travel speeds for all vehicles including buses. Improvement in bus travel speeds of over 30% in the morning peak direction and 20% in the evening peak direction were forecast for 2026 compared to the scenario without the Project.
- Marginal travel time savings were also forecast for bus services that use Moggill Road corridor between the Western Freeway and Benson Street in Toowong.

Chapter 5 of the EIS Supplementary Report identifies that the Project, without local connections, would provide buses travelling via Moggill Road, Coronation Drive and Milton Road with improvements in travel time and travel time reliability due to changed traffic conditions and reduced traffic volumes on the road network in the inner west.

Bus services travelling along Milton Road and Coronation Drive would experience indicative travel time savings of approximately 5 minutes in the peak direction. There would be a minimal change in travel time during peak periods on Moggill Road.

Unlike the EIS reference project, the Project without local connections does not provide the immediate potential for diversion of existing Rocket bus services between the western suburbs and CBD that operate in peak periods to utilise the Northern Link as without the Kelvin Grove Road connection there is no "direct" connectivity with the Inner Northern Busway. Brisbane City Council however is in consultation with the Queensland Government to examine the potential for efficient and cost-effective bus connectivity between the Inner Northern Busway and the Project.

The potential for future cross-town bus services between key trip generators in the western and northern suburbs (e.g. Chermside to Indooroopilly, Indooroopilly to Australia TradeCoast) to travel via Northern Link and the Northern Busway continues to be provided with the Project. Such services would be planned and introduced by Translink in the context of overall network planning being undertaken by the State. The Project provides the opportunity for a very efficient and direct routing of these types of services.

B.2.3 Issue 3 – Environmental and Social Objectives

It was submitted that it is questionable that environmental and social objectives are met comprehensively, in a socially equitable and sustainable manner. The project doesn't provide overall enhancement, nor is it clear how Northern Link specifically will "assist development of a sustainable urban environment for inner-western suburbs" especially as the area is one of significant growth. Overall, Northern Link does not comprehensively meet the Project Objectives and has significant adverse local outcomes.

Response

The EIS found that a 'do nothing' approach to forecast travel demand to 2026 would lead to a significant reduction in transport efficiency, accessibility and amenity for communities and businesses in the western and inner western suburbs. The EIS presented an evaluation of project alternatives, being a public transport alternative and a surface road upgrade alternative, and found that neither of them responded to the project objectives as well as Northern Link. Indeed, the evaluation of the 'surface road upgrade' alternative clearly demonstrated the environmental and social benefits of an underground solution such as Northern Link compared with a surface road transport solution.

The inner western corridor bounded by Coronation Drive and Milton Road, with the CBD and Toowong at either end, is constrained in its future development and redevelopment by traffic congestion and the flow-on effect that congestion has on the attractiveness of public transport (bus). The EIS findings are that, with improved public transport in this corridor occurring as a consequence of providing an alternative route for cross-city travel, Northern Link will create opportunities for re-development in the corridor. The EIS identified a need for local planning measures to capture the land use benefits accruing from enhanced accessibility and connectivity, while seeking to avoid the impacts of ad hoc, speculative redevelopment.

The perception of significant adverse local outcomes, primarily arising as a result of the local connections, has been overcome through the removal of the local connections from the Project.

B.2.3 Issue 4 – Connections Conflict with Project Objectives

Submissions questioned the concept of city-connections (at Toowong and Kelvin Grove) contradicting or being inconsistent with the objective of providing a "cross city bypass". Specifically, the connections at Toowong and Kelvin Grove, would appear to be promoting travel from Northern Link to the city, rather than promoting an orbital bypass of the city, and may be contrary to the project's objectives. It was also submitted that the local connections are not necessary for Northern Link to achieve its objectives.

Response

The Initial Advice Statement (IAS) included the objective "to provide an effective and convenient bypass of the Brisbane CBD for cross-city movement of people and freight." While the ability for the Project to still provide for such a cross city bypass remains, the primary objective identified in the EIS for Northern Link "is to improve east-west cross-city movement of people and freight". As stated in section 2.1.3 of the EIS - 'By moving cross city travel out of the inner city and the congested arterials of Coronation Drive and Milton Road, Northern Link would enhance the road network and contribute to the safe and efficient movement of people and goods with and across the city'.

While it is not considered that the Toowong and Kelvin Grove connections would have contradicted the EIS primary objective, the perception of any inconsistency between these connections and the project objectives has been removed.

B.2.3 Issue 5 – Timing

Submissions question the objective relating to the timing of delivery by 2013 which appears to be a purely internal objective and is not a meaningful objective, particularly where other sections of the EIS refer to completion by 2014.

Response

The TransApex Prefeasibility Report (BCC 2005) indicated that Northern Link would be delivered by 2016. In 2007, the Brisbane City Council identified a range of benefits in bringing forward delivery of Northern Link, including the apparent window in the Australian market to take on a project of this magnitude, and the expectation of a better 'value for money' outcome from the bidding process if it were to follow on from the successful procurement of CLEM7 and Airport Link. While recent global economic circumstances have introduced new and significant challenges to the bidding market, the need for and benefits of Northern Link are expected to become greater with increasing travel demand from the western suburbs.

The current program for the delivery of the Project is for completion by late 2014.

B.2.4 Sustainability

B.2.4 Issue 1 – Sustainability Issues

A number of submissions raised issues with the Project not achieving sustainability including; that the Project appears to favour the travel needs of residents from the Western Suburbs rather than providing encouragement for more people to live closer to the city, imperatives for more sustainable transport and land use, and the need for fundamental change in our thought processes and behaviours. More specifically it was questioned whether the EIS sustainability assessment, provided in sections 2.4 and 22.4 of the EIS, meets criteria other than in terms of resource efficiency, such as "sustainable places and urban form, biodiversity conservation or health and well being". It was submitted that there are no specific measures for these criteria and it would seem that the Sustainability Framework and Northern Link table [Table 2-5] has left blank relevant items relating to the operation of the Project.

Response

The SEQ Regional Plan is the Queensland Government's principal tool to manage regional growth and change in the most sustainable way to protect and enhance the quality of life in the region. There are however many parts to the problem of managing regional growth to achieve sustainable outcomes for

the region's overall quality of life. The Northern Link Project does not attempt to provide a whole of planning solution to sustainability, and nor should it. Northern Link is one of many transport infrastructure projects identified within a matrix of regional policies all contributing part solutions to the ultimate regional vision for South East Queensland. The contribution that Northern Link provides towards a more efficient, effective and safe transport network is an important element in a balanced overall approach to the management of regional growth and change to help achieve sustainable outcomes for the future of South East Queensland.

Within this context, the Brisbane City Council proactively supports sustainability through a range of initiatives identified in the EIS, including a Corporate Sustainability Policy which provides Brisbane-specific guidance for achieving sustainability outcomes through the proposed Northern Link Project.

As stated in the EIS, it is Council's intention to include sustainability measures in the Project procurement phase. This would include incorporating sustainability performance measures into the project specification covering the detailed design, construction and operation of the project. The perceived bias towards resource efficiency measures identified in the EIS are there due to these measures being identified for the next phase of the project design and delivery where resource efficiency during design and construction are key measures for sustainable infrastructure. While this does not exclude other areas of focus in Council's Corporate Sustainability Policy being considered, such as sustainable places and urban form; biodiversity conservation; and health and well being; for a major infrastructure project such as Northern Link it is considered that the key area of sustainability focus lies with resource efficiency.

Table 2-5, Sustainability Framework for Northern Link, in the EIS provides a framework for identifying relevant strategic and project specific areas for the development of sustainability measures within identified phases of the Project. These phases include operation and maintenance and include all areas of strategic focus in Council's Corporate Sustainability Policy identified above. It should also be stressed that this table is a framework, or starting platform and does not preclude further items relating to the operational phase of the project being included during the detailed design and development of the project.

B.2.5 Assessment of Project Alternatives

B.2.5 Issue 1 – Do Minimum

One submitter asked whether the 'no project' question was ever asked and another noted that the 'do-minimum' option assessment in the EIS included SEQIPP projects which may not be funded. It was submitted that the EIS needs to consider that there is no commitment for the State to deliver all SEQIPP identified projects.

Response

The South East Queensland Infrastructure Plan and Program 2008 - 2026[6] (SEQIPP) is "…based on the planning horizon included in the SEQ Regional Plan, which provides the framework for managing growth, land use and development in South East Queensland". (SEQIPP p16). It is stated clearly in SEQIPP (p16) that:

[6] Queensland Government, 2008, *South East Queensland Infrastructure Plan and Program 2008 – 2026*, Qld Govt, Brisbane

- infrastructure projects in the period 2008-09 to 2011-12 are committed and funded in the State budget;
- infrastructure projects in the period 2012-13 to 2018-19 are within a seven year planning period that aims to meet the strategic objectives for the region; and
- infrastructure projects in the period 2019-20 to 2025-26 represent an indication of the longer-term, forecast needs of the growing regional population, and are to be confirmed in future versions of SEQIPP.

Projects referred to in SEQIPP are clearly considered by the Queensland Government to be appropriate to the forecast need for infrastructure, where such need arises in step with population growth and economic development. The EIS adopted these projects in the 'do minimum' scenario on the basis that, regardless of Northern Link, they would likely proceed in step with stated Government planning and policy. The qualifications to infrastructure development are clearly set out in SEQIPP and are not matters to be addressed in a project EIS.

Chapter 5 of the EIS presents the forecast growth in travel demand without the Project and concludes that a 'no project' option would lead to unacceptable impacts on the efficiency, economic competitiveness and liveability of the City and of the Brisbane metropolitan area.

B.2.5 Issue 2 – Public Transport Alternatives

Many submissions were received that favoured a wide range of public transport alternatives to the Project including light rail, a reliable bus system, de-privatising the Air Train, rail tunnels, bus and bike access and a Western Freeway busway. It was submitted that the tunnel option will lead to an exponential increase in vehicle use and does not take into account the potential for public transport to provide an alternative. Also the traffic modelling underpinning the present study fails to take any such initiatives into account and is therefore fundamentally flawed.

Submissions included suggestions for restricting car parking in the CBD, and dramatically improving public transport systems including halving costs to encourage long term use, use of bikes and train access every 500 metres in city (underground system) and car parking at train stations (better managed system) and at least one lane each way in the tunnel should be devoted exclusively to public transport.

There are already good links by rail, ferry and bus that could be enhanced at a relatively low cost. A ferry terminal at Park Road, better utilisation and design of the bikeway along Coronation Drive or a frequent bus loop incorporating Coronation Drive and Milton Road could be implemented.

Response

While submissions indicated a preference for other transport measures, the EIS is obliged by the ToR to identify and assess the impacts of a particular project – in this case, the Northern Link Reference Project. The EIS has discharged this obligation.

The SEQ Regional Plan and SEQIPP canvass a range of transport measures for accommodating the forecast growth in travel demand arising from population growth, demographic change and economic development in the SEQ Region over the period 2008 – 2026. In previous reports about major transport

infrastructure, the Coordinator-General[7] has expressed the view that policy regarding the provision of transport infrastructure is properly addressed through the SEQ Regional Plan and SEQIPP and should not be addressed through the EIS process.

Chapter 2, section 2.5 of the EIS presented a qualitative evaluation of a number of alternatives to Northern Link, as required by the ToR. The option to optimise travel by non-private transport was unable to meet the strategic transport objectives to the level attained by Northern Link, particularly, for example, the public transport option would not respond to the strategic freight task at all.

B.2.5 Issue 3 – Further Assessment of PT Options

It was submitted that the assessment did not examine enhanced passenger rail capacity or frequencies (as envisaged by the Inner City Rail studies) to enhance the capacity to move people through this corridor or to complement the recently enhanced rail station and suggested busway station at Indooroopilly. Another submission suggested that the EIS did not quantify the potential benefit of an express bus route from the Western Freeway to the Inner Northern Busway stations, including the impact such a facility will inevitably have on the viability of a freeway connection.

Response

See response to issue 2 above – the EIS must identify and assess the impacts of the Northern Link Reference Project. The EIS presented an assessment of a range of options, as required by the terms of reference.

B.2.5 Issue 4 – Tidal Flow on Coronation Drive

It was submitted that the assessment of alternative surface road works traffic forecasts should reflect removal of tidal flow system on Coronation Drive and the Hale Street Link project.

Response

Section 2.5.3 of the EIS notes that the existing network upgrade alternative would focus upon Milton Road as the key route for cross-city travel and Coronation Drive for CBD-destination travel. This option did not include the recent removal of the tidal flow system on Coronation Drive or recent developments relating to the Hale Street Link Projects.

As reported in Chapter 4.1 of the Supplementary Report, the base future road networks have now been updated to incorporate contemporary descriptions of key future projects, which date from after the EIS modelling was undertaken. Such projects include:

- Hale Street Link (HSL) – July 2008 Changed Project including Coronation Drive viaduct and right turn from Hale Street to Coronation Drive outbound;
- Coronation Drive – removal of tidal flow operation (as at October 2008) resulting in three traffic lanes inbound and two traffic lanes outbound;
- Airport Link – BrisConnections Conforming Design as per the Airport Link Request for Project Change (May 2008);

[7] Coordinator-General 2005 Evaluation Report on the North South Bypass Tunnel, 2006 Evaluation Report on the Airport Link Project.

- Airport Roundabout Upgrade (ARU) – BrisConnections design including Fast Diamond interchange;
- Ipswich Motorway Upgrade – based on public information from DTMR (2008); and
- BCC Road Action Plan updates and updating of the expected timing of future network projects consistent with Council's programs.

The impact of the updated assumptions on future traffic demand and intersection performance in the study area in the base (without Northern Link) scenario is summarised in response B.5.4 Issue 9 This shows that the updated traffic forecasts prepared using the latest descriptions of future base road network projects are very similar to those reported in the EIS. The changes in screenline totals are very small, while for individual roads, the forecast volumes on higher order routes are very similar to the EIS forecasts. There are small changes on Coronation Drive, particularly towards the northern end, as a result of the changes to the Hale Street Link northern intersection and the removal of tidal flow, which have consequent impacts on the eastern end of Milton Road and on flow patterns on some local streets. Intersection performance in the corridor remains similar and the overall description of traffic performance without Northern Link remains generally as described in the EIS.

B.2.5 Issue 5 – Outer Ring Road

A number of submissions suggest that the entire project should be reassessed in favour of an outer ring road, with reductions in speed limits on the Western Freeway and the toll taken off the road to encourage heavy vehicles to use it, instead of local roads. It was submitted that what is really required is an outer (10-12km) ring road system allowing traffic and travel around the city.

It was submitted that the Northern Link has not been compared objectively and expertly with alternatives such as surface road upgrades, a no-toll options and a North West Motorway with Stafford Road upgraded. It was suggested that a north-south bypass, with an east-west orbital using Stafford Road and Airport Link, would provide significant congestion relief to the north and west of Brisbane and should be assessed directly against the proposed Northern Link tunnel. The submission expresses concerns that the focus on the Inner City Bypass could create a situation where one breakdown or other incident could spread gridlock across much of Brisbane's road network within a very short time.

In order to form a comparable project scope to a North West Motorway, Northern Link should be combined with a major capacity upgrade of Gympie Road from Kedron to Carseldine. This should assess the merits of having three major north south corridors through the north of Brisbane, compared with the existing two (Gympie road and Gateway Motorway). It should also assess the merits of distributing the east-west travel demand on the north of Brisbane across a middle ring (Stafford Road and Airport Link) and an inner ring (Inner City Bypass) rather than concentrating demand on the ICB.

Response

See response to issue 2 above regarding impact assessment of alternatives to the Northern Link Reference Project. The EIS has sought the Coordinator-General's evaluation in respect of the Northern Link Project. The project is consistent with the intentions and measures of the *Draft SEQ Regional Plan 2009 - 2031* and was countenanced in the *SEQ Regional Plan 2005 – 2026*. The regional planning instruments are the appropriate mechanisms for addressing strategic transport and land use planning.

In this regard the submitters are also referred to the State Government's WBTNI process where wider policy and strategic alternatives for western Brisbane transport networks are being investigated. As identified in the EIS, the range of other transport investigations feeding into the WBTNI process include

considerations regarding the Australia TradeCoast Transport Study, Centenary Highway bus priority/transit lanes investigations, Gateway Motorway North Planning Study, Inner City Rail Capacity Study, Inner City Bus Access Capacity Study, Kenmore Bypass Study, North Moreton Transport Network Study, Northern Busway (Royal Children's Hospital to Kedron to Bracken Ridge), Petrie to Redcliffe multi-modal corridor and Northern Link.

Whilst a range of corridor options were identified by the WBTNI in the April 2008 consultation round, it was identified in the display material that if a corridor option is required, further work on its social, environmental, engineering, and economic feasibility including government affordability, would need to be undertaken along with community consultation. The cumulative impact assessment of potential wider north-south or east-west orbital bypass options against the Northern Link proposal have been reported in the EIS and further addressed where necessary within this supplementary report (refer Chapter 21 of the EIS and section B.21 of this Appendix).

B.2.5 Issue 6 – River Crossing

Improvement in west to east travel will never be achieved without a river crossing to relieve congestion on Coronation Drive and Riverside Expressway heading east.

Response

See response to issue 2 above

B.2.5 Issue 7 – Ramp over Mt Coot-tha Road

As a major issue being addressed by the Northern Link Road Tunnel project is the morning peak traffic congestion on the Western Freeway, it was submitted that a much less expensive alternative would be to provide a ramp over the existing round-about for Mount Coot-tha Road traffic and, following construction of the ramp, remove this roundabout.

Response

See response to issue 2 above. The EIS, in chapter 3, describes the range of design options considered in development of the reference design. Localised treatments, such as intersection upgrades were considered and found not to achieve project objectives.

B.2.5 Issue 8 – Increase to Milton Road and Coronation Drive capacity

A submission suggests that further consideration, including analysis of traffic and economic impacts, be given to the option of optimising surface roads including increasing lane capacity on a number of roads, doubling Milton Road from 4 to 8 lanes or Coronation Drive from 6 to 8 lanes. The submitter considers that this option was not fully considered in the EIS and appears to have been rejected on political grounds, rather than any analysis of traffic and economic impacts.

Response

The EIS, in chapter 2, section 2.5, responded to the ToR in describing a 'do minimum' option, a 'public transport' option and an 'upgrade the surface road network' option. Each option was evaluated in chapter 2. The 'surface road' option was found to fall short in terms of meeting project objectives while having excessive and unacceptable impacts on property and landmark community facilities along both Coronation Drive and Milton Road. These are not political grounds.

The EIS found on technical grounds that the impacts of the 'surface road' option would likely be so significant and adverse as to preclude further development of the option.

B.2.5 Issue 9 – Alternative to the Toowong Connection

It was submitted that an assessment of traffic demand for the Toowong connection needs to be undertaken, taking into account the strategic plans and needs of major traffic generators such as the University of Queensland. Such an assessment should include consideration of alternatives using the same road network and assessment of alternative road infrastructure networks that are expected to achieve the same outcomes.

Response

An assessment of the traffic demand for the Toowong connection was undertaken in Chapter 5 of the EIS. A decision has been made to remove the Toowong connection from the Project and updated assessment of the Project without both the local connections has been undertaken for this supplementary report within Chapter 4.

B.2.5 Issue 10 – Comparative Assessment

It was submitted that a full comparative assessment of project alternatives is required. It was submitted that without the EIS having done a full comparative economic assessment with the alternatives considered, it is not possible to determine whether the project would deliver comparable value for money in comparison with, for instance, an alternative optimising public transport. Northern Link itself is not included in the analysis and therefore the assessment of Northern Link against the project alternatives cannot be undertaken. The Proponent should reassess the benefits and disadvantages of the various alternatives so that each of them can be considered individually and compared with the alternatives.

Response

The EIS, in chapter 2, section 2.5, responded to and met the ToR with regards a comparative evaluation of two project alternatives. Section 2.2 of the EIS sets out the strategic transport outcomes from the Reference Project, while section 2.3 of the EIS presents the project objectives.

B.2.5 Issue 11 – Detailed Assessment

Submissions have raised issues with the EIS not assessing alternative scenarios in sufficient detail to provide a meaningful comparison with the Project. It was considered that there was no evidence that these alternatives were assessed for their traffic and transport performance outcomes or for their economic implications including in the associated technical papers. The EIS does not provide a cost-effect analysis or cost-benefit analysis or any kind of quantitative comparative analysis for the potential alternatives. The qualitative comparison does not provide a basis as to which alternative is the most effective or efficient approach to achieve the performance criteria in reducing travel demand, cost and environmental impacts. The 'Optimise Public Transport' alternative lumps pedestrian and cyclists in with this option and there is little consideration of expanding the rail network. Proper consideration should include traffic modelling and economic analysis including provision of Northern Link as a free road (no toll) and provision of the North West Motorway. The extent to which an increase in rail freight and intermodal systems was factored into the Project Rationale Alternative options scenarios argument, was also questioned.

Response

The development and comparative evaluation of the alternatives to the Northern Link project in the EIS has met the requirements of the ToR. Section 2.2 of the ToR requires an assessment of the strategic fit of the alternatives with the project objectives and broader transport planning for SEQ. This assessment was presented in chapter 2 (Table 2-6) of the EIS.

The analysis sought by the submitters was undertaken in the development of the SEQRP and the SEQIPP. Northern Link is one of the projects identified in SEQIPP as being necessary to meet forecast increases in travel demand arising from population growth, demographic changes and economic development.

B.2.6 Oil Price Vulnerability and Oil Availability

B.2.6 Issue 1 – Peak Oil

Submissions raised issues regarding the peak oil assessment in the EIS. It was submitted that rather than investigating changes in global oil availability and oil price vulnerability the EIS has ignored and/or misrepresented an extensive body of official data, official reports and independent research into the peak oil phenomenon and its implications for both the transport sector and the broader economy which have a direct bearing on the feasibility of the project. Most importantly the Proponent has not assessed the sensitivity of the traffic modelling assumptions to changes in global oil availability. The BSTM is only able to partially address implications of peak oil and indirectly through reflection of higher fuel prices in operating costs. The model is unable to reflect land use changes which might be influenced by changes in energy price and availability. No consideration has been given to the prospect of motor fuel shortages or the prioritisation of distribution to essential services which is likely to result for oil supply depletion. The core premise of the project rationale is that Brisbane will experience perpetual growth in motor vehicle traffic, population, economic activity and employment. It was submitted that the Hirch Report analysis invalidates the assumptions in the EIS regarding the continuation of historical trends in employment growth, growth in person trips and the affordability of private car travel. It is also unrealistic to be planning for the "business as usual" scenario when there is no doubt that consumer behaviour will change out of necessity.

Response

There is concurrence between the EIS and submissions that the availability of oil is expected to decline in the future.

Historically the price of petroleum as a fuel for transport has risen, sometimes dramatically, and numbers of motor vehicles have also significantly increased. Increasing fuel prices may be a short term deterrent to private motor vehicle usage but in the longer term the convenience of flexibility provided by private motor vehicles can be expected to continue the general upward trend in motor vehicle usage as shown in *Queensland Transport Facts 2008,* Figure H4. While the total distances travelled by passenger vehicles (VKT) in Queensland decreased in the years 2003-2004, 2004-2005 and 2005-2006 the decreases were each less than 2% whereas the passenger distance travelled by public transport (bus) decreased over the same period by over 2%. There is also alternative demand for electric and hybrid vehicles increasing in response to both fuel prices and environmental effects.

The EIS (Volume 1, Chapter 2, Section 2.6) acknowledges a range of measures being addressed to prepare for the peak oil scenario and its aftermath. Among these is the improvement in road

infrastructure to decrease or eliminate congested traffic conditions which may decrease fuel consumption by as much as 30%. There is also a trend towards hybrid and electric vehicles. As presented in the EIS (Volume 1, Section 5.4.5) the sensitivity analysis of traffic, to increased fuel prices showed a preference towards more direct routes and the overall forecast traffic volumes on Northern Link were found to be similar to those forecast with standard operating cost assumptions.

B.3 Project Development

B.3.1 Initial Development of the Project

No issues were raised in the submissions.

B.3.2 Preliminary Assessment of Prefeasibility Options

B.3.2 Issue 1 – Railway Option

A submission requested more detailed information on capital, community and engineering impacts that clearly provide a picture that the bored option, as compared to the railway option, is the best choice.

Response

The railway option route as reported in the TransApex Prefeasibility Report (March 2005) would be highly influenced by cut-and-cover opportunities through open space and beneath existing roads. The railway option would have high capital, community and engineering impacts due to the high degree of property impacts, traffic impacts and the variable geotechnical conditions and tunnelling methods required.

Capital cost estimates were prepared for the TransApex Prefeasibility Report (March 2005) for the Northern Link bored and railway options. At prefeasibility stage, the P50 risk adjusted cost (October 2004) of both the bored option and the railway option were similar, being $1.15 billion for the bored option and $1.2 billion for the railway option. The railway option however, would have a much higher risk of capital cost increase due to the high degree of property, traffic impacts and the variable geotechnical conditions and tunnelling methods required.

B.3.2 Issue 2 – Alternative Mainline Tunnel Alignment

It was submitted that two sets of tunnels should be constructed with an above ground link in Norman Buchan Park, Bardon (or cut and cover). Simple cross section tunnels and mainly above ground access ramps would greatly reduce construction costs. There is ample space between Anzac Park and the Botanic Gardens for on and off ramps.

Response

The demand for Northern Link use from the suburbs north of Milton Road was considered to be minimal and a potential connection to Bardon was excluded from the detailed feasibility investigation.

B.3.2 Issue 3 – Regionally Significant Freight

Clarification sought on what is meant by regionally significant freight.

Response

Regionally significant, for the purpose of strategic options assessment, was the measure of the percentage of total traffic (and percentage of freight traffic) on Northern Link. Regionally significant is the traffic that requires long distance travel between metropolitan areas and major/key activity centres such as Ipswich and Australia Trade Coast.

B.3.3 Design Development

B.3.3 Issue 1 – Western Freeway Connection

It was submitted that there is no current commitment to upgrade the Centenary Motorway to ultimately provide two general purpose and a HOV lane in either direction, and that this assumption for the development of Northern Link was not agreed with the then Queensland Department of Main Roads (QDMR). At the same time the submission stated that the Northern Link design may constrain the State with regard to HOV lanes as the State requirements are for HOV lanes to flow continuously onto Milton Road. This may mean that they should be provided on the verge side of the motorway. The submission requests that the Northern Link design give consideration to a continuous HOV route from Centenary Highway to Milton Road. The arrangement with the Northern Link portals on the outside and HOV lanes on the inside was questioned regarding safety issues and allowance for adequate length of HOV to be useful on a motorway standard road.

It was also requested that the Northern Link design ensure 'best value' and buildability of constructing a potential Inner Orbital, as identified in WBTNI.

Response

As stated in Section 3.3.2 of the EIS, ongoing consultation was undertaken with the then QDMR in relation to the future lane requirements for the Western Freeway. An initial assumption was agreed with QDMR Manager Network Planning, in order to allow advancement of the Northern Link reference design, that the Western Freeway would ultimately provide three traffic lanes in each direction to the existing Mt Coot-tha Road roundabout. This would include two general-purpose lanes and a High Occupancy Vehicle (HOV) lane. The combination of Northern Link portals on the outside with HOV lanes on the inside (median) was preferred, in consultation with Main Roads, because:

- it provided good quality access to Northern Link for toll road users;
- potential compatibility with the East West Link; (TransApex project);
- maximises the length of HOV lanes to Mt Coot-tha Road roundabout;
- no trapped lanes are involved; and
- no right hand diverges.

Following the submission of the EIS, QDMR advised that should future HOV lanes be developed for the Centenary Motorway, they would be provided from the west and stop somewhere between the Fig Tree Pocket and Moggill Road interchanges. No HOV lanes would be provided for the Western Freeway. QDMR also indicated that the portals for any future "Inner Orbital" as identified in WBTNI, would be located within the inner lanes of the Western Freeway. The proposed Northern Link Western Freeway connection would not constrain, including with regard to buildability and 'best value', such an option.

B.3.3 Issue 2 – Design Development – Closure of Dean Street

A submission sought clarification on access requirements to Dean Street inbound from the Western Freeway, including future relocation of the bus workshop/depot and both long and short term access arrangements for Dean Street.

Response

The access arrangements to Dean Street from the Western Freeway would remain as currently exists.

B.3.3 Issue 3 – Local Connections West of Frederick Street

A number of submissions raised the need for the consideration of alternative connections in Toowong from the vicinity of Dean or Frederick Streets (MetRoad 5), including as far west as the Moggill Road ramps onto the Western Freeway, or through the cut and cover of Payne Road (or alternatively Waverley Road), Indooroopilly for access from Moggill Road.

Response

A connection to the Toowong precinct via south-facing ramps in Frederick Street was considered in Section 3.3.3 of the EIS as part of the further consideration of Option 1 or the Prefeasibility, Bored Option. The design included provision of a signalised intersection at Mt Coot-tha Road and maintained the existing elevated ramp bridge and the Frederick St / Milton Road roundabout. As identified in the EIS, further analysis was undertaken on this concept with the Strategic Review Framework. It was concluded that this option did not sufficiently meet a number of criteria for the Northern Link project including high complexity of construction, limited construction method flexibility, low cost effectiveness, high impacts on existing infrastructure, high property impacts and high environmental impacts. The following issues were identified:

- additional construction widths were required for the construction of the structures in Frederick Street increasing the property requirements for the project;
- increased complexity in the design of structures to maintain traffic clearances and required clear spans;
- complex traffic management under construction with the high risk of traffic 'rat running' during construction;
- high property impacts in Frederick Street; and
- potentially substantial increase in construction cost.

Further west of Frederick Street, there is no practical local connection that can be provided into the mainline tunnel. Due to a range of topographic, hydrological and property constraints, primarily the need to commence driven tunnelling for the mainline tunnels prior to the boundary of the Toowong Cemetery, the connections with the Western Freeway are some 1km west of the cut and cover portals, which in turn are some 200m west of the Mt Coot-tha roundabout. The next local road network connection to the Western Freeway is located some 4km west of the Mt Coot-tha roundabout at the Moggill Road ramps.

Providing local connectivity to the Northern Link main line tunnel from the Toowong (and Taringa) precincts via new connections to the Western Freeway through Payne Street or Waverley Road at Taringa, or through upgrading of the existing Moggill Road ramps, was not considered within the Strategic Options Development stage of the project. As previously addressed in Section 4.2 1(Issue 6), there is no need for an additional connection to the motorway network for Indooroopilly to that already provided by the Western Freeway. Neither Toowong nor the University are conveniently accessed from the motorway network although both are served by public transport (Toowong - rail, bus, ferry; University of Queensland – bus, ferry). The linkages for the movement of people and goods between these centres and other economic centres, such as the Australia Trade Coast including Brisbane Airport are not well developed and would be enhanced by the provision of connections to the motorway network at Toowong.

B.3.3 Issue 4 – Design Development – Toowong Connection

The options assessment undertaken for the Toowong local connection in Section 3 of the EIS is flawed in that the design used in the options assessment has been significantly changed to have much larger impacts, but the revised design was not reassessed against the options development criteria. The submission requests assessment of the current project design against the strategic review framework and the results of this assessment presented to the community.

Response

The development of the strategic and concept designs was undertaken to determine a feasible design before releasing it to the community for input. The concept design was released early in the community display period to allow feedback on the design.

During design development of the Toowong connection a preliminary concept was developed that retained the existing movements at the Frederick St / Milton Road roundabout and provided all movements to / from the tunnel ramps (EIS Chapter 3, Figure 3-6). This preliminary concept was analysed against the strategic review framework and it did not sufficiently meet a number of the strategic framework criteria and these are discussed in Section 3.3.3 of the EIS. The alternative option was developed with an objective of reducing the impacts identified in the preliminary concept. The alternative option reduced the impact on:

- the existing infrastructure specifically the Western Freeway and the Frederick Street elevated ramp;
- properties along the eastern side of Frederick Street, Valentine Street and the southern side of the Western Freeway;
- the construction costs by reducing the extent of work, complexity of the connection at Frederick St / Milton Road and less complex traffic management during construction; and
- the impact on the environment.

The community impacts of this option were assessed as being similar to the preliminary concept.

The Toowong connection EIS reference design was preferred as it minimised the impacts of the connection in comparison with the alternative feasible option described above. Reduction in the surface footprint by reducing lanes along Milton Road and Croydon Street would have a minimal reduction in the number of properties impacted. Additionally, reduction in lane capacity would significantly reduce the traffic performance of the connection.

The requirement to locate the tunnel portal adjacent to Frederick Street above the 1 in 10,000 year flood level was one of the major design constraints and this, with the need to maintain the existing movement on Milton Road, required the use of a flyover to connect to the Milton/Croydon Intersection.

Milton Road, is an east-west regional radial road between the CBD and the Toowong Roundabout. It is designated as a secondary freight route in the Brisbane City Council future freight hierarchy. Milton Road is a key route between the western suburbs and a variety of cross-city locations, as well as the CBD. It also provides access to Suncorp Stadium, which during events generates a high level of bus traffic and pedestrian movement. The Toowong connection was seen as providing a significant role in catering for traffic between the designated activity centres in the inner western suburbs and the ICB/Kelvin Grove Road (north).

While mitigation measures were proposed to reduce the impacts on residents living in the vicinity of the works, including noise barriers, landscaping and urban mitigation such as enhancements to existing pedestrian/cycle connections, Council has decided to proceed with the Project, without the local connections.

B.3.3 Issue 5 – Toowong Connection – Pedestrian / Bicycle Options

Chapter 3 includes a discussion on design options for pedestrian access particularly at the Toowong connection. Rather than have these considerations remain unresolved, they should demonstrably influence the reference design.

Response

The considerations for pedestrian access, particularly at the Toowong connection, included in Chapter 3 of the EIS were that the options identified were not considered feasible and were not considered further in the concept design. The pedestrian underpass would require a high capital cost, maintenance costs such as cleaning, lighting and surveillance costs, be subject to vandalism and a risk to personal security.

The signalised pedestrian crossing would require the lowest capital cost to implement. However, the crossing could have a negative impact on the road network performance, including the QTMR network, and would have sight distance constraints for the westbound crossing of Milton Road due to the walled structures connecting to the elevated tunnel ramps.

The pedestrian overpass would require high capital cost, maintenance costs and safety concerns particularly at night. The overpass would have visual impacts and depending on the design of the southern ramp approach require more land in Quinn Park.

Council has now considered the submissions and further detailed assessment of the Project, without local connections. In weighing these competing matters, Council has now decided to proceed with the Project, without the local connections.

B.3.4 The Developed Project

B.3.4 Issue 1 – Toowong Connection – Benefits

Two submissions supported the need for the Toowong connection, submitting that the Toowong connection is absolutely vital to ensure that this road tunnel is a success and that the Toowong connection will result in benefits for the local community including reducing current and worsening disruptions to the neighbourhood and boosting access and connectivity to the important community services, such as the Royal Brisbane Hospital. It was also submitted that with the Toowong connection, traffic congestion will be reduced on Milton Road and Coronation Drive and that traffic increases on Croydon Street and Jephson Street will actually reduce traffic on other roads and will reduce the likelihood of rat-running through local streets. Rat-running already exists due to the grid pattern of the streets and this tunnel will enable direct flow to the arterial network. The Toowong connection will actually provide for increased liveability in the local area. Only a couple of streets will be affected and the overall benefits for the community will outweigh the negatives.

It was submitted that the Toowong connection is an essential element to enable local access to the tunnel. Constructing the tunnel without this would require Milton, Auchenflower and Toowong residents to access the tunnel via the Moggill Road on ramp to the Western Freeway.

Response

As recognised by these submissions, the Toowong local connection would have provided benefits to the local and wider road network through the relief of surface road congestion. The level of overall reduction in traffic on the surface network, and the associated benefits this would bring, with the local connections would be greater than without the local connections. For example, by 2026, the Project without the local connections is forecast to result in a reduction of 26,000 vpd across the surface network at Toowong and Milton, whereas the EIS Reference Project, with the local connections, yielded a further 14,000 vpd reduction with the diversion of trips via the local connections. As identified in Chapter 4.1.3 of the Supplementary Report, without the local connections, the total use of the tunnel heading east would be lower than forecast for the EIS Reference Project (-32%), due to the loss of local connectivity to the tunnel from the inner western suburbs and the use by local traffic of the existing surface network. Reductions in daily traffic are forecast without the local connections on many local streets throughout the inner west suburbs such as Eagle Terrace (-11%), Haig Road (-5%), Stuartholme Road (-10%), Rainworth Road (-38%), Sylvan Road east of Milton Road (-11%), Morley Street (-11%) and Birdwood Terrace (-12%). These forecast traffic reductions are sound, although in some cases are not as strong as that offered by the EIS Reference Project, due to the lack of accessibility to Northern Link for trips from the Toowong area without the local connections. While it essentially true that the Toowong connection is an essential element to enable local access to the tunnel, and that without the Toowong connection residents of Milton, Auchenflower and Toowong would only be able to access the tunnel via the Moggill Road on ramp to the Western Freeway, these areas remain open to using a relieved surface road network. As stated in the EIS, without the local connections, the Project is still capable of meeting the strategic needs of the project. The Project without the local connections would predominantly carry cross city traffic, 86% of all trips, which is a higher proportion of cross city movements compared to the EIS Reference Project, with the local connections at 80%. The Project would also carry a higher proportion (6.4%) of commercial vehicles compared to the EIS Reference Project, with the local connections at 5.5%.

On balance, Council considered that the environmental and community impacts identified in the EIS, and the majority of submissions, outweighed the identified potential benefits of the local connections. While the Toowong connection would enable local access to the tunnel, it would be accompanied by significant and long term impacts on the directly affected local community, which was not considered acceptable to Council. In the Toowong area, with removal of the local connection, several roads that provided connectivity to the EIS Reference Project would have reductions in traffic compared to the scenario without Northern Link. Key examples of traffic reductions include Jephson Street (-4%), Sylvan Road (-10%), Burns Road (-4%) and Morley Street (-11%), Traffic congestion on Milton Road and Coronation Drive will also be relieved without the Toowong connection although to a different extent than with the EIS Reference Project. The Project will relieve traffic on Coronation Drive by a forecast 14% in 2026 and on Milton Road by 6% in 2026. This compares with the EIS Reference Project of 22% relief for Coronation Drive reported in the EIS, which on the updated traffic modelling as completed for the Supplementary Report would be 17%, and 7% for Milton Road with 5% forecast relief with the updated modelling.

B.3.4 Issue 2 – Toowong Connection – Detriment

Many submissions expressed dissatisfaction with the conception, design and development of the Toowong connection, including:

- Rather than instil confidence in the planning process and in the proposed infrastructure, the EIS has strengthened our conviction that the proposed Toowong Connection is ill-conceived.
- Strongly oppose the proposed secondary local access to the Northern Link Tunnel at Toowong. Urge Queensland Government and Brisbane City Council to remove the Toowong connection from the Northern Link Project.
- The Toowong local connection is a disgrace.
- Our house is located only 30m from the proposed worksite and following construction of the Toowong Connection, will be only 50m from the portal entrance. I believe that Northern Link, specifically in relation to Toowong, has failed in the EIS process. I ultimately want the Toowong Connection removed from the Northern Link Project. Failing this, the Toowong connection design needs to be taken back to the drawing board and significantly redesigned.
- Strongly disagree with the access link at Toowong. The project has serious flaws that need to be addressed and is unbalanced. The EIS shows that the access link is not socially or environmentally justifiable.
- The design of the Toowong entry in its current form is not supported and should be removed. The desire to provide a direct access from Northern Link to St Lucia is flawed.
- Local residents incur more costs and no benefits from having the local access situated in their neighbourhood.
- The Toowong connection provides no benefits for the local community.
- Objects to the Toowong connection as it is not needed, wanted or justified and would have significant impacts on the local community and divide the community.
- The secondary entrance in Toowong with its associated 10 lane widening of Milton Road, 7 lane widening of Croydon Street and 2 flyovers will permanently divide the suburb both north-south and east-west and will be a blot on the landscape for future generations should it go ahead. The associated widening and infrastructure cannot be mitigated in a satisfactory way.
- Our residence and the surrounding neighbourhood will suffer severe adverse effects if the secondary entrance to the tunnel at Frederick Street proceeds. We believe that the negative impact of this secondary entrance far outweighs any potential positives and request that this proposed secondary entrance not proceed. We have no objection to the operation of the mainline tunnel, where the entrance is off the eastern end of the Western Freeway.
- I will have my home resumed if the Toowong Connection goes ahead and as a result do not want an access tunnel through Toowong.
- The project will create a division of Toowong - Oldest community in Brisbane.
- Toowong entrance will split Toowong and create problems and disruption within the area.
- The proposed entrance will be a blot on the landscape which future generations will regret.
- The proposed widening will make it problematic to walk, cycle or catch public transport.

Response

The local connection in Toowong was well conceived and developed as outlined in Chapter 3 of the EIS. Its final proposed location adjacent to Frederick Street with on and off ramps collocated within the existing road corridor of Milton Road was a logical and feasible development of the EIS Reference Project, including the required surface road improvements to Croydon Street, being a "city distributer" road classification, and associated intersections. The EIS also recognised that the provision of this

needed infrastructure, despite its collocation within an area already seriously affected by existing transport infrastructure impacts, would change the impacts in this area, and that these would be in some areas significant and long term. Despite this, a valid and sympathetic attempt was made to minimise these new impacts through urban design and landscape treatments, sound barriers, landscaped buffer zones and alternative pedestrian and cycle path provisions.

The EIS also recognised, as identified in Chapter 20.5.1, that should the local Toowong connection proceed in its present form, a range of further urban mitigation options should be considered during more detailed design of the connection including investigating opportunities to reduce the scale and impact of the elevated road structures, or to reconfigure the connection in such a way to reduce impacts on nearby properties. It was also recommended that an integrated program of further urban mitigations would be required involving land use changes, such as through the extension of Quinn Park to Croydon Street and over time encouraging commercial redevelopment adjacent to significant road corridors in order to provide suitable buffers for residential areas.

The impacts of the Toowong connection, expressed in the submissions above and throughout many other submissions in regard to particular issues of noise, air quality, social amenity, land use character and heritage, urban design and pedestrian/cycle connectivity, were addressed in the EIS and throughout this Supplementary Report in response to the submissions. Despite the strategic benefits identified in the EIS of the Toowong connection, the EIS recognised significant adverse and long term impacts at the local level. Given the uncertainty, as well as the difficulty and impact of the required mitigation measures for those impacts and in weighing these competing and other matters, Council has decided now to proceed with the Project without the Toowong Connection.

B.3.4 Issue 3 – Support for the "Straight Through"

Similar to the opposition to the Toowong connection were various expressions of support for or no objection against, and need to proceed with the "straight through option", including that it:

- delivers a benefit to the Toowong community whereas the secondary entrance does not deliver benefit but in fact detriment;
- will contribute to the creation of improved national road infrastructure;
- will meet the Project Objectives and the fundamental transport goals of the Project;
- is the 'Best Business Case' (according to quotes from the Lord Mayor in media over the past few months);
- will benefit the Toowong community - not harm it;
- will free up funds for other major infrastructure projects (e.g. public transport) that would otherwise be consumed by Toowong Local Connection;
- will allow the Toowong traffic to find its own level, freed from the encumbrance of through traffic from the outer suburbs;
- will provide adequate access to the Western Freeway and Northern Link Tunnel via the roundabout at Toowong;
- will offer an alternative to inbound and outbound traffic to and from suburbs further west;
- will provide a link between the outer west and the north;
- will provide the anticipated benefits;
- can be accessed from the Western Freeway for people beyond the inner suburbs;

- will take traffic away from existing local roads;
- will improve access to the airport and the Australian TradeCoast precinct and relieve Milton Road and Coronation Drive;
- has community support, clearly appears as providing transport efficiency, but has the distinct advantage of a better balance environmentally;
- will take commuter traffic from beyond the inner western suburbs to the city centre and beyond, without using Moggill Road, Milton Road and Coronation Drive;
- will move traffic from the Ipswich and Centenary Motorways to the airport and northern suburbs; and
- the [mainline] tunnel makes sense on its own - to move traffic through the inner city areas without destroying them or creating a visual blight on leafy residential areas.

Response

An assessment of the Project without the local connections is provided in Chapter 4 of the Supplementary Report. While not all of the positions expressing support for the straight through project are entirely accurate, most of the submissions do reflect a good understanding of the project without the local connections, as stated in the EIS. As identified in the some of the submissions above, and based on the further assessment of the Project in Chapter 4 of the Supplementary Report, the "straight through project":

- would contribute to the creation of improved national road infrastructure;
- would meet the Project Objectives and the fundamental transport goals of the Project;
- does provide the greatest benefit to cost ratio and affordability position in the current financial climate;
- would not harm the Toowong community;
- would offer an alternative to inbound and outbound traffic to and from suburbs further west;
- would provide a link between the outer west and the north;
- can be accessed from the Western Freeway for people beyond the inner suburbs;
- would take traffic away from existing local roads;
- would improve access to the airport and the Australian TradeCoast precinct and relieve Milton Road and Coronation Drive;
- has expressed community support;
- would move traffic from the Ipswich Motorway and the Centenary Highway to the airport and northern suburbs; and
- would move traffic through the inner city areas without destroying them or creating a visual blight on leafy residential areas.

Consistent with the sentiments expressed in these submissions, Council has decided now to proceed with the Project without local connections at Toowong and Kelvin Grove.

B.3.4 Issue 4 – Consideration of the Project without Connections

A number of submissions also expressed concern that the EIS has not compared the impacts of a tunnel proposal without local connections (at Toowong and Kelvin Grove) with a tunnel proposal that has those local connections. The EIS does not seem to provide information comparing impacts, costs and

benefits of the Project 'without local connections'. Concern has been expressed that there is no credible consideration of removing the Toowong connection of the project. Submitters wrote that they were impressed by the detail and scope of the EIS for Northern Link, but were shocked to find that it lacked any analysis of the "without connections" option. The EIS does not address the possibility of a 'straight through' design. The EIS does not address the desirability and feasibility of the "straight through" tunnel separately from those of the optional connections at Toowong and Kelvin Grove. It therefore fails to justify the preferred option of a design which incorporates both optional connections. The community needs to be able to assess the proposal both with and without the Toowong access to determine if the benefits are greater than the costs. The "straight through" tunnel option has not been adequately evaluated in the EIS.

Some of the more specific submissions regarding consideration of the Project without connections include:

- the need and justification for each of the connections separate to the main tunnel proposal;
- incorporate traffic modelling for the "without" the connection scenario necessary to enable "proper" decision making about the effects of the project on the Toowong area;
- the effect of the Kelvin Grove Road portal on reductions in traffic on Milton Rd and Coronation Drive;
- effective and empirical assessment of the 'straight-through' option of the project to illustrate the impacts of the local connections;
- a critical comparison of both options, including in relation to traffic modelling and costings;
- economic benefits to the community when taking into account the cost of the project and the social costs to the community and financial costs to business;
- the business case showed the mainline tunnel, excluding the local connections, to be a better financial option;
- detailed environmental assessment information in relation to the "straight through" option for assessment of the potential noise and vibration problems related to the secondary entries / exits;
- clear comparisons for noise and vibration for the options shown;
- the socio-economic costs of the options;
- the national, regional and local strategic context of the options;
- the benefits, costs and impacts of construction; and
- the future East-West tunnel component of the larger AusLink road network framework.

Response

While the EIS provided some understanding of the project without the local connections at Toowong and Kelvin Grove Road, further assessment has been presented in the Supplementary Report, Chapters 3 and 4, including a comparative assessment against the EIS Reference Project. The assessment includes:

- traffic modelling;
- description and assessment of construction worksite locations, methods and construction impacts;
- air, noise and vibration impacts during construction and operation;
- economic and social impact assessment; and
- other additional potential impacts on the Project.

B.3.5 Ventilation Systems and Outlets

B.3.5 Issue 1 – Ventilation Systems and Outlets – Site Options

While there was generally satisfaction expressed with the location of the northern or eastern ventilation station and outlet location, a number of submissions expressed opposition to and concern with the location of the western ventilation station and outlet. Submissions expressed concern that the position of the western ventilation outlet is too close to residential housing, schools and the Botanic Gardens. Some submissions suggested it should be further west, further back, or relocated to the Toowong Quarry, or in industrial areas away such as Sumner Park and Darra. The outlet would be significantly higher than all buildings in the local community and would impose a massive physical structure in an area renowned for its botanic and visual appeal. Given the topography of the land at Toowong with the steep rises on both sides of the site, the proposed height of the stack is definitely not taller than the valley sides and therefore clearly inappropriate for a ventilation outlet.

Response

The selections of preferred sites for the ventilation stations and outlets are presented in the EIS (Volume 1, Section 3.5.2). Each option was assessed against a range of criteria including ventilation function, air quality, land use, physical constraints, access, visual impact and relative indicative costs of construction of the ventilation shaft connecting the ventilation station with the outlet. At the western end, two site options (W1 and W2) were evaluated in accordance with these criteria, both of which were some 300 m from existing residential areas, being the area of west Toowong in the case of W1 and the residents north of Mt Coot-tha Road in the case of W2.

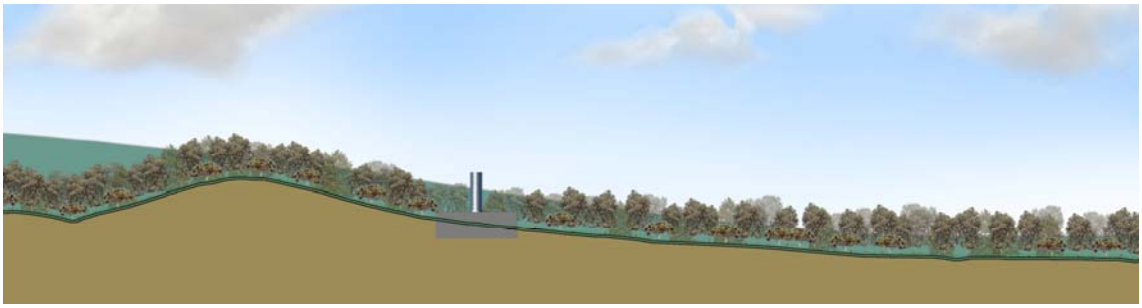
The key objective for site selection was to ensure that the goals for ambient air quality would not be exceeded as a consequence of operating the ventilation outlets for Northern Link. The site selection process determined that the goals would be achieved for each site including assessing a range of heights for the ventilation outlets. Availability of land, and access to land, were also important considerations in site selection.

For site W2, further away from the Western Freeway and within the Botanic Gardens, construction of the ventilation tunnel would have an adverse impact on the Brisbane Botanic Gardens in terms of clearing vegetation and potential drawdown of groundwater. The ventilation tunnel for this site would be in the order of 600 m in length, adding significantly to construction costs and construction impacts. In addition to the environmental impacts and construction costs of the ventilation connection to the tunnel, increased distance between the tunnels being ventilated and the location of the ventilation outlet, would also lead to increased energy demand during the operational phase. There would be consequential increases in greenhouse impacts with increased energy demands and associated operating costs. These issues associated with construction cost and energy requirements limited consideration of locating the ventilation outlet further west along the Western Freeway, including to such locations as Sumner Park or Darra.

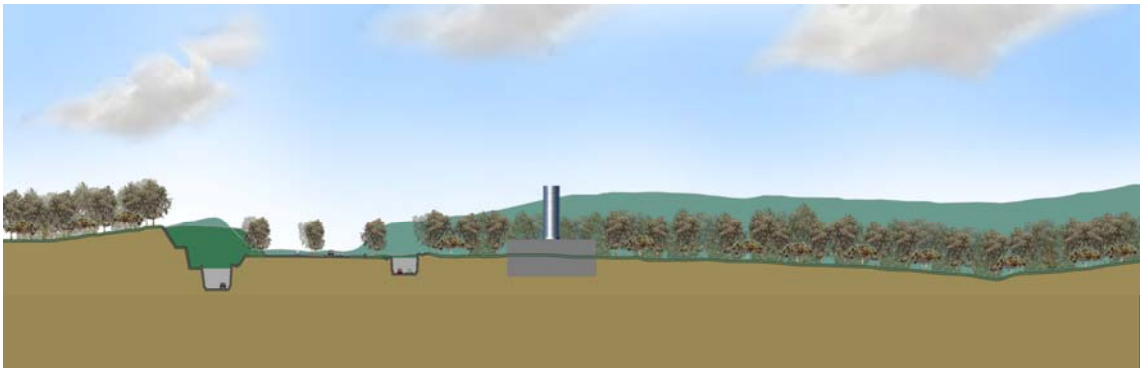
Discussion of the comparison of options against the criteria was outlined in Table 3-5 in the EIS. These options were available for public comment in May 2008 as part of material presented and discussed in preliminary consultation activities. All site locations have similar concentrations of NO_x in terms of both maximum ground level concentrations (1 hour and annual average), and the overall pattern of dispersion. Based on background concentrations at these sites the maximum 1hr NO_2 level would not reach half the air quality goal at ground level. W1 and W2 are remote from any buildings above 2

stories with W1 at least 300 m from any buildings. Both W1 and W2 are adjacent to tall trees but the ventilation outlet would be designed to provide dispersion above these. While both W1 and W2 sites are generally within the broad "valley" between Mt Coot-tha and the higher elevations of Toowong, this has not affected the ability for the released air from the outlet to be adequately dispersed as presented in the air quality modelling and dispersion analysis based on detailed topographic and meteorological data. The selected site for the western ventilation outlet provides for the station to be partially buried into the side of a ridge with the outlet being 20 m taller than the top of the station building, approximately in line with the height of the surrounding topography as shown in the sections below (**Figure B-1** and **Figure B-2**).

- **Figure B-1 Western Ventilation Station and Outlet – West to East Section, Looking North**



- **Figure B-2 Western Ventilation Station and Outlet – South to North Section, Looking West**



B.3.6 Spoil Management Options

B.3.6 Issue 1 – Spoil Transport Options - Conveyor

Proposal to transport spoil by conveyor to the Mt Coot-tha Quarry poses a health risk to residents living north of Mt Coot-tha Road. It will result in noise levels during construction in excess of present levels at sites north of Mt Coot-tha Road. Dust levels may also be higher than present levels also unless the conveyor is adequately screened.

Response

The proposal to transport spoil by conveyor from the western worksite, through the botanic gardens to the Mt Coot-tha Quarry is unlikely to present any health risk to residents living north of Mt Coot-tha Road. While the EIS noted that the spoil conveyor is predicted to marginally exceed the LAeq dBA

noise goal by up to 2dBA (barely perceptible) at nearest residences on Wool Street and north of Mt Coot-tha Road, this assessment was based on an open or un-enclosed conveyor having a direct line of sight between the open conveyor and the nearest residences. It is proposed in the EIS that the conveyor would be fully enclosed which would completely eliminate the risk of exceeding the noise goal at the nearest residences. Further screening is also available due to the local topography through which the conveyor would pass, including the topography within the quarry itself. As a result, no significant acoustical impacts would be expected.

In relation to issues associated with dust from the proposed conveyor, it is specified that the conveyor would be fully enclosed. Dust monitoring, similar to that already being undertaken for the existing Mt Coot-tha Quarry, would be implemented during the Northern Link construction works as outlined in the Draft Environmental Management Plan (Appendix D of the Supplementary Report).

B.3.6 Issue 2 – Spoil Transport Options – Road Transport Hours of Operation

The Toowong work site is in close proximity to residences and therefore trucking of spoil should not be permitted 24 hours per day. Mitigation measures for noise for spoil removal are not adequately covered in the EIS. Given the greater than three year time frame, it is totally unreasonable to expect local residents to have to endure disruptive noise throughout the night for the duration of the project. After hours spoil removal and work proposed are excessive and should be reduced. In addition, the entry /exit to the work shed should be redesigned to avoid the trucks having to reverse and the beeping noises this will cause.

Response

The EIS indicates that spoil transferred to the Western Connection Worksite (WS1) would be conveyed via a conveyor to the Mt Coot-tha Quarry. Thus, no spoil generated at the Western Worksite would be trucked off-site from the Western Worksite. Trucking of spoil generated from the construction of the trough and cut and cover tunnels associated with the Northern Link connections to the existing Western Freeway would generate spoil that is placed at approved spoil placement sites, including at Swanbank. These works would be undertaken during daytime hours only and hence the trucking of this spoil will be during daytime hours (6.30am to 6.30pm on Monday to Saturday).

The Toowong connection worksite has been removed from the project and the issues raised in the submissions regarding the trucking of spoil from this worksite have been removed from the Project.

B.3.6 Issue 3 – Spoil Transport Options – Road Transport Traffic Management

Road works, diversions and speed restrictions should be clearly signed. Lane closures should be kept to a minimum and preferably only in off-peak or night operations. The Traffic Management plan should attempt to minimise the need to reduce speed limits through Northern Link roadwork sites.

Truck haulage of spoil would potentially have significant impacts on traffic, as well as noise/environmental consequences. Main Roads may need to be consulted as to whether a traffic management plan is required.

Response

Temporary traffic control measures would be implemented within the confines of the construction works area. Thus, vehicle speeds would be restricted in the area and significant speed differential between construction vehicles and traffic on the existing road network would not be expected. Section 4.3.17 of the EIS states:

- "Construction would need to proceed in accordance with a Construction Environmental Management Plan (EMP) and a Construction Traffic Management Plan (CTMP). The CTMP would be prepared in consultation with Queensland Transport, Department of Main Roads and Brisbane City Council to address and manage construction traffic issues, …"

QTMR would be consulted in developing its proposals for traffic management at all stages of construction adjacent to the Western Freeway. Construction Traffic Control Plans (CTCP) would be prepared for each construction sequence identified in CTMPs or major change in site traffic provision. The CTMP would define the level of provision of temporary traffic control measures at road work sites to control vehicle speeds and maintain road safety for all road users. It would be expected that the temporary traffic control measures implemented at road work sites would slow traffic down but keep traffic flowing and delays to a minimum. This might involve increasing lane capacity by the provision of lane widening or lane gain. These measures would be identified during the detail design and development of the CTMPs. In addition, Road Safety Audits would be required during construction in connection with all temporary road layouts.

B.3.6 Issue 4 – Spoil Transport Options – Road Transport from Mt Coot-tha Quarry

EIS states that spoil would be taken to Mt Coot-tha quarry and that truck movements out of the quarry would be the same. Requests clarification of this, and BCC to state the number of truck movements (2007 values) and the number of additional truck movements projected from NL works.

Response

It is proposed that the spoil replace the quarried material so that the quarry output would remain the same but be drawn from stockpiled spoil rather than excavated from the quarry. In this scenario the spoil could be trucked from the quarry at the same rate as quarried material is trucked at present and thus not increasing the number of truck movements. The quarry produces 410,000 tonnes of product annually that is trucked out along Mt Coot-tha Road at a rate of up to 60 truck loads per day based on a 5 day working week. Largest trucks used have capacity for 33 tonnes but truck size is not uniform.

B.3.6 Issue 5 – Spoil Transport Options – Cumulative Impacts

It was submitted that Chapter 3 of the EIS does not address cumulative impacts of spoil haulage by North South Bypass Tunnel [Clem 7], Airport Link, Hale Street Link and Northern Link and requests that the cumulative impacts be reviewed and addressed (in 2007 values).

Response

Cumulative impacts of spoil haulage is addressed in Chapter 21 of the EIS, and as addressed in relation to specific submissions in Appendix B.21 of this Supplementary Report.

B.3.6 Issue 6 – Spoil Transport Options – Noise Impacts

It was submitted that Chapter 3 of the EIS does not appear to have adequately addressed noise impacts of road haulage truck movement during evening and early morning particularly on Kelvin Grove Road and Milton Road.

Response

Noise Impacts from proposed road haulage truck movements is addressed in Chapter 9 of the EIS and where necessary, Appendix B.9 of this Supplementary Report. With the decision to proceed with the Project without the local connections at Toowong and Kelvin Grove Road, there will be no requirement to haul spoil from either Kelvin Grove Road or from Milton Road.

B.3.7 Construction Water Supply Options

No issues.

B.4 Project Description

B.4.1 General Description of Northern Link

B.4.1 Issue 1 – Project Length

The Project length and the tunnel component are variously quoted in different parts of the EIS. Accurate dimensions are required for consistency. Anecdotal accounts from local citizens would indicate that the longer a tunnel is, the less likely people are to use it, particularly if there is traffic at the end (e.g. from the ICB).

Response

The Project is approx. 7 km long including the tunnels and connections to the Western Freeway and ICB at each end of the project. The eastbound tunnel between portals, including cut and cover and driven TBM is approx. 4.6 km long. The westbound tunnel between portals is approximately 4.9 km long. The design length of the tunnel is subject to numerous issues associated with the feasibility of the alignment rather than anecdotal evidence regarding perceptions of use based on tunnel length. It is also important to have established road networks at either end of the tunnels where connections have been designed to merge safely with existing and planned future traffic conditions.

B.4.1 Issue 2 – General Description – Pedestrian and Cycle

It was submitted that the general description of the Reference Project does not include options to enhance pedestrian and cycling connectivity in the study area and requested that Brisbane City Council address the enhancement of pedestrian and cycling connectivity within the scope of the EIS. It was further recommended in the submission that the following condition be applied. "*Brisbane City Council must design and construct pedestrian and cycle ways that form part of the project, or that are impacted by the project, in consultation with the Department of Main Roads. Brisbane City Council must reinstate and reconnect existing pedestrian and cycle networks safely and conveniently through Project Works. Existing pedestrian and cycle movements are to be maintained (or suitable alternative connections are to be provided) during construction of Project Works. Alternative connections must be approved by Main Roads and be of at least a standard comparable to the existing condition at all times*."

Response

The Project is primarily a road tunnel project. Project works associated with urban mitigations to offset the impact of the Project, including enhancements to existing pedestrian and cycle connectivity are described in Chapter 2 of this Supplementary Report. Project mitigation works include the reinstatement and reconnection of existing pedestrian and cycle networks that are to be returned to relevant asset owners under their approval. The maintenance of existing pedestrian and cycle movements, including the provision, where necessary, of temporary alternative connections, during construction, are identified in the Construction Traffic Management and Staging Plans in **Volume 2** of this Supplementary Report. Opportunities for the enhancement of pedestrian and cycle connectivity to be provided as part of the Project without the local connections at Toowong and Kelvin Grove Road are specifically identified in **Section 2.5.2** of this Supplementary Report. As part of the urban mitigation and regeneration conditions, it is standard practice to require the design of these project mitigations and regeneration opportunities in consultation with relevant agencies and interests, including, but not restricted to, QTMR.

B.4.2 Project Design

B.4.2 Issue 1 – Standards & Criteria

Submissions have expressed the need for the Project works to be built to current motorway design specifications. The grade of the Northern Link at the Toowong Connection [Vol 2 EIS-TM-05] appears to have a grade of > 5%. The cycle and pedestrian networks also need to conform to applicable standards or better. It is suggested that BCC be required to reflect QDMR tunnel standards in the design.

Response

The recent experience gained from the Airport Link Project (APL) and the Road Planning and Design Manual (RPDM) of QTMR has been used as input to the geometric design standards for the Northern Link tunnel. The RPDM also includes Chapter 23: Tunnels (June 2006). The Design Manual advises that this chapter describes the basis for adopting a tunnel solution, types of tunnels and factors to be considered in designing a tunnel. This chapter of the RPDM has been used as a guidance document along with other internationally recognised guidance. While the Toowong connection grade was in accordance with these design specifications, the Council has decided to remove this connection and the issue is no longer relevant to the Project.

The detail design of the works outside the tunnel portals would be in accordance with the QDMR Road Planning & Design Manual (RPDM). Codes and practices used for the design would include CPTED principles, Australian best practice urban design and landscape standards and Austroads Guide to Engineering Practice - Part 14, Bicycles. The Project will, as a minimum, replace pedestrian/cycle connections affected by the Project to existing standards and where possible enhance these connections.

B.4.2 Issue 2 – Tunnel Configuration

It was submitted that the 1.0m and 0.5m shoulders shown in the tunnel cross-sections do not provide adequate verge to accommodate any vehicle suffering a crash or breakdown. It was submitted that such an incident will effectively block the through lane, creating dangerous weaving and queuing within the tunnel and making access by rescue vehicles very difficult, especially at peak times.

Other submissions on the tunnel configuration raised the need to provide 4 traffic lanes, not 2, to cope with increasing future demand and to cope with incidents and also that a single 19m diameter tunnel would minimise vibration effects on the surface during boring activity.

Response

The main difference between a tunnel and a road in connection with incidents such as a breakdown is the level of surveillance by a traffic control and monitoring system and the emergency response. In the event of a breakdown within the tunnel, one lane would remain open to traffic. Drivers approaching the incident would also be advised of the operational status of traffic lanes through lane control signs. Emergency response procedures would be implemented to ensure that the lane is cleared and the normal operation of the tunnel is resumed as soon as practicable. In the situation of a one lane entry or exit ramp, a 4.0m lane with 2.0m inner and 1.0m outer shoulder is provided to allow traffic to pass a vehicle breakdown.

A two bore, uni-directional tunnel configuration, each carrying two lanes is provided and would be sufficient to carry forecast traffic volumes of 48,800 vehicles per day in the Design Year (2026). The

tunnel cross section for the Project has been developed using internationally recognised guidance and is consistent with the standards applied across all TransApex projects.

In recent years, larger diameter tunnels have been possible to construct, mainly through improved construction techniques and development of larger Tunnel Boring Machines (TBM). However, there are potential construction difficulties with larger diameter tunnels (e.g. 19m as proposed by the submitter) including TBM operation, risk of settlement and problems constructing the tunnel lining.

B.4.2 Issue 3 – Alignment of Tunnel Ramps – Toowong Connections

Concern has been expressed by the owners of property at Victoria Crescent, Toowong, in relation to the potential destabilisation of the house and proposed swimming pool and the associated noise and vibrations (during construction and ongoing with tunnel use), based on the identified minimum depth of the tunnel access ramps beneath the property of some 10 metres.

Response

The Toowong EIS Reference Project ramp tunnel was a two-lane tunnel with an excavated tunnel width of 13.5-14m. Based on this, and the known geological conditions, the EIS undertook an assessment of the tunnel excavation induced settlement impacts on the existing properties on the surface. As indicated in the EIS Volume 2 (Map No. EIS-SC-01), and based on the EIS Reference Design of the Toowong Ramp tunnels, the existing surface in the vicinity of the property in Victoria Crescent was predicted to settle vertically by approximately 5-8mm. Given the small levels of potential settlement it would be likely that the predicted damage level to structures (including swimming pools) at this property would be negligible.

As outlined in the EIS, all buildings and structures within the areas where surface settlements and possible damage are predicted would have a building condition survey completed. Surveys and other displacement monitoring would be used to monitor the effects of settlement, if any, from tunnelling. The actual settlements would be compared to predicted settlements and further mitigating measures taken where adverse departures from predictions are noted.

The construction noise and vibration modelling undertaken for the EIS indicated that the properties referred to in the submission would experience both vibration and regenerated noise during construction of the tunnel ramps, including:

- A maximum predicted vibration of 0.1mm/s – This level of vibration is considered not perceivable. A level of 0.15mm/s is regarded as being at the threshold of perception, and 1.0mm/s being noticeable. A continuous vibration level of 5mm/s is regarded as a trigger level for possible cosmetic damage to residential buildings. Generally, sleep disturbance may result if the vibration levels from a continuous source are higher than 0.5 mm/s which is predicted to be the case for several residences above the mainline TBM tunnels. It should be noted that the 0.5 mm/s night-time guideline vibration level for Northern Link is conservatively low and some people may be comfortable with higher levels.
- The maximum predicted regenerated noise is 46 decibels (dBA) - "audible" and a (minor) 1dBA exceedance of the nominated sleep disturbance goal (45dBA). A person's ability to sleep is perhaps the most important value that can be impacted by noise and/or vibration. Noise and vibration effects on sleep are generally referred to as sleep disturbance. (Both the Brisbane City Council's Noise Impact Assessment Planning Scheme Policy (NIAPSP) and the Queensland

Environmental Protection Agency's Ecoaccess Guideline Planning for Noise Control recommend maximum internal noise levels in sleeping areas to avoid sleep disturbance – it is from these documents that the 45dBA measure comes from). This would trigger a range of mitigation measures including monitoring to confirm that the predictive modelling is accurate for the detailed design, altering the construction methods and temporary relocation of residents during the affected construction period.

Depending upon the approval of the Project and the further stages of detailed design, detailed analysis and predictive modelling will be required to be undertaken for properties that are likely to be adversely affected by the final design and alignment. Further, building condition surveys, which would include assessment of substantial property assets, such as swimming pools, would be undertaken, and appropriate measures would need to be undertaken to protect or reinstate such assets from any damage caused by the proposed construction. In the event of any damage, the contractor will be required to 'make good' the property.

During the operation of Northern Link, the EIS predicts that noise and vibration passing through the tunnel lining and 10m of rock would not be discernible from background levels.

A 10 metre tunnel depth may constrain the future development of land zoned for higher density residential or commercial use where basement depths for associated foundations and underground services such as car parking may be restricted by the location of the tunnel.

Council has now however, decided to proceed with the Project without the local connection at Toowong and the concern raised in the submission in relation to the effect of the construction of the tunnel connection ramps is no longer relevant to the Project.

B.4.2 Issue 4 – Design of the Surface Connections – Western Connections

A submission has expressed a number of issues associated with the connection to the Western Freeway as indicated on the EIS Reference Design. These include:

- The Northern Link portals on the outside and HOV lanes on the inside offers little advantage to those entering the motorway from Moggill Road i.e. 1km max usage of HOV facility.
- Inner Orbital precedence and connection needs to be reflected in the EIS.
- Concerned with safety and efficiency of the connection as described in the EIS, particularly if the Centenary Motorway/Northern Link Interface (CMNLI) project (a 5th and 6th lane on the motorway between Moggill Road and the Northern Link ramps) does not proceed. Can four outbound lanes safely merge into two lanes without congestion? The submitter wishes to see demonstration of safe and efficient merge and diverge arrangements.
- The eastbound diverge to the tunnel drops a lane from off the Western Freeway (Planning Layout 1/11). This is contrary to government policy for no funnelling into tolled facility. The westbound merge lanes layout is poor and would undoubtedly lead to operational problems. Merging the two westbound lanes from the tunnel into the two westbound lanes from Milton Road would appear unlikely to be a workable solution. What design standards does this meet?

Response

Ongoing consultation was undertaken with Main Roads during the development of the concept design in relation to the future lane requirements for the Western Freeway. To advance the concept design for the

connection to the Western Freeway a number of design assumptions were required. An initial assumption agreed with QDMR is that the Western Freeway would ultimately provide three traffic lanes in each direction to the existing Mt Coot-tha Road roundabout. This would include two general-purpose lanes and a High Occupancy Vehicle (HOV) lane.

The combination of Northern Link portals on the outside with HOV lanes on the inside (median) was preferred, and agreed in consultation with QDMR, as it provided the following benefits:

- good quality access to Northern Link for toll road users;
- potential compatibility with the East West Link (TransApex project);
- maximises the length of HOV lanes by extending to the Mt Coot-tha Road roundabout;
- no trapped lanes are involved; and
- no right hand diverges.

To maximise the potential use of the HOV lanes, access to the HOV lanes from/to the Moggill road entry/exit and from/to the Northern Link entry/exit is provided via breaks in the HOV lane line marking.

The reference design connects into the existing two lanes each way on the Western Freeway and caters for the future upgrading to three lanes each way.

The Project assumes that the Western Freeway would remain two lanes in each direction. The eastbound diverge presented in the EIS shows that two lanes are maintained on the Western Freeway with a diverge from the nearside (outer) lane in accordance with the "Two lane Ramp Exit" given in Figure 16-22 of the Road Planning & Design Manual (RPDM). There would be no 'lane drop' or funnelling towards Northern Link.

The westbound merge from the tunnel to the Western Freeway has been increased for the Project. The section of single lane carriageway between the two-lane Northern Link carriageway and the merge with the Western Freeway outer lane has been increased from 100m to 200m. The design retains the future planning requirements of DTMR for the Western Freeway to include three lanes each way to the Mt Coot-tha Road roundabout. This arrangement meets RPDM standards for merging and inter-visibility.

B.4.2 Issue 5 – Design of Surface Connections – Frederick Street Roundabout

It was submitted that the Toowong roundabout should be reconfigured as a signalised intersection to allow safe pedestrian and cycle crossing (the flyover could remain, if necessary).

Response

The Project works do not interfere in any way with, nor does its operation require any alteration to, the Toowong Roundabout. Any alteration or upgrading of this intersection would necessarily be a part of other initiatives. At the same time, it is anticipated that the Project would remove traffic from this intersection, at least in the short to medium term, and thus provide opportunity for its improved operation.

B.4.2 Issue 6 – Design of the Surface Connections – Toowong Surface Ramps

A number of submissions raised issue with the proposed size and scale of the Toowong connecting ramps and questioned whether this scale of structure was necessary. A submission also commented on the grade of the ramps of > 5%, being relatively high for this type of facility with potential for safety and operational issues associated with sight-distance, stopping distance, and vehicle speed. A lower impact alternative should be considered.

It was also raised that the ramps provide no access to Milton Road even though Milton Road has been increased from four to six lanes.

Response

The Toowong connection presented in the EIS Reference Design necessitated the tunnel portal adjacent to Frederick Street to be located above the 1 in 10,000 year flood level. This was one of the major design constraints, which in combination with the need to maintain the existing movement on Milton Road, required the use of a flyover to connect to the Milton/Croydon Intersection. The Toowong connection was also designed to provide for approximately 30% of the Northern Link traffic catering for movements between the designated activity centres in the inner western suburbs and the ICB/Kelvin Grove Road (north).

The EIS Reference Project included a 5% uphill gradient on the overbridge structure taking the Toowong ramps over Milton Road and Sylvan Road. The grade of the elevated structure was influenced by the minimum clearance requirements and the elevation of the tunnel portal between Morley Street and Valentine Street. The geometry of the ramps complied with the requirements for a Design Speed of 60 km/hr. Queuing was not be expected to occur on the uphill section of the ramp outside the tunnel as the kerb side lane would be continued to the stop line at the Milton road and Croydon street intersection thus giving ample capacity for the double right turn movement towards Toowong Centre. Where appropriate, mitigation measures such as road marking, signage and high friction, skid resistant road surfacing could be implemented.

There would have been be minimal use of Milton Road or the adjacent local network to the north for travel access to the EIS Reference Project, with less than 1,000 vpd and 300 vpd for entry traffic and exit traffic respectively. Additionally, only 2% of the Northern Link entry traffic at the western connection would enter from Milton Road, including traffic from the residential precinct north of Milton Road, which would be able to enter the Toowong connection from Morley Street.

Council has now considered the submissions and further detailed assessment of the EIS Reference Project without local connections. Council has decided to proceed with the Project without the local connections and these design issues are no longer relevant to the Project.

B.4.2 Issue 7 – Design of Surface Connections – Milton Road

A number of submissions questioned the need for the widening of Milton Road, referring to the "10 lane" section between Miskin Street and Croydon Street. If it is argued that one of the major benefits of the project is to reduce traffic on Milton Road, why is further expansion necessary? In this regard a submission also questioned the length of the right turn lane into Croydon Street (Planning Layout 4/11) within Milton Road from Frederick Street and whether this was an indication that queues are expected to spill onto the roundabout with associated safety issues. The Project should review if

there is a need for a double right turn at Croydon Street instead of the single. One submission expressed support for the closure of the right turn from Milton to Sylvan Road while another questioned the ability to access the area bounded by Miskin Street, Ascog Terrace, St Osyth Street and Sylvan Road unless a dedicated signalised intersection was provided.

Submissions also commented that such a widening will result in additional heat radiation from the road surfaces.

Response

The proposed widening of Milton Road to ten lanes required for the EIS Reference Project's Toowong connection would have specifically occurred between Quinn Street and Croydon Street and included:

- two lanes to provide access to the tunnel on-ramp, one from Croydon Street and one from Milton Road or Morley Street
- three lanes on Milton Road heading west – one of these lanes providing left turn access into Sylvan Road;
- two lanes turning right into Croydon Street from the tunnel off-ramp;
- three lanes on Milton Road heading east – one of these lanes providing dedicated right turn access to Croydon Street - following the closure of the right turn from Milton Road into Sylvan Street.

The right turn lane into Croydon Street from within Milton Road rather than the connecting ramp provided sufficient capacity for the expected traffic volumes anticipated to 2026. A double right turn from within Milton Road to Croydon Street is not considered necessary and would have had the effect of further widening this section of Milton Road to 11 lanes.

Four of the lanes west of Quinn Street were not part of Milton Road as they formed a divided and grade separated element of the proposed tunnel ramps. The width of Milton Road, west of Quinn Street was 6 lanes, separated by on and off-ramps from the tunnel connection. During development of the Toowong Connection it was considered that it would be preferable to co-locate these ramps within existing surface road infrastructure rather than creating new road infrastructure through residential areas.

The expansion of Milton Road between Croydon Street and Sylvan Road would have been required to cater for the existing and future traffic movements on Milton Road and to accommodate the Toowong connection entry and exit ramps.

Heat is generated from all surfaces that absorb and reflect heat energy in an urban area where there is a large area of paved surfaces and building facades. A 10-lane road could contribute slightly to the overall heat in an urban area. Unless standing on the road surface, it is unlikely that residents adjacent to the Toowong Connection would experience elevated temperatures from a specific source such as a nearby road pavement. Substantial shading would also have been provided by the connecting ramps.

In consideration of the EIS Reference Project, the EIS, and these and other submissions, Council has decided to proceed with the Project without the local connections and these design issues are no longer relevant to the Project.

B.4.2 Issue 8 – Design of Surface Connections – Property and Access Milton Road

A number of submissions raised issues concerning the effect of the local connection on properties along Milton Road and their associated access, including:

- The need for resumption of 512 Milton Road is inconsistent with advice that no properties on Milton Road east of Croydon Street would be required.
- If an additional lane is added [on Milton Road], it will quite possibly make it impossible to access the property [524 Milton Road], given the grade/slope of the site and the steepness of the existing driveway. The widening of Milton Road heading outbound up to Croydon Street is unnecessary. The road is wide enough now. They are going to widen the road to put in a row of trees. The owners suggest that a slip/access lane is created so that the property can be accessed. Depending on the area to be resumed, increased noise, signage and visibility issues are anticipated.
- The EIS does not address access to the property at 555 Milton Road, Toowong. The only option to access this property is to either turn right into the property from the westbound direction (therefore crossing over eastbound lanes) or by driving directly across from Quinn Street. With Quinn Street becoming a cul-de-sac and the plan to place concrete barriers down the centre of Milton Road access to the property would be removed. Suggest that the requirement for the driveway be redesigned to allow for entrance via the eastbound lane or the ability to enter the property from a rear entrance from Morley Street.

Response

Properties along the southern side of Milton Road, east of Croydon Street, were notified in May 2008 as being of interest to the EIS Reference Project. This was due to the EIS reference design proposing the widening of Milton Road along its southern boundary between Penrose Street and Croydon Street to accommodate an addition standing lane and a further lane, between Eldridge Street and Croydon Street, to accommodate the dedicated left turn into Croydon Street. Only where the required road widening would sever significant improvements to the existing properties would a full take of the property have been required. Generally, the impact of the EIS reference design widening would have only required a part take of the property frontage along Milton Road. Further discussions with the owners of 512 Milton Road advised that a potential compulsory acquisition would be required for a whole take should the existing main improvement to the property have been severed by the EIS reference design. The issues associated with access to 524 Milton Road, including the potential for a slip lane from Milton Road would have been subject to detailed design development during the next stage of the EIS Reference Project.

Access to 555 Milton Road was identified in the EIS reference design as a left in/ left out only off Milton Road. It would remove the current access arrangement from the westbound lane, across two eastbound lanes, which is an unsafe movement, as is the uncontrolled crossing of Milton Road from Quinn Street. A safer access movement is achieved via a U-turn at the Frederick Street roundabout and a left turn into the property from the outer lane. The detailed arrangements of the access would have be en identified in the detailed design stage.

Discussions with property owners to date have been on the basis of the EIS Reference Project. The need for the widening of Milton Road to accommodate the third out-bound standing lane would have been subject to further assessment and design development. Property requirements, including changes to access, would not have been confirmed until the detailed design stage.

Council has now considered the submissions and further detailed assessment of the Project. In weighing these competing matters, Council has decided to proceed with the Project without the local connections and these design issues are no longer relevant to the Project.

B.4.2 Issue 9 – Design of Surface Connections – Widening of Croydon Street

As well as the widening of Milton Road, submissions expressed concern with the associated widening of Croydon Street to 7 lanes, including the implication that it has been designed to increase the flow of traffic from Moggill Road through [Jephson Street] to the western links. Concern was expressed that the seven lanes finish at the junction of Sylvan Road. Croydon Street should be recognised as a key road and the Supplementary Report should include widening of Jephson Street [within the Project]. Additional traffic on Jephson Street will also make dangerous to turn into Ventnor Street.

The proposed median barrier on Croydon Street will significantly inhibit local access and mobility in the local area and should be removed from the project, including retaining the right turn out of Cadell Street, and the right turn in and out of Bayliss Street and St Osyth Street. Rat-running will be essential for Croydon Street residents to access their properties as there will be a median strip in the midline and access will only be available via a left turn in and out from Croydon Street. Safe access to properties along the eastern side of Croydon Street should require a slip lane.

The effect of the widening of Croydon Street on being able to sharply turn into local driveways including the unnamed lane that runs one way from Croydon Street to St Osyth Street is not clear in the EIS. In some parts of the EIS it is ignored and sound mitigation walls are proposed across its entrance whereas in other places it is left with the access from Croydon Street. Suggest that the access point to the unnamed lane be changed to be from St Osyth Street and use some of the resumed land at Croydon Street end to make a turning space. This would also allow sound mitigation measures barriers along Croydon Street to be continuous and more effective.

Response

Croydon Street and Jephson Street with the EIS Reference Project were forecast to experience increases in average weekday traffic in 2026 (compared to the without Project scenario). These increases ranged from 60% on Croydon Street to 28% on Jephson Street. To facilitate these increases in traffic volume the EIS Reference Project proposed widening of Croydon Street from an undivided four lane road to a divided seven lane road, with the central seventh lane providing dedicated turning into Cadell Street and Milton Road, heading north, and into the western section of Sylvan Road heading south. Upgrades were proposed to the intersections of Milton Road/Croydon Street/Morley Street and Croydon Street/Jephson Street/Sylvan Road. Signalised pedestrian crossings were provided at the Jephson Street and Croydon Street intersection.

Jephson Street and Croydon Street are four-lane City Distributors (defined in the road network hierarchy as those which provide a direct connection between the radial arterial routes or act as major connection between arterial routes and nearby residential areas). The Toowong connection ramp traffic would have been directed to these city distributor roads. Council has been actively preserving set-backs along the Jephson Street corridor over a number of years as re-development occurs in order to progressively improve the traffic capacity of this route, with or without Northern Link. Operation of the Jephson Street/Ventnor Street intersection would not have been altered by the EIS Reference Project or by any changes to traffic volumes on Jephson Street. The current left turn from Jephson Street into Ventnor

Street would have remained and the solid middle line on Jephson Street would have also remained, preventing a right turn from Jephson Street into Ventnor Street.

The left turn into and left turn out of properties on the eastern side of Croydon Street would have been preserved. The solid white line along the centre of Croydon Street which currently prevents residents from making a legal right turn into their properties would have been replaced by a central median strip that with the same legal effect as the existing solid white line. Legal and safe access to these properties in Croydon Street would therefore have remained unchanged.

Properties on the western side of Croydon Street with access directly from Croydon Street would have been acquired for the proposed widening of Croydon Street. The one way lane from Croydon Street to St Osyth Street would have been maintained in the EIS Reference Project. The lane could have been changed to a two way operation with a cul-de-sac at the eastern end utilising the acquired land on the northern side of the lane. This would have eliminated the left in movement from Croydon Street with access provided from St Osyth Street.

Council has considered the submissions and further detailed assessment of the EIS Reference Project. Council decided to proceed with the project without the local connections and these design issues are no longer relevant to the Project.

B.4.2 Issue 10 – Design of Surface Connections – North Toowong Access

The Toowong connection does not provide residents of [north] Toowong, with "local connectivity". Residents would not be able to exit the off-ramps into Morley Street, but would have to "rat run" through streets on the southern side of Milton Road. The lack of proper local connections for people who live locally is inequitable and social equity needs to be applied in terms of access to the proposed tunnel. The EIS largely ignores the rat running through north Toowong of vehicles coming from Bardon. It occurs now and can be expected to worsen as some from the north seek to gain entry to Northern Link via Morley Street and its connecting streets.

Response

The ability to provide “equitable” connections to and from the then proposed local tunnel ramps for people living north of Milton Road without creating significant impacts was highly constrained, particularly for traffic exiting the ramps and having to cross over Milton Road to access the north. The area north of Milton Road was also considered to have sufficient alternative routes to the east and the north not to justify the cost and impacts associated with providing such connections.

Council’s decision to proceed with the Project without local connectivity to the tunnels from Toowong resolves this issue.

B.4.2 Issue 11 – Design of Surface Connections – Jephson Street / Sylvan Road Intersection

A number of submissions have expressed concern that the removal of the right hand turn from Jephson Street heading north, into Sylvan Road will increase rat running in order to access the Wesley Hospital and Toowong Private Hospital, particularly through Lissner Street and Bennett Street. The right turn across the traffic to enter Lissner Street, will effectively remove the capacity of one lane of traffic. The second right hand turn from Bennett Street into Sylvan Road, is often blocked with traffic and would

thus encourage rat running. The loss of this right turn will also affect the 416 bus route. Also, traffic wishing to access Coronation Drive from Ascog Terrace will have to turn right into Jephson Street.

The need for the right-hand turn from Sylvan Road (west) into Jephson Street and for a slip left turn into Croydon Street has also been questioned given the potential reduction in traffic on this section of Sylvan Road with the closure of inbound traffic from Milton Road. The removal of these turns would provide greater safety for pedestrians and cyclists.

Response

Council has now decided to proceed with the project without the local connections and as such, there will be no change to the layout or design of the local road network, including Jephson Street and Sylvan Road, as a result of the Project.

B.4.2 Issue 12 – Design of Surface Connections – General Traffic Disruptions

A secondary access point at Toowong would lead to nine permanent disruptions to the flow of local vehicular or pedestrian traffic affecting Milton Road, Morley Street, Croydon Street, St Osyth Street, Bayliss Street, Sylvan Road, Valentine Street, Quinn Street, Frederick Street and Gregory Street.

Response

Council has now decided to proceed with the project without the local connections and as such, there will be no change to the layout or design of the local road network as a result of the Project.

B.4.2 Issue 13 – Toowong Connection Pedestrian/Cycle Connectivity

The Toowong connection with its anticipated increase in traffic on Milton Road, Croydon Street and Jephson Street, together with the widening of these roads would discourage active and public transport in Toowong, by making it more difficult and less inviting to walk or cycle around the suburb. The proposed plans have not addressed these issues and are inadequate for people wishing to access public transport or local facilities by foot.

The EIS reference design does not include any crossing of Milton Road between Frederick Street and Croydon Street (in addition to the existing formal crossings) and no safe cyclist access is provided between the community north of Milton Road to the Brisbane River. The signalised intersection crossing at Croydon Street is limited to 3 of the 4 approaches and the associated level of service for pedestrians in this area will be lower than existing. The proposed local access in the EIS actually takes one of a current pedestrian access points away and makes a current problem worse. There is an unmet demand for pedestrian access currently from the Croydon Street and Milton Road intersection to the Western Freeway. More pedestrian connectivity is needed not less. Pedestrian access to Toowong State School will be very difficult for pupils who walk from the Morley Street precinct. Those who access from the Western Freeway (a sizeable proportion of pupils are driven to school from this direction) will have great difficulty in accessing the school.

Consideration should be given to the inclusion of a pedestrian overpass/underpass in the area from Morley Street precinct to Quinn Street. Suggestions also included the need for better access to local parks and the Coronation Drive bikeway including a comprehensive array of walkovers, underpasses, safety islands with traffic lights that have sufficient walk time for the local community.

Response

Alternatives to the crossing of Milton Road between Frederick Street and Croydon Street were investigated during the design of the surface connections to attempt to address the potential impacts of the loss of this connection. These alternatives included the provision of an overpass, the provision of an underpass and also an additional signalised crossing. The cost of an overpass could not be economically justified for such low movements as it would require high capital and maintenance costs. In addition, it would have safety concerns, particularly at night and the overpass would have visual impacts and require significant ramps and associated land-take due to topographic constraints. It was determined that a pedestrian underpass would not be feasible as it would require high capital and maintenance costs, be subject to vandalism and a risk to personal security associated with such a long structure. A signalised pedestrian crossing on Milton Road between Frederick Street and Croydon Street would cause potential queuing at the Frederick Street Roundabout and at the Milton/Croydon Intersection and this would be unacceptable to both QTMR & Council.

In consideration of these submissions and other matters, Council has decided to proceed with the project without the local connections and as such, there will be no change to the existing pedestrian and cycle connectivity in the area affected by the local connection previously proposed in Toowong.

Pedestrian and cycle connectivity would be provided from the west through the provision of safer pedestrian and cycle crossings across Dean and Miskin Streets and the enhancement of the off-road bicycle path from Sylvan Road to the realigned Western bikeway and the pedestrian and cycle overhead crossing of the Western Freeway constructed by QDMR. The existing connectivity and function of the Western Freeway bikeway would be maintained as would the connectivity and functionality of the Cycle and Pedestrian Bridge.

B.4.2 Issue 14 – Cycleways on Milton Road and Croydon Street

Cycleways should be included along Milton Road and Croydon Street linking the western freeway cycleway to the river through the centre of the neighbourhood.

Response

The on-road bike paths on Sylvan Road and its connectivity with the Western Freeway and the Bicentennial bikeway would not be impacted by the Project.

B.4.2 Issue 15 – Toowong Connection Design – Community Severance

The Toowong local access, by the very nature of its design, will fragment and divide the community. It will involve the loss of public spaces, the loss of access to facilities and services and the proposed introduction of commercial areas in a predominately suburban environment. The closure of Valentine Street limits permeability. The park at Toowong is reduced by approximately half its area and there appears to be no offsetting enhancements proposed. The Project would not maintain safe and equitable access to Community Use Areas such as Toowong State School.

Response

In consideration of these submissions and other matters, Council has decided to proceed with the Project without the local connections, addressing all of the concerns raised in regard to the perceived impact of the local Toowong connection in these submissions.

B.4.2 Issue 16 – Design of Surface Connections – ICB Connections

It was submitted that the Coordinator-General should mandate that the portals at the ICB be moved further away from the Victoria Park Road/Normanby Terrace intersection, by another 400 metres, to reduce the direct effects from the combined emissions from the ICB and the tunnels (via ventilation outlet) on residents living nearby.

Response

The eastbound tunnel exit portal has been positioned in line with the Victoria Park Road intersection with the ICB to tie into the geometry of the existing ICB prior to the Inner Northern Busway overbridge which constrains the available alignment width preventing this portal being moved further east. The westbound tunnel entry portal is located some 300 m further east of the exit portal and the Victoria Park Road intersection.

Ambient air is drawn into the tunnel portals as part of the ventilation system with the effect that there are no emissions of vitiated air from the tunnel portals. Dispersion modelling of the ventilation outlet emissions and the effect on the area, which included consideration of atmospheric inversions, predicts extremely small contributions to air pollution from the ventilation outlet in the vicinity of the Victoria Park Road and Normanby Terrace intersection.

B.4.2 Issue 17 – Design of Surface Connections – Kelvin Grove

Concern was expressed that a 2 lane (general purpose traffic) exit onto Kelvin Grove Road would encourage commuter trips to the CBD and potentially disrupt CBD inbound peak flow on Kelvin Grove Road and requested analysis of demand, signal phasing and impact on both general traffic flow and public transport services on Kelvin Grove Road. It was also submitted that there is no access to the tunnel from Hale Street northbound forcing all traffic entering the tunnel from the city direction westbound to travel through the Normanby Fiveways, a notoriously congested intersection. Also that the entrance from Kelvin Grove Road outbound is entirely unnecessary since any traffic travelling northbound on Petrie Terrace could turn left into Musgrave Road and use the Musgrave Road entrance instead.

Response

A two lane exit onto Kelvin Grove Road was provided in the EIS Reference Project for standing capacity due to the controlled intersection at the end of the proposed tunnel off ramp at Kelvin Grove Road. The capacity of the off ramp, and the presumed "encouragement of commuter trips to the CBD" would have been governed by the single lane diverge from within the mainline tunnel providing access to the Kelvin Grove Road exit. This exit provided for the continuation of this single lane to Kelvin Grove Road north through an uncontrolled slip lane. Due to the signalised control of the traffic from the tunnel ramp having to cross Kelvin Grove Road to access both the Kelvin Grove Urban Village via Musk Ave and also the Kelvin Grove Road southbound, two lanes were provided to avoid queuing back into the tunnel ramp. The two lanes were not provided to encourage commuter trips into the city as submitted.

Access to the tunnel from Hale Street was not provided as it would have presented an unsafe weave movement on the exit ramp east of Musgrave Road. The tunnel entry from Kelvin Grove Road outbound provided access from Petrie Terrace and beyond. Removing this connection would not have been viable as its removal would have directed additional traffic to the Musgrave Road exit ramp.

Council has now considered the submissions and further detailed assessment of the Project. Council has now decided to proceed with the Project without the local connections and these design issues are no longer relevant to the Project.

B.4.2 Issue 18 – Kelvin Grove Local Road Networks – Victoria Park Road

Submissions varied on their attitude to the reference design maintaining the left in / left out access from the ICB to Victoria Park Road. The Kelvin Grove Urban Village expressed support for the maintenance of this access while others expressed the desire to make Victoria Park Road a cul-de-sac at the ICB end or an exit only onto the Inner City Bypass.

Response

The Project maintains the existing left in / left out access from the ICB to Victoria Park Road. Urban mitigation works for Victoria Park Road identified in the EIS and reiterated in Chapter 4 of the supplementary report include streetscape development through the provision of build outs and tree planting to side streets between Maidstone Street to the ICB, subject to consultation with the local community and detailed design. Such consultation would also include matters of local area traffic management to balance the need to maintain this existing access with the inevitable impacts to local residents living alongside Victoria Park Road.

B.4.2 Issue 19 – Kelvin Grove Local Road Networks – Victoria Street Precinct

A number of submissions raised concern over the Reference Design's closure of local roads providing access to and from the western side of Kelvin Grove Road in the vicinity of the tunnel portal. Residents in the Federal Street and adjacent street area will no longer have vehicular access to the Kelvin Grove shopping centre which will significantly and adversely impact business owners. The project severely reduces local connectivity and severs communities via the closure of Upper Clifton Terrace and Lower Clifton Terrace. The combined effect of changed traffic arrangements on Victoria Street and closures of other streets mean that local trips will be forced to circumnavigate the mega-block between Prospect Terrace and the Normanby intersection, increasing the length of local trips.

Response

The left in/left out movement would have been removed from the Kelvin Grove Road and Victoria Street intersection for the EIS Reference Project as it would conflict with the northbound tunnel exit ramp merge and would result in potential traffic accidents. Residents of Federal Street and the surrounding area would have had access to the Kelvin Grove Shopping Centre via Prospect Terrace, Kelvin Grove Road and Blamey Street. Alternative access from Victoria Street to Kelvin Grove Road Urban Village would have been achieved via the signalised intersection of Prospect Terrace and Kelvin Grove Road. Additionally, the volumes along Victoria Street with the EIS Reference Project would have been reduced.

Direct access to Kelvin Grove Road from Lower Clifton Terrace would have been removed to provide for the Kelvin Grove tunnel ramp connection. Currently, there is no direct access from Upper Clifton Terrace to Kelvin Grove Road and no direct access was provided for in the EIS Reference Project due to differences in levels between the two roads. It would have been unsafe to maintain the existing connection to Lower Clifton Terrace. Alternate access to Kelvin Grove Road would have been available via Musgrave Road.

Council has now decided to proceed with the Project without the local connections and there will be no change to the layout or design of the local road network as a result of the Project.

B.4.2 Issue 20 – Kelvin Grove Road – Pedestrian and Cycle Connectivity

Significant concern was raised regarding the perceived lack of proposed works brought by the Project to enhance opportunities for the non-vehicle (pedestrian, cycle, disabled) connections in the Kevin Grove area. The current tunnel portal infrastructure designs will lead to a lower standard of amenity for the non-motorised users of the ground plane around the tunnel portals at Kelvin Grove. The designs deliver no improvements in pedestrian, bicycle or disabled access to the City from the Kelvin Grove Urban Village or other areas to the north of the tunnel portals. They also contain no specific designs for improvements in amenity for crossing Kelvin Grove Road or accessing the Normanby Fiveways Busway Station. The Coordinator General should require the Northern Link tunnel project to include in its scope of works the provision of significantly improved surface connections between areas to the east and west of Kelvin Grove Road and to the west side of the city, overcoming the physical barriers of the ICB and Hale Street Underpass. It is also essential that the pedestrian overpass to Brisbane Grammar playing fields is not compromised and remains open at all times.

Response

Council has decided to proceed with the Project without the local connections and as such, there will be no change to the existing pedestrian and cycle connectivity in the area affected by the local connection previously proposed in Toowong and Kelvin Grove.

As raised in the EIS, Chapter 20, the existing absence of pedestrian and cycle linkages to transport nodes such as the Normanby busway station, and to other communities such as Red Hill and Paddington, are of concern. The consultation process during the EIS indicated a desire for enhanced pedestrian and cycle connectivity from Kelvin Grove Urban Village, Normanby Terrace and the QUT campus south to the Normanby busway station and to the west towards Red Hill and Paddington.

The pedestrian overpass to the Brisbane Grammar playing fields would remain open and in operation during the construction of the Project. Some changes to the alignment of the access pathway may be required during construction of the works in this area, however access would be maintained at all times.

The EIS also identified merit in further detailed planning and design to support development of a pedestrian and cycle scheme which provides a safe and convenient access from Kelvin Grove Road south to the Normanby busway station and west to Lower Clifton Terrace. The program, funding and responsibility for delivering these connections should be determined by the Queensland Government in consultation with the Brisbane City Council. Such works also need to be considered in the context of the City West – Smart City initiatives.

B.4.2 Issue 21 – Design of Surface Connections – Impact on Properties

When the temporary access is no longer required for Upper Clifton Terrace and a new footpath and buffer zone is completed, it is requested that a similar fence be provided to protect our house in Westbury Street from pedestrian and bicycle traffic. The proposed plan for temporary access and future footpath needs to be amended to provide for a reasonable buffer between new works and our house to give us security and privacy.

Response

Council has decided to proceed with the project without the local connections and there will be no change to the access to Upper Clifton Terrace from Kelvin Grove Road or in Westbury Street as a result of the Project.

B.4.2 Issue 22 – Ventilation Stations and Outlets – Reference Design

A number of general issues were raised in relation to the proposed reference design location and dimensions of the western ventilation station and associated outlet including visual impact, scale of the structure in relation to an area renowned for its botanic and visual appeal, should be relocated to the western end of the study corridor, height of the ventilation outlet, stacks need to be taller than valley sides to take advantage on natural atmospheric dispersion, and should be filtered or space provided now for future retrofitting of filtration equipment.

Response

The proposed positions for the ventilation outlets are shown in Chapter 4, Figs 4-12 and 4-13. The western outlet would be 20m above the existing ground level at the designated location and the eastern outlet would be 15m above the existing ground level at the designated location.

The ventilation outlets and associated buildings are proposed on sloping ground allowing for partial burial into the existing slope in order to minimise the visual impact and provide for some degree of stacking of the extraction fans to reduce the building footprint.

Provision would be made at each of the sites for the possible future installation of filtration equipment. Locating the ventilation outlet further to the west to the limits of the study corridor would have significant impacts on construction and operation costs which do not make such locations feasible.

B.4.3 Project Delivery Mode

B.4.3 Issue 1 – Opening Year

A submission questioned that forecasting of traffic demand modelling has been carried out for the year of opening 2014 while Chapter 4 described commissioning as June 2013. The submission requested clarification regarding the date of commissioning/opening and consistency between text, and modelling to support validity of conclusions.

Response

The estimated time of commissioning would be 2014 based on a Design & Construction period of 45 months starting from late 2010. This schedule is subject to EIS evaluation and completion of the tendering process.

B.4.3 Issue 2 – Preliminary Works

A submission suggested that plantings and other mitigations and/or enhancements that are recommended in the final design should be finished as early as possible, and preferably before major works are begun.

Response

Many of the urban mitigation measures and associated project works, including landscape design treatments are not subject to detailed design packages until later in the construction phase of the project.

Many of these mitigation works are also subject to consultation processes with relevant stakeholders and asset owners beyond the construction area and while design development of these measures should be undertaken earlier rather than later, the likely works would not be implemented until relevant construction works are completed. However, environmental mitigation measures, including temporary noise and safety barriers within the boundaries of the construction and worksite areas, as identified in the design and construction environmental management plan and associated sub-plans and procedures, would be implemented, as required, prior to the commencement of major works.

B.4.3 Issue 3 – Access to Western Worksite

It was submitted that access to the western worksite via a left in / left out arrangement from the Western freeway would be unacceptable on the basis of road safety and congestion impacts. It was submitted that the vehicles exiting the motorway work site would have little acceleration and sight distance before entering the motorway and intersection and that this could create safety and operational issues due to the large speed differential between vehicles.

Response

A construction entry to/exit from the western worksite is proposed approximately 400 m southwest of Mt Coot-tha Roundabout. Proposed access to the western worksite from the Western Freeway would be by way of a standard taper and deceleration lane, which would be separated from the main carriageway by a physical barrier. Proposed egress from the western worksite to the Western Freeway would be by way of a simple junction to the nearside (outside) lane of the freeway.

As the exit from the Western Worksite would be 400 m (approx), from the stop line at the roundabout, the speed differential is expected to be low. Consultation with QTMR would be required in developing proposals for traffic management at all stages of construction adjacent to the Western Freeway. The approved Construction Traffic Control Plan would define the level of provision of temporary traffic control measures at the site to control vehicle speeds on the approach to the roundabout and maintain road safety for all road users.

B.4.3 Issue 4 – Access to Toowong Worksite

The vehicles exiting the Toowong work site have little acceleration and sight distance before entering Frederick Street and Milton Road. This can create safety and operational issues due to the large speed difference between vehicles.

Response

The Council has decided to proceed with the Project without the local connections and there is no longer a requirement for a Toowong worksite off Milton Road.

B.4.3 Issue 5 – Acoustic Enclosure of Construction Sites

The EIS does not mention any covering over all or part of the actual construction site at the ICB connection (as opposed to that at the Kelvin Grove Road site, where a very large acoustic structure is proposed). It is recommend that the Coordinator-General should mandate the need for all actual construction sites to be covered as early and as far as possible, to mitigate effects on nearby residents. In addition, the after hours spoil removal and work proposed are excessive and should be reduced and the entry /exit to the work shed should be redesigned to avoid the trucks having to reverse and the beeping noises this will cause.

Response

The ICB surface road works will be constructed in various stages, interacting with and maintaining the existing traffic conditions on the ICB. Construction activities for works on or above the surface and which generate excessive levels of noise, vibration, dust or construction traffic movements, would only be undertaken between 6.30am to 6.30pm Mondays to Saturdays and at no time on Sundays or public holidays. There may be some exceptions to these conditions to avoid disruptions to peak traffic flows and where works involve the transport of large pre-fabricated components.

Spoil handling facilities for the handling and loading into haulage trucks servicing the underground cut and cover works between the driven tunnel portals and the cut and cover portals would be enclosed, ventilated and acoustically lined. The nature of such enclosure at the ICB portals may include the covered tunnels with the inclusion of acoustic doors to allow 24 hour underground construction and/or temporary acoustic external enclosures to provide for the removal of the TBM cutting heads, including the erection of gantry cranes to lift sections of the TBMs from the ICB connections.

B.4.3 Issue 6 – Utility Modifications

The EIS indicates a number of utilities will need to be replaced, modified or relocated during the construction phase of the project. Some of these utilities provide services to the Royal Brisbane and Women's Hospital and Royal Children's hospital. It is essential that the services to these facilities are maintained at all times or temporary measures implemented to ensure continuity of service.

Response

The relocation, modification or replacement of public utilities would be undertaken in the early stages of the Project with no or minimal disruption to existing services. Any relocation of critical services would be carried out in consultation with the relevant authorities.

B.4.3 Issue 7 – Mainline Tunnel Construction – Grout

Grout may emerge on the surface of Toowong cemetery in areas where the cover is minimal during the very early stages of excavation. Such grout fills voids. In the case of the cemetery, this may include cavities in some graves and some grout may find its way to the surface.

Response

Grouting within the mainline tunnel in the vicinity of the Toowong cemetery will be undertaken behind the installed permanent support (segmental lining or cast in-situ concrete lining). The purpose of the grout is purely to fill the annulus (void) between the excavation and the permanent support and as such, grouting for this purpose is only installed under low pressures. These low pressures will be lower than the overburden pressure from the weight of soil/rock above the tunnel, and therefore grout will not emerge on the surface of the Toowong Cemetery, nor within graves.

B.4.3 Issue 8 – Rehabilitation of Toowong Worksite

The EIS reference design shows that the residual land between Valentine Street and Morley Street (the Valentine Street Triangle) would be regenerated into parkland, but this "park" area would have extremely high noise levels (between 68 and 78 dBA), and therefore would have low amenity and not be an enjoyable place to visit. Section 3.5 of the Department of Main Roads' Road Traffic Noise Management Code of Practice (2008), the recommended maximum road traffic noise levels for passive recreational reads is 63 dBA LA10 (12hr) over a 10 year horizon.

Response

The Council has decided to proceed with the Project without the local connections so resolving this issue.

B.4.3 Issue 9 – Construction Traffic Staging (Western Worksite)

Based on the construction stages provided, it would appear that the northern approach at the intersection (roundabout) with the Western Motorway is losing significant capacity in Stages 1, 2, and 4. (EIS-TM-01, EIS-TM-02, EIS-TM-04). Furthermore, queue storage area is significantly reduced in Stage 1.

The roundabout proposed in all stages EIS-TM-0, EIS-TM-02, EIS-TM-03, EIS-TM-04 could produce a relatively high number of collisions at the western departure between southbound right-turning and westbound right-turning vehicles.

In Stages 2 and 4, (EIS-TM-02, EIS-TM-04), vehicles travelling through on Mount Coot-tha Road have a broad straight path and could cause collisions by not seeing the roundabout and crashing with circulating vehicles during lower volume periods.

Response

The construction staging sketches included within the EIS show major traffic stages only and they are not fully representing detailed lane widths/extents etc. They show a proposed sequencing of traffic movements and staging of the construction of the Northern Link works.

Section 5.7.3 of the EIS states the following "At the Mt Coot-tha Roundabout construction of cut and cover tunnels would require the temporary re-alignment of traffic lanes during the staged construction process. It is proposed that the construction of the cut and cover tunnels would start in May 2011 and be completed by October 2012 and would be carried out in four stages. The existing number of traffic lanes and connectivity would be maintained with the exception of the free flow slip through the Mt Coot-tha Roundabout from the north to the east. This would be closed for a period of time during Stage 1 construction. A short left turn pocket on the approach to the roundabout would be provided which is not expected to have an impact on the capacity of the Western Freeway." Note that it states that the existing number of traffic lanes and connectivity would be maintained, with the exception of the current free flow slip through from Mt Coot-tha Road. An additional traffic stage may be required in Stage 1 during the detailed design that would minimise the duration that the northern approach capacity is reduced.

Section 4.3.17 of the EIS states that “Construction would need to proceed in accordance with a Construction Environmental Management Plan (EMP) and a Construction Traffic Management Plan (CTMP). The CTMP would be prepared in consultation with Queensland Transport, Department of Main Roads and Brisbane City Council to address and manage construction traffic issues.”

QTMR would be consulted in developing proposals for traffic management at all stages of construction adjacent to the Western Freeway. Construction Traffic Control Plans (CTCP) would be prepared for each construction sequence identified in CTMPs or major change in site traffic provision. The CTMP would define the level of provision of temporary traffic control measures at road work sites to control vehicle speeds and maintain road safety for all road users.

Specific detailed construction staging of the works would be developed to comply with the above requirements of the EIS and these construction stages and detailed traffic assessments (including such

things as turning movement counts, design vehicle swept paths, upstream effects of queue lengths, and expected construction zone related capacity loss with the analyses) will be included in the CTMPs which would be submitted both to BCC and DTMR for approval prior to construction of the works commencing. In addition, Road Safety Audits would be required during construction in connection with all temporary road layouts.

B.4.3 Issue 10 – Construction Traffic Staging (Road Marking)

The road marking shown for the northern approach during Stage 3 guides through motorists using Mount Coot-tha Road through the roundabout as opposed to the continuous slip lane. In addition, the lane markings shown for the south-eastern approach appear to guide vehicles onto the Western Motorway. The motorists are most likely turning right, as vehicles accessing the Western Motorway are expected to use the continuous slip lane provided.

The road marking shown in Stage 4 has inappropriately placed solid road marking around the south-eastern and northern departures.

Response

This issue is noted and would be addressed in the detailed design. The intention of the RD-TM Series of reference design drawings is to indicate possible construction staging and traffic management.

B.4.3 Issue 11 – Issue Construction Traffic Staging (Protection from Hazards)

The Stage 4 plan features a below-grade construction zone in the centre island of the roundabout which is a high-severity hazard.

Response

Access to the worksite within the central island would be cognisant of the need to maintain an acceptable level of operation and the safety of all road users.

The CTCP would include proposals for gaining construction access to the central island of Mt Coot-tha Roundabout and mitigation measures to prevent all vehicles other than construction vehicles entering the worksite. These measures may include but are not limited to safety barriers, road lighting, hazard lamps, road marking, signage and high friction skid resistant road surfacing.

Road Safety Audits would be required during construction in connection with all temporary road layouts including maintenance of adequate sight distance for all vehicles approaching the intersection.

B.4.3 Issue 12 – Construction Traffic Staging (Reinstatement of Mt Coot-tha Roundabout)

Note 3 on the Stage 4 plan (EIS-TM-04) states that the existing roundabout scenario would be reinstated after construction works were completed. BCC should provide recommended design alternatives and corresponding analysis for the reconstruction of the existing intersection.

Response

The Project would provide an opportunity to upgrade the existing junction to improve the operation and road safety at the roundabout. The geometry of the roundabout after construction of the project should allow for reassigned traffic as a result of Northern Link.

The construction of the large diameter circulatory carriageway of the new roundabout would be implemented at Stage 4 of the staging of the Western Freeway Connection in order to allow for the cut and cover works through the existing roundabout. This enlarged central island would have the potential to improve road safety and operation at the roundabout and would allow for further improvements by upgrading the geometry of the approach & departure flares connecting to the roundabout should it be decided to retain the proposed temporary layout in consultation with DTMR during detailed design.

B.4.3 Issue 13 – Construction Staging (Frederick Street Roundabout)

The plan (TM-05) indicates that the circulating lanes on the eastern side of the roundabout would be closed. This would create significant adverse safety and operational effects to the surrounding road network.

The plan (TM-06) does not adequately show how the temporary eastern departure from the Frederick Street roundabout ties into the circulating carriageway of the existing roundabout – detail significantly lacking. In addition, concerned that there may not have been traffic analysis to support a poorly detailed proposal.

The adjacent overpass structure construction and horizontal alignment of the eastern approach during Stage 2 could create sight distance issues for approaching and departing vehicles. This could lead to an increase in rear-end collisions as drivers approach queues.

Response

It was not the intention of the EIS Reference Project that the circulating lanes on the eastern side of Frederick Street Roundabout would be closed. The existing line-marking of the Frederick Street roundabout on the circulating roadway would have remained.

Council has decided to proceed with the Project without local connections at Toowong. Consequently, there will be no physical changes to the Frederick Street roundabout, including during construction.

B.4.3 Issue 14 – Construction Staging (Milton Road / Croydon Street Intersection)

The eastbound right turn storage at the Milton Road/Croydon Street intersection appears to be relatively short compared to Stage 3. This could cause eastbound congestion on Milton Road back through to the motorway.

The right turn storage for the eastbound approach at the Milton/Croydon intersection extends almost completely to the Frederick Street roundabout. Is this an indication that queues are expected to be that long and they could possibly spill into the roundabout and therefore cause queuing on Frederick Street and the motorway?

Response

The Council has decided to proceed with the Project without the local connections thus resolving these issues.

B.4.3 Issue 15 – Construction Staging (Safety)

The location of the bus stop on westbound Milton Road requires two merges. This would provide unsafe and inefficient operation. BCC to review plans (EIS-TM-05, EIS-TM-06, EIS-TM-07) in conjunction with existing, build-out, and design year traffic volumes with local transit agencies. BCC to provide results and discussion.

Response

The Council has decided to proceed with the Project without the local connections removing any potential impact on existing bus stops on Milton Road.

B.4.3 Issue 16 – Construction Staging (Public and Active Transport)

It is imperative that the project proactively provides for public and active transport enhancements prior to and during construction to sufficiently offset any disruption to normal transport operations and capacity, and to accommodate growth in those trips otherwise potentially affected by the project. This is not adequately reflected in the traffic management plan provisions. A local access management scheme is needed, as suggested in the EIS, but this should be instituted before work on Northern Link begins, especially in the vicinity of the portals.

Response

Construction Traffic Control Plans (CTCP) would be prepared for each construction sequence or major change in site traffic provision. DTMR or BCC would be consulted as relevant in developing proposals for traffic management at all stages of construction.

Existing pedestrian/cycle connectivity would be maintained during construction. The RD-TM Series of drawings for the Project (refer Volume 2 of the Supplementary Report) have been amended to reflect the requirement to maintain existing pedestrian/cycle connectivity during construction.

B.4.3 Issue 17 – Construction Spoil – Mt Coot-tha Conveyor

The proposed Mt Coot-tha quarry conveyor is too vaguely described to provide a basis for the assessment of the noise impacts, mitigation measures and residential impacts.

Response

The majority of the spoil is proposed be taken to the Mt Coot-tha quarry via an external conveyor from the Western Freeway worksite. The conveyor would be enclosed to mitigate potential impacts from noise and dust. The conveyor would likely follow a route west from the spoil handling facility from within the enclosed work shed. This alignment would parallel the Western Freeway construction area south of the knoll with the Wall of Remembrance. It is likely that the most suitable alignment through the botanic gardens would be in line with the existing access road along the ridge just south of the grove of Bunya Pines providing access to the quarry site through the steep eastern face of the quarry.

The conveyor would require a corridor of land up to 8m wide to provide for the conveyor and an adjacent access road for construction and maintenance. The alignment would be fenced with access beneath or over the alignment provided at specific points. The conveyor would be either elevated on legs across low ground or possibly beneath ground level on high ground, the aim being to minimise grades and thus energy input to the conveyor operation. A transfer station would be required at major changes of direction, such as adjacent to the Western Freeway, to pass material off one conveyor onto

another and these facilities would be enclosed for noise and dust control. The conveyor would operate 24 hours a day provided that its operation does not exceed the goals for noise and dust generation.

Clarification on the impact assessment of the conveyor as addressed in Chapter 9 of the EIS is further provided in Appendix B 9.3 / Issue 5 of the Supplementary Report.

B.4.3 Issue 18 – Hours of Work

Workforce/working hours details, residential impacts, consultation process and mitigation measures are not addressed. Noisy works should be scheduled in holiday periods/non-school hours/weekends if possible.

Response

The likely workforce and work hour requirements are outlined in section 4.3.19 of the EIS. Further details are provided in other relevant sections of the EIS, Section 15.6 Employment and Appendix D of the Supplementary Report Section D.6, Element 1. The description of the likely workforce and hours of work, as with other descriptive elements of the project design, are used throughout the EIS where relevant to addressing the environmental impacts of the Project. These impacts have been discussed at length with the general public over the entire public consultation program.

It is acknowledged that an alternative mitigation measure for excessive noise levels at schools may be to schedule those works in holiday periods or outside school hours. Scheduling of the noisy works outside school hours is a recognised mitigation measure for sensitive sites, as addressed in the Draft Environmental Management Plan (Appendix D of the Supplementary Report).

B.4.3 Issue 19 – On-site Car Parking by Site Vehicles

Brisbane City Council work vehicles are often parked in our street when works are being done in the local area. During the construction of the Project, will we have Council work cars continually parked in our street?

Response

Some works such as alteration of the Public Utility Plant (PUP) will require vehicles owned by relevant service operators to park adjacent to work being carried out. This would be inevitable but limited only to the duration of these works.

The contractor's site vehicles and construction vehicles would park within the construction worksites. Staff vehicles would park in designated parking areas. Dedicated workforce parking facilities would be provided at the eastern end of Victoria Park between Gilchrist Avenue and the ICB. At the western end dedicated workforce parking areas would be established either in the overflow carpark across Mt Coot-tha Road from the entrance to the Mt Coot-tha Botanic Gardens or in areas along Sir Samuel Griffith Drive between Mt Coot-tha Road and Simpsons Road, or any combination of more than one of these sites where required to avoid workforce parking on local streets.

B.4.3 Issue 20 – Decommissioning Worksites

The EIS provides limited advice on commissioning a limited number of items, i.e. tolling, lighting, electrical etc but not decommissioning of worksites.

Response

The rehabilitation of construction sites is described in the EIS (Volume 1, Chapter 4, Section 4.3.16) and options for future redevelopment of specific worksites are provided in Chapter 20 of the EIS.

Worksite layouts in the EIS are indicative only and worksite design, establishment and decommissioning would be planned through detailed design. In addition, decommissioning works would be scheduled to occur when each worksite is no longer required for construction. After decommissioning, details for the rehabilitation of the three worksites are outlined in Section 14.7 of Chapter 14 of the EIS - Urban Design & Visual Environment.

B.4.4 Project Operations Mode

B.4.4 Issue 1 – Facility Management – Tolling System

The tolling system, road vehicle classification regime, needs to be interoperable with other toll roads in Australia including the North South Bypass Tunnel [CLEM7] and Airport Link.

Response

The Northern Link tolling system would be interoperable with other toll roads in Australia. Refer to the EIS, Volume 1, Chapter 4, Section 4.4.1.

B.4.4 Issue 2 – Facility Management – Traffic Management & Control System

There is no mention of planned and unplanned incident management other than fire. There is no mention of road-based enforcement measures, particularly speed management.

At the very least, the tunnel control centre needs to integrate with the Brisbane Metropolitan Traffic Management Centre. The submission requested that the tunnel control centre provide traffic incident and traveller information to the Brisbane Metropolitan Traffic Management Centre under an interface agreement between the Northern Link tunnel proponent, Brisbane City Council and QDMR.

Has the option of the Brisbane Metropolitan Traffic Management Centre hosting the Northern Link tunnel control centre been considered? Confirmation is requested of this and if it was considered and ruled out, explanation as to why it was ruled out.

The submission requires it to be a condition that it is able to restrict traffic to and from the tunnel should there be road safety/queuing/congestion issues on Milton Road or the Centenary Motorway.

In relation to an analysis of the road network sensitivity and operational vulnerability due to incidents - What penalty regime would be instigated against the PPP Co in the case of asset/system withdrawal? Requests a sensitivity analysis and system reliability measures to articulate the necessary performance required and the design criteria, including the penalty regime in the case of asset/system withdrawal.

Response

The traffic management objectives for the toll road during the O&M Phase are to:

- maximise safety on the toll road and the surrounding road network;
- maximise toll road and surrounding road network throughput and efficiency;

- minimise time to clear incidents;
- minimise delay, disruption and variability of travel times for passenger, freight and commercial travel;
- keep relevant Authorities informed of all current operating conditions and provide motorists and road user information;
- maximise compliance by toll road users with traffic laws; and
- respond to surrounding road network requirements.

The management of all planned and unplanned incidents in the tunnels would be through the Tunnel Management and Control System as described in the EIS (Volume 1, Chapter 4, Section 4.4.1 Facility Management – Traffic Management and Control System (TMCS)). The requirements of this system are further outlined in the Draft Outline EMP (Operation) (Supplementary Report, Appendix D, Section D.7, Element 7, Hazard and Risk) where the requirement for adjustable speed limit signage is identified as a specific requirement. More specific technical and operational documentation of this system would be produced in the tendering phase and in the subsequent detailed design phase of the Project.

B.4.4 Issue 3 – Traffic Management and Control System – Recommended Conditions

A submission has recommended the following conditions be applied to the Project in relation to the traffic management and control system.

"Brisbane City Council will be responsible for any modification or additional elements to the existing traffic management and control system used to operate the Brisbane metropolitan road network (including the systems at the Brisbane Metropolitan Transport Management Centre) required due to the addition of the Northern Link Tunnel to the road network.

To ensure the safe and efficient movement and management of all traffic and road users, Brisbane City Council must prepare, implement and operate a Traffic Management and Traffic Control System for the Northern Link Tunnel and surrounding road network that is impacted by Northern Link traffic.

Brisbane City Council must develop an incident management system to manage any planned or unplanned incident or event that has an impact on the normal traffic flow on the Northern Link or on the surrounding road network.

The system must be structured to integrate with other incident management and control systems utilised by Brisbane City Council and QDMR (including the systems at the Brisbane Metropolitan Transport Management Centre) to manage the road network. The identification of incidents will be developed through a comprehensive risk and evaluation process.

Operational and Incident Management and Control Systems will need to be programmed in consultation with stakeholders. All systems will be subject of an interface agreement between the Northern Link Tunnel proponent, Brisbane City Council and QDMR. Together these documents will provide detailed operational protocols that describe how the Northern Link tunnel operators would interact and cooperate to operate the road network safely and efficiently.

Brisbane City Council must acknowledge in the operating plan that QDMR retains the right to restrict traffic to and from the tunnel should there be significant road/safety/queuing/congestion issues on Milton Road and or the Centenary Motorway.

If QDMR considers, in its absolute discretion, that the operating plan would have one or more of the adverse effects described in this condition, Main Roads may, by notice in writing to Brisbane City Council, require Brisbane City Council to amend the operating plan as specified and Brisbane City Council must amend the operating plan accordingly. Brisbane City Council must act consistent with the operating plan."

Response

As stated in these recommended conditions, the Operational and Incident Management and Control Systems will need to be programmed in consultation with stakeholders. All systems will be subject of an interface agreement between the Northern Link Tunnel proponent, Brisbane City Council and DTMR. Together these documents will provide detailed operational protocols that describe how the Northern Link tunnel operators would interact and cooperate to operate the road network safely and efficiently. It would be premptive to acknowledge the rights of any party to restrict traffic to and from the tunnel outside this interface agreement and associated detailed operational protocols or operating plan.

B.4.4 Issue 4 – Tunnel Ventilation – Design

The tunnel section of Northern Link [mainline tunnel] is 4.3km long, which is longer than the M5 East tunnel. It is therefore important that the design for Northern Link incorporates at the outset suitable measures that will overcome and avoid the pollution episodes experienced with the M5 East tunnel. The EIS has only given a brief explanation of the in-tunnel air quality using only one type of ventilation system that is a longitudinal system. Other systems are available such as transverse system. Some discussion could be included about the in-tunnel air quality that could be achieved using different ventilation systems.

Response

The Permanent International Association of Road Congresses (PIARC) has recommended limits on the concentrations of emissions within a tunnel and the following limits have been adopted for the ventilation design of NL tunnel:

- a peak of 70ppm (parts per million) of CO, with a peak of up to 90ppm during extreme congestion;
- an average of 1ppm of NO_2; and
- a visibility limit of $0.005m^{-1}$ for free flowing traffic and $0.007m^{-1}$ for congested traffic .

On going and continuous monitoring of in-tunnel air quality would be linked to a system of traffic management to maintain appropriate traffic flows and consequent emission levels within the nominated air quality goals. Refer to Chapter 4, Section 4.4.2 of the EIS. The M5 tunnel is a longitudinal ventilation system, similar to Northern Link. However it is difficult to make comparisons as the M5 tunnel has a single ventilation outlet and transfers air from one tunnel bore to the other. Northern Link transfers air from each tunnel bore to separate (2) ventilation outlets.

Longitudinal Ventilation - Air can be drawn into the tunnel at the portals and as it moves along the roadway, vehicle emissions progressively increase pollutant concentrations so that at the point of discharge the air is fully vitiated (or "used"). Air is moved along the tunnel by a combination of vehicle induced airflow and mechanical ventilation. The tunnel air is then extracted from the tunnel and discharged to atmosphere through an elevated discharge point.

Transverse Ventilation System - A transverse ventilation system needs an extract duct along the full length of the roadway as well as a supply duct. Outside air is distributed evenly along the tunnel using a supply duct adjacent to the roadway. Air can be drawn out of the tunnel adjacent to the point of supply so that it flows from side to side or from top to bottom of the tunnel. This is known as a fully transverse system.

Semi-Transverse System - Similar to the transverse ventilation system but without the distributed extract system. The tunnel air travels along the tunnel and is either discharged through the tunnel portals or through an extraction point.

Preliminary ventilation analysis indicates that a longitudinal ventilation system can provide suitable in-tunnel conditions. Under normal operations, outside air will enter the tunnels from all portals and will be extracted from a single point within each of the tunnels. The extract points are located near exit portals. To meet the requirements to maintain inflow of air at the portals, the ventilation system needs to counteract the traffic induced airflow. Transverse and semi transverse ventilation systems do not control the airflow along the tunnel, but rather the airflow extracted from and/or supplied into the tunnel, these systems would not control portal discharge, without significant point extraction adjacent to the portals. Therefore these systems are not seen as economical in meeting this project requirement.

B.4.4 Issue 5 – Services – Tunnel Lighting

A passive (minimal energy input) tunnel lighting system should be implemented to assist in minimising the CO2-e footprint and possibly being eligible for funding under Federal Government emission reduction incentives. This would typically involve vehicle headlights, painting the tunnel roadways, walls and ceilings white (incorporating reflective microscopic glass beads or similar), road markings painted black.

Response

The tunnel lighting would comprise the base lighting system throughout the length of the tunnel with increased lighting being provided in the transition zones adjacent to the portals. The base lighting would suit illumination levels required during the day. The lighting would be able to be switched to 50% levels at night, during which time vehicle headlights would supplement the tunnel lighting system. Reflective surfaces of the light coloured architectural wall panels within the tunnels would allow a more efficient lighting design. These panels would be periodically cleaned as part of the tunnel washing process to maintain the reflective surface.

B.4.5 Infrastructure Requirements

The issue of utility modifications was addressed in section B.4.3 Issue 6 above. No other issues were raised.

B.4.6 Permits, Licences and Approvals

B.4.6 Issue 1 – EPBC

Request that the EIS be reviewed to reflect issues associated with the conveyor including EPBC Act and other government permits which would be required.

Response

As advised in the EIS, a referral was made to the then Commonwealth Minister for the Environment and Heritage under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) to determine whether the Project and its associated works are a 'controlled action' under the Act. The referral included advice that should the construction spoil prove suitable for recycling as aggregate for asphalt or road base or other industrial application it may be carried by conveyor belt into the adjacent Mount Coot-tha Quarry that is owned and operated by the Proponent. Investigations determined that the only matter of national environmental significance that was potentially affected by the proposed conveyor was listed threatened species and communities, in particular the threatened Black-breasted Button-quail (*Turnix melanogaster* – listed as Vulnerable). An investigation was undertaken within a 1 km radius of the proposed Western Freeway worksite for the this species. The proposed alignment of the conveyor would not impact directly on the specified "Essential Habitat" and there is no evidence of permanent occupation of any such small patches of suitable habitat by the Button quail east of the Mt Coot-tha road. The potential for impact of the proposed Project works, including the proposed conveyor, on this species is considered extremely low as it is not recorded from any closer to the proposed works than 1.4km, because the existing Western Freeway and other human activities like the Mount Coot-tha Quarry which would discourage its inhabiting this vicinity for any length of time.

The Delegate of the Commonwealth Minister for the Environment and Heritage determined on 6 December 2007 that the Project does not constitute a controlled action pursuant to s75 of the *EPBC Act*.

Other approvals and or Permits that may be required for the temporary construction and operation of the conveyor, identified in the EIS, include:

- operational work for the clearing of native vegetation under the *Vegetation Management Act 1999*;
- operational work of any kind that allows the taking, or interfering with, water under the *Water Act 2000*, including a Riverine Protection Permit if necessary;
- the potential for a permit for work within Brisbane Forest Park under the *Brisbane Forest Park Act, 1977* (the BFP Act) and the Brisbane Forest Park By-Law 1999.

B.4.6 Issue 2 – ERA Scale and Scope of Information

The EIS does not adequately define the scale and scope of Environmentally Relevant Activities (ERAs) required for the project. It will be difficult for the EPA (now DERM) to develop recommended conditions for these ERAs without this information. Details such as the scale and nature of the proposed work, predicted impacts on land, air, water and acoustical environmental values and proposed mitigation measures for these impacts are required.

Response

The EIS has identified the range of permits, licences and approvals required for the Project, including a description of the Environmentally Relevant Activities (ERAs), as defined at the time of the EIS, under the *Environmental Protection Act 1994*. The ERAs identified include the likely part of the project that would trigger the need to obtain the approval as required by the Terms of Reference. Details regarding the scale and nature of possible ERAs, such as chemical storage (ERA 7 – now ERA 8), the potential of sewer mining for recycled water, under sewage treatment (ERA 15 now ERA 63), the treatment of bore water under water treatment (ERA 16 now ERA 64), the processing of spoil conveyed to the quarry (ERA 22 now ERA 16) or the possible batching of concrete (ERA 62 now ERA 43) at this stage of the

Project's feasibility, are not certain. The scale and nature of the proposed ERA works, where necessary, will be addressed in development approval applications for such works as finally proposed following detailed design.

B.4.6 Issue 3 – ERA Changes to Definitions

The Environmental Protection Regulation 2008 (the 2008 Regulation) takes effect on the 1 January 2009 and replaces the Environmental Protection Regulation 1998. The 2008 Regulation contains changes to the definitions of ERAs including the ERA number. The proponent is to note the following ERAs may apply to the project:

- ERA 8 Chemical Storage, consisting of:
  - 50t or more or chemicals of dangerous goods class 1 or class 2, division 2.3 in containers of at least 10 m^3; or
  - 50t or more of chemicals of dangerous goods class 6, division 6.1 in containers capable of holding at least 900kg of the chemicals; or
  - 10 m3 or more of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3; or
    - the following quantities of other chemicals in containers of at least 10 m^3;
    - 200t or more, if they are solids or gases;
    - 200 m3 or more, if they are liquids.
- ERA 63 Sewerage Treatment, consisting of operating one or more sewage treatment works at a site that have a total daily peak design capacity of at least 21 Equivalent Persons;
- ERA 64 Water Treatment, consisting of any of the following activities in a way that allows waste, whether treated or untreated, to be released into the environment:
  - desalinating 0.5ML or more of water in a day;
  - treating 10ML or more of raw water in a day;
  - carrying out advanced treatment of 5ML or more of water in a day.

Response

The above changes within the Environmental Protection Regulation 2008, have been noted and the list of project approvals has been updated the Project in Chapter 3 – Project Description the supplementary report.

B.4.6 Issue 4 – ERA 51 Road Tunnel Ventilation Stack Operation

Operation of road tunnel ventilation stacks is proposed to be included as an Environmentally Relevant Activity under the revised Environmental Protection Regulation. The submission requests that Brisbane City Council revise the EIS to include road tunnel ventilation stack operations within the scope of the Environmentally Relevant Activities requiring development approval. This means the project will require an annual operating licence at an annual cost of $7200 (based on an aggregate environmental risk score of 36 and $200 fee unit).

Response

The EIS noted in Chapter 4 that the EP Regulation, including the Schedule of identified ERAs was under review and that the Environmental Protection Agency has advised its intention to add Ventilation

Outlets from road tunnels to Schedule 1 of the Environmental Protection Regulation 2008 as an ERA from 1 January 2009. Accordingly, it was further noted that development approval would also be required for this element of the Project. It is now noted that the relevant ERA is numbered 51 and entitled "Road Tunnel Ventilation Stack Operation".

B.4.6 Issue 5 – Heritage Act

All heritage places likely to be affected are identified in the EIS and the actions proposed are outlined. The development application that precedes the work must detail the following actions and copies of any reports prepared should be supplied to DERM.

- Condition reports are to be carried out on all places prior to the commencement of the works. They will then be monitored for vibration during tunnelling under the place. Settlement will be monitored during and after completion of the works.
- During development, should damage occur to existing building fabric and/or other significant elements or artefacts, such incidents must immediately be reported to DERM confirming details of the incident.

Response

The identified requirements for development applications carried out on registered places under the *Queensland Heritage Act 1992*, prior to the work proceeding, as advised in the submission are noted and copies of any reports prepared shall be supplied to DERM.

B.4.6 Issue 6 – Vegetation Management Act

The EIS states that assessable development for operational works includes clearing of vegetation of native vegetation on freehold.

However, the *Vegetation Management Act 1999* (VMA) and *Integrated Planning Act 1997* (IPA) regulate the clearing of remnant native vegetation on freehold land (Schedule 8, Table 4, Item 1A IPA) and the clearing of remnant and non-remnant native vegetation on State land (Schedule 8, Table 4 Item 1B-1G IPA) (including council land that is not freehold).

NOTE: Any clearing exemptions sought under the VMA and IPA may be impacted upon by the zoning of the subject area under Brisbane City Council's Planning Scheme (i.e. City Plan 2000).

Response

It is acknowledged that development approval would be required before construction begins for any development defined as "assessable" under Schedule 8 of the IPA that includes operational works that involve either the clearing of remnant native vegetation on freehold land (IPA, Schedule 8, Table 4, Item 1A) or the clearing of remnant or non-remnant native vegetation on State land (IPA, Schedule 8, Table 4, Item 1B-1G), including Council land that is not freehold.

B.4.6 Issue 7 – Riverine Protection Permit

Any of the following activities proposed within the bed and banks of any reach of a 'non-tidal reach' watercourse will require a Riverine Protection Permit from NRW:

- destruction of native vegetation;

- excavation of material; or
- placing of fill material.

However, if the applicant is an 'entity' under the entity guidelines, then they will be exempt from the requirement of such a permit for proposed activities in the watercourse.

The taking of or interfering with water in any 'non tidal' watercourse will require either a Permit to Take Water (if the activity has a foreseeable end date) or a Licence to Take Water or Licence to Interfere with the Flow of Water (if the activity will be ongoing).

Any one or a combination of these authorities may be required from NRW during the course of construction of the Northern Link Tunnel. Final details of activities that are to occur in any defined watercourse, will need to be known before the need or otherwise for an authority can be determined by the department.

Response

Chapter 4 of the EIS acknowledged that assessable development for operational works also include any kind of work that allows the taking, or interfering with, water under the *Water Act 2000.* Such work may include excavation and or the placement of fill affecting a watercourse, diverting the flow of a watercourse, and the removal of vegetation within a watercourse. A Riverine Protection Permit may also be required. It is further noted that the final details of activities that are to occur in any defined watercourse will be provided to the Department of Natural Resources and Water (NRW) in order for the Department to assess the need or otherwise for an authority, including whether the final applicant is an "entity" under the entity guidelines, and would thus be exempt from the requirement for such a permit. This detail and subsequent referral fro advice or application will not be known until the detailed design stage of the Project.

B.4.6 Issue 8 – Nature Conservation (Koala)

Mitigation measures in Chapter 10 do not include a reference to Clearing Requirements under the *Nature Conservation (Koala) Conservation Plan 2006* and *Management Program 2006-2016 (Koala Plan).*

Response

There are no approvals required under the *Nature Conservation (Koala) Conservation Plan 2006* as there are no known populations of Koalas within the affected area and there are no mapped Koala habitat areas affected by the Project.

The draft South East Queensland Koala State Planning Regulatory Provisions and regulatory maps came in to effect on 12 December 2008. The draft regulatory provisions are an interim measure to provide additional protection for koala habitat located within the South East Queensland Regional Plan urban footprint. They replace the *Nature Conservation (Koala) Conservation Plan 2006* and *Management Program 2006-2016 (Koala Plan)* for development located within that area. The Department of Infrastructure and Planning is now a Referral (Concurrence) Agency under the *Integrated Planning Act 1997* for development occurring in an interim koala habitat area within the urban footprint.

B.5 Traffic and Transport

B.5.1 Approach and Methodology

B.5.1 Issue 1 – Modelling of Logan Motorway

It was submitted that the modelled area and assessment needed to incorporate consideration of the Logan Motorway. Further analysis, including modelling, was required on the freight task for the Logan Motorway and its relationship with Northern Link. The freight outcomes for Northern Link require clarification in the context of the function and role of the Logan Motorway.

Response

The road network modelled in the strategic transport model used in the EIS incorporates the Logan Motorway. As described in the EIS (Volume 1, Section 5.1.2, Traffic Modelling and Forecasting, P5) the strategic transport model used in the EIS was termed the Northern Link Traffic Model and was based upon the Brisbane Strategic Transport Model, which is widely used for assessment of traffic volumes on the Logan Motorway and Brisbane Urban Corridor (BUC).

The effect of Northern Link on total daily volumes on Logan Motorway is included in Table 5-34 of the EIS. Further information on forecast commercial vehicle volumes and total vehicles on the Logan Motorway has been extracted for time periods during the day and is summarised in **Table B-4** and **Table B-6** for the EIS Reference Project and in **Table B-5** and

Table B-7 for the Project.

The forecasts indicate that the effects of Northern Link on total and commercial vehicle use of the Logan Motorway and BUC freight routes are small, indicating that the routes perform largely separate functions and the catchments and travel patterns served by the Logan Motorway do not strongly overlap with those suited to use of Northern Link. The effects are very similar for both the EIS Reference Project and the Project.

Logan Motorway would continue to operate as the route to the Gateway Motorway for placarded commercial vehicles (i.e. those carrying dangerous goods) or over-size vehicles travelling to the Australia TradeCoast as such vehicles would not be permitted to use tunnels such as Northern Link, Airport Link or CLEM7, or generally travel within inner urban areas.

Table B-4 Effect of EIS Reference Project on Commercial Vehicle Volumes on Logan Motorway

Road	Location	Without NL				With EIS Reference Project				% Difference			
		AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs
2014													
Northern Link	Main Line					600	1,100	400	2,000				
Logan Mwy	at Oxley Creek, Larapinta	1,200	4,500	700	6,400	1,100	4,400	700	6,200	-4%	-2%	-2%	-2%
Kessels Road	E of Lowndes Street, Coopers Plains	1,200	5,100	600	7,000	1,200	5,100	600	7,000	-1%	0%	-3%	-1%
2026													
Northern Link	Main Line					900	2,500	600	4,100				
Logan Mwy	at Oxley Creek, Larapinta	1,300	5,200	800	7,300	1,200	5,000	700	7,000	-6%	-4%	-7%	-4%
Kessels Road	E of Lowndes Street, Coopers Plains	1,100	5,300	600	7,100	1,100	5,200	600	6,900	-3%	-2%	-3%	-2%

Table Notes:

Table Source – Northern Link Traffic Model Runs TR_255 and TR_256

1Model runs for without NL and project scenario incorporate updated base future networks.

Table B-5 Effect of the Project on Commercial Vehicle Volumes on Logan Motorway

Road	Location	Without NL				With Project				% Difference			
		AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs
2014													
Northern Link	Main Line					400	900	200	1,500				
Logan Mwy	at Oxley Creek, Larapinta	1,200	4,500	700	6,400	1,100	4,400	700	6,200	-4%	-2%	-2%	-2%
Kessels Road	E of Lowndes Street, Coopers Plains	1,200	5,100	600	7,000	1,200	5,100	600	6,900	-1%	0%	-3%	-1%
2026													
Northern Link	Main Line					600	1,900	300	2,900				
Logan Mwy	at Oxley Creek, Larapinta	1,300	5,200	800	7,300	1,200	5,000	700	7,000	-7%	-4%	-7%	-5%
Kessels Road	E of Lowndes Street, Coopers Plains	1,100	5,300	600	7,100	1,100	5,300	600	7,000	-2%	-1%	-2%	-1%

Table Notes: Table Source – Northern Link Traffic Model Runs TR_255 and TR_257

1Model runs for without NL and project scenario incorporate updated base future networks.

Table B-6 Impact of EIS Reference Project on Total Vehicle Volumes on Logan Motorway

Road	Location	Without NL				With NL				% Difference			
		AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs
2014													
Logan Mwy	at Oxley Creek, Larapinta	7,700	29,200	7,400	44,400	7,500	28,900	7,200	43,600	-3%	-1%	-4%	-2%
Kessels Road	E of Lowndes Street, Coopers Plains	10,800	47,200	11,500	69,500	10,700	46,400	11,300	68,400	-1%	-2%	-2%	-2%
2026													
Logan Mwy	at Oxley Creek, Larapinta	11,700	51,500	11,500	74,600	11,300	50,700	11,000	73,000	-3%	-1%	-4%	-2%
Kessels Road	E of Lowndes Street, Coopers Plains	10,300	48,200	11,600	70,200	10,000	46,800	11,400	68,100	-3%	-3%	-2%	-3%

Table Notes: Table Source – Northern Link Traffic Model Runs TR_255 and TR_256

1Model runs for without NL and project scenario incorporate updated base future networks.

Table B-7 Impact of the Project on Total Vehicle Volumes on Logan Motorway

Road	Location	Without NL				With NL				% Difference			
		AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs
2014													
Northern Link	Main Line					5,500	23,100	5,600	34,200				
Logan Mwy	at Oxley Creek, Larapinta	7,700	29,200	7,400	44,400	7,500	28,900	7,200	43,600	-3%	-1%	-3%	-2%
Kessels Road	E of Lowndes Street, Coopers Plains	10,800	47,200	11,500	69,500	10,600	46,300	11,400	68,300	-1%	-2%	-2%	-2%
2026													
Northern Link	Main Line					7,800	33,400	7,500	48,800				
Logan Mwy	at Oxley Creek, Larapinta	11,700	51,500	11,500	74,600	11,300	51,000	11,200	73,500	-3%	-1%	-2%	-1%
Kessels Road	E of Lowndes Street, Coopers Plains	10,300	48,200	11,600	70,200	10,100	46,900	11,400	68,400	-2%	-3%	-2%	-2%

Table Notes: Table Source – Northern Link Traffic Model Runs TR_255 and TR_257

1Model runs for without NL and project scenario incorporate updated base future networks.

B.5.1 Issue 2 – Area of Interest for Impact Assessment

The inclusion of the Inner West Transport Study Area in the Chapter 5 of the EIS is solely for traffic and transport movement purposes and does not assess the impact on the community.

Response

Traffic and transport impact assessment presented in the EIS focuses on areas within the inner west transport study area, where the impacts on local communities would be greatest, but also provides information on the traffic effects of the project within the wider Brisbane metropolitan area. Traffic volumes without and with the project for the inner west and Brisbane metropolitan area road network from traffic modelling have been used for assessment of a wide range of effects of the project on communities associated with changes in traffic volumes, such as air quality, noise, economic and social impact.

B.5.1 Issue 3 – Opening Year for Traffic Forecasting

It was submitted that forecasting of traffic demand modelling has been carried out for the year of opening 2014, however Chapter 4 describes commissioning as June 2013. Clarification on date of commissioning/opening was requested.

Response

For traffic modelling, the year 2014 was used as opening year as it represented the first full year during which the project was expected to be operational and approaching steady-state demand. It has been noted in the EIS (refer Table 5-31) that traffic volumes immediately upon opening of a new tolled facility would typically be 70% of the traffic model forecast, as it takes time for all users to fully appreciate the route choice options available in the network and the travel time benefits that would be realised via use of the new facility. This process, known as demand ramp-up, typically takes an 18 month to 2 year time period. It is therefore appropriate to assess opening year traffic operating conditions in 2014, for a facility that opens during the 2013 calendar year.

B.5.1 Issue 4 – Supplementary Dynamic Modelling

A submission requested traffic modelling review including supplementary dynamic modelling, as necessary, to adequately reflect impacts on the network beyond the portals, particularly the Centenary Motorway and the ICB as result of the cumulated effects of projects in the area.

Response

During the development of the EIS Reference Project, dynamic traffic modelling using the Paramics micro- simulation software was undertaken to check the impacts on the feeder road network, including the adequacy of the design to cater for weaving and merging movements particularly on the Centenary Motorway and the ICB. Video displays of the models were used during the Community Information Sessions.

Dynamic traffic modelling using the Paramics micro-simulation modelling has been prepared for the Project and the findings are summarised in Chapter 4 of the EIS Supplementary Report.

B.5.2 Description of the Existing Transport Network

B.5.2 Issue 1 – Road Hierarchy

A submission identified a number of issues with regard to the road hierarchy descriptions used in the EIS. A review of assumptions for modelling purposes was identified. Specific aspects were:

- Description of Kelvin Grove road as a regional arterial was not supported.
- Description of Milton Road as a secondary freight route was not supported.
- Statement that Frederick Street, Macgregor Terrace and Jubilee Street have a significant freight assumption was not supported.

Response

The descriptions of road hierarchy classification used in the EIS are based on that applied in Map 6 – Road Hierarchy and Map 9 – Freight Hierarchy within Brisbane City Council Transport Plan for Brisbane 2008 – 2026. The road hierarchy classifications used in the transport model are based on the standard BSTM designations.

The comments on the freight function of Frederick Street, Macgregor Terrace and Jubilee Street were based on the fact that existing use by commercial vehicles (Austroads Class 3 and above) is approximately 4%.

B.5.2 Issue 2 – Freight Volumes and Composition

A lack of quantification of freight traffic volumes and composition for the study area, and identification of a steady state level unaffected by short term construction projects was raised. Understanding the freight usage of routes is critical to understanding the impact of the project in terms of not only traffic and transport but analysis of noise.

The EIS in describing the existing transport network describes two sources of freight traffic within the study area. The traffic on Milton Road contains a much wider variety and quantity of freight than is described in the EIS.

Response

Table 5-5 in the EIS summarises existing commercial vehicle (freight traffic) volumes on a cross-section of roads within the study area to provide an overall appreciation of the range and variation in usage of various roads by freight.

In Section 5.4 of the EIS, a description of the process whereby commercial vehicle travel patterns are incorporated into the traffic modelling is provided. This has been applied for modelling of the existing situation and future time horizons. This process incorporates modelling of commercial vehicle (freight) movements between all origins and destinations (represented by traffic zones within the model) throughout the Brisbane metropolitan area.

B.5.2 Issue 3 – Freight

A submission noted that the EIS analysis indicates that Coronation Drive currently carries a low proportion of travel to Australia TradeCoast North including Brisbane Airport, and raised the role of Northern Link in catering for freight travel to the ATC. Clarification on usage of Northern Link by commercial vehicles, particularly during off peak travel periods was requested.

Response

Table B-8 and **Table B-9** summarises forecast commercial vehicle volumes on Northern Link and alternative surface roads in the inner west by time period with and without Northern Link, for the EIS Reference Project and the Project. These results show that the effect of Northern Link on commercial vehicle volumes is strongest in the peak periods, but the Project does have significant benefits off-peak on Milton Road. The effect of Northern Link on all these routes increases over time, as expected, as congestion on surface routes increases.

The impact of Northern Link on ATC and CBD related freight traffic on Milton Road and Coronation Drive has been examined via origin-destination analysis.

An origin-destination analysis of forecast Northern Link users is presented in Section 5.6.2 of the EIS, with commercial vehicle patterns included in Table 5-32. This analysis found that by 2026, 32% of heavy vehicle traffic on Northern Link would be associated with the Airport and ATCN. A further 63% of freight use would be by other cross-city traffic. This shows a strong agreement with the strategic goals of the project.

Table 5-6 within the EIS identifies both the overall travel and commercial vehicle travel patterns of current users of Coronation Drive. This table, and the explanatory text on Page 5-24 of the EIS, identifies that whilst 5% of total use of Coronation Drive is associated with travel to the Australia TradeCoast North including Brisbane Airport, a much higher proportion i.e. 13%, occurs for commercial vehicles. On Milton Road, 22% of all traffic and 19% of commercial vehicles currently travel to the Australia TradeCoast North including Brisbane Airport (EIS page 5-26). The lower proportion on Coronation Drive reflects the higher status of Milton Road on Brisbane City Council's freight hierarchy (a secondary freight route whereas Coronation Drive is tertiary) and its more direct connection to long distance routes via the Western Freeway and Inner City Bypass.

These sound proportions (i.e. 13% and 19%) of commercial vehicles currently using surface routes within the inner west for travel to the Australia TradeCoast north area would have the option of using Northern Link, which would offer significant travel time benefits for freight vehicles.

The differences between the existing freight breakdowns on these routes and the Northern Link forecasts reflect the strong forecast growth in the Airport/ATC region and the strategic attractiveness of Northern Link.

The forecast freight usage patterns on Milton Road and Coronation Drive in the future, with and without Northern Link, are summarised in **Table B-10** and **Table B-11**, for the EIS Reference Project and the Project. This shows that in 2026 the EIS Reference Project would divert some 35-40% of Airport/ATC freight from these routes. The Project would divert 25-30% of Airport/ATC freight from the Coronation Drive-Milton Road corridor and would also reduce other cross city freight by almost 20%. These findings confirm that Northern Link would have an important role in catering for the freight task to the ATC.

Table B-8 Temporal Breakdown of Commercial Vehicle Volumes for EIS Reference Project

Road	Location	Without NL				With EIS Reference Project				% Difference			
		AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs
2014													
Northern Link	Main Line					600	1,100	400	2,000				
Milton Road	East of Croydon Street, Toowong	500	2,600	300	3,400	400	2,300	200	2,900	-30%	-12%	-39%	-17%
Coronation Drive	West of Land Street, Auchenflower	500	2,800	300	3,600	500	2,800	200	3,500	-17%	1%	-21%	-4%
2026													
Northern Link	Main Line					900	2,500	600	4,100				
Milton Road	East of Croydon Street, Toowong	500	2,700	300	3,500	400	2,300	200	2,800	-31%	-16%	-36%	-20%
Coronation Drive	West of Land Street, Auchenflower	600	3,100	300	4,100	500	2,800	200	3,600	-25%	-8%	-28%	-12%

Table Notes:
Table Source – Northern Link Traffic Model Runs TR_255 and TR_256
1Model runs for without NL and project scenario incorporate updated base future networks.

Table B-9 Temporal Breakdown of Commercial Vehicle Volumes for the Project

Road	Location	Without NL				With EIS Reference Project				% Difference			
		AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs	AM 2hrs	OP 20hrs	PM 2hrs	24hrs
2014													
Northern Link	Main Line					400	900	200	1,500				
Milton Road	East of Croydon Street, Toowong	500	2,600	300	3,400	400	2,300	200	3,000	-22%	-12%	-13%	-13%
Coronation Drive	West of Land Street, Auchenflower	500	2,800	300	3,600	500	2,600	300	3,400	-10%	-5%	-9%	-6%
2026													
Northern Link	Main Line					600	1,900	300	2,900				
Milton Road	East of Croydon Street, Toowong	500	2,700	300	3,500	500	2,400	300	3,200	-16%	-10%	-6%	-11%
Coronation Drive	West of Land Street, Auchenflower	600	3,100	300	4,100	500	2,900	300	3,700	-14%	-6%	-16%	-8%

Table Notes:
Table Source – Northern Link Traffic Model Runs TR_255 and TR_257
1Model runs for without NL and project scenario incorporate updated base future networks.

- **Table B-10 Impact of the EIS Reference Project on Commercial Vehicle Daily Traffic Patterns on Coronation Drive and Milton Road**

Road / Trip Type	2014		2026		Difference		% Difference	
	Without NL	With EIS Ref Project	Without NL	With EIS Ref Project	2014	2026	2014	2026
Milton Road								
Radial or CBD Related Travel	910	970	890	990	60	100	7%	11%
Cross City Travel	2,090	1,670	1,880	1,380	-420	-500	-20%	-27%
Airport/ATC North Travel	890	590	1,030	670	-300	-360	-34%	-35%
Local Travel	90	80	80	80	-10	0	-11%	0%
Total	3,980	3,310	3,880	3,130	-670	-750	-17%	-19%
Coronation Drive								
Radial or CBD Related Travel	1,660	1,580	1,870	1,720	-80	-150	-5%	-8%
Cross City Travel	2,280	2,090	2,410	2,080	-190	-330	-8%	-14%
Airport/ATC North Travel	630	490	900	550	-140	-350	-22%	-39%
Local Travel	50	50	70	60	0	-10	0%	-14%
Total	4,620	4,210	5,240	4,410	-410	-830	-9%	-16%
Milton Road + Coronation Drive								
Radial or CBD Related Travel	2,560	2,550	2,760	2,710	-10	-50	0%	-2%
Cross City Travel	4,370	3,750	4,280	3,460	-620	-820	-14%	-19%
Airport/ATC North Travel	1,520	1,080	1,940	1,230	-440	-710	-29%	-37%
Local Travel	140	130	150	140	-10	-10	-7%	-7%
Total	8,600	7,510	9,120	7,540	-1,090	-1,580	-13%	-17%

Table Notes:
Table Source – Northern Link Traffic Model Runs TR_255 and TR_256
1Model runs for without NL and project scenario incorporate updated base future networks.

- **Table B-11 Impact of the Project on Commercial Vehicle Daily Traffic Patterns on Coronation Drive and Milton Road**

Road / Trip Type	2014		2026		Difference		% Difference	
	Without NL	With NL	Without NL	With NL	2014	2026	2014	2026
Milton Road								
Radial or CBD Related Travel	910	960	890	970	50	80	5%	9%
Cross City Travel	2,090	1,680	1,880	1,420	-410	-460	-20%	-24%
Airport/ATC North Travel	890	590	1,030	660	-300	-370	-34%	-36%
Local Travel	90	80	80	80	-10	0	-11%	0%
Total	3,980	3,310	3,880	3,130	-670	-750	-17%	-19%
Coronation Drive								
Radial or CBD Related Travel	1,660	1,540	1,870	1,640	-120	-230	-7%	-12%
Cross City Travel	2,280	2,090	2,410	2,050	-190	-360	-8%	-15%
Airport/ATC North Travel	630	530	900	660	-100	-240	-16%	-27%
Local Travel	50	50	70	50	0	-20	0%	-29%
Total	4,620	4,210	5,240	4,410	-410	-830	-9%	-16%

Road / Trip Type	2014		2026		Difference		% Difference	
	Without NL	With NL	Without NL	With NL	2014	2026	2014	2026
Milton Road + Coronation Drive								
Radial or CBD Related Travel	2,560	2,500	2,760	2,610	-60	-150	-2%	-5%
Cross City Travel	4,370	3,760	4,280	3,480	-610	-800	-14%	-19%
Airport/ATC North Travel	1,520	1,120	1,940	1,330	-400	-610	-26%	-31%
Local Travel	140	130	150	130	-10	-20	-7%	-13%
Total	8,600	7,510	9,120	7,540	-1090	-1580	-13%	-17%

Table Notes:
Table Source – Northern Link Traffic Model Runs TR_255 and TR_257
1Model runs for without NL and project scenario incorporate updated base future networks.

B.5.2 Issue 4 – Clarification on Table 5-6

A submission requested clarification on the data source for Table 5-6 – Coronation Drive Daily Traffic Patterns.

Response

Table 5-6 was sourced from the validated 2007 Northern Link Traffic Model (as identified in the Table Notes to **Table 5-6**). The model validation is provided in Section C.6 of the EIS Technical Paper No 1 – Traffic and Transport.

B.5.3 Transport Network Performance

B.5.3 Issue 1 – Clarification on Level of Service for Western Freeway

A submission requested clarification on the Level of Service indicated by the Northern Link Traffic Model for the Western Freeway in the AM Peak. Figure 5-25 show Level of Service A which was considered optimistic.

Another submission identifies that Figures 5-25 and 5-26 show a Level of Service "A" on the Western Freeway during both the AM and PM peaks – 'Generally Free Flowing'. This is at odds with ABC traffic reporting that indicates the Western Freeway to be "slow from Moggill Road to the Toowong Roundabout" on a daily basis.

Response

Figure 5-25 shows the in the AM Peak for the existing (2007) situation. On the Western Freeway, it shows Level of Service A (generally free-flow) for inbound "mid-block" travel between Moggill Road and the Mt-Cootha Road roundabout, however this deteriorates to Level of Service F (severe congestion) at this roundabout and the nearby Toowong Roundabout. At times however field observations indicate that severe congestion at the roundabouts during the peak can quickly permeate back to influence mid-block conditions as well. The 2007 travel time survey did not isolate the Freeway traffic speed conditions in the inbound direction in the AM peak separately to travel through the intersections. However for outbound travel in the PM peak, over the 4km route along the Western Freeway from Mt-Coot-tha Road to Moggill Road an average speed of 75 km/hr was surveyed, which would equate to a very sound Level of Service B, approaching LoS A.

B.5.3 Issue 2 – Mt Coot-tha Roundabout

A submission requested data for the existing performance at the Mt Coot-tha Road Roundabout.

Response

Based upon SIDRA analysis, the existing performance at the Mt Coot-tha Road Roundabout is:

- AM Peak: Degree of Saturation 80%. Level of Service (based on average delay) = A
- PM Peak: Degree of Saturation 74%. Level of Service (based on average delay) = B

It is noted that the overall level of service is good, because outbound vehicles to the Western Freeway effectively bypass the intersection. The Level of Service for the inbound traffic approach from the Western Freeway is much lower.

B.5.3 Issue 3 – Intersection Level of Service

The schema used to describe intersection levels of service in Table 5-16 does not allow for differing levels of service for different directions of use at a given intersection.

Response

The tabulation provides an overall individual performance summary for 30 intersections, using standard reporting data extracted from detailed SIDRA intersection analysis. The SIDRA analysis calculates the delays and level of service for each approach direction to each intersection, and then combines results to calculate the overall level of service based upon average delay.

B.5.3 Issue 4 – Croydon Street Existing & Future Performance

Croydon Street is not described in the Transport Network Performance section (5.3) of the EIS despite it being a street heavily impacted by the project. Table 5-26 in the EIS does not include Croydon Street.

Response

The existing role of Croydon Street as a City Distributor in the existing road network is described in Section 5.2.1 Road Hierarchy and Function of the EIS. The existing (2007) traffic volume on Croydon Street, 12,000 vehicles per average weekday as noted in Table 5-35 of the EIS. The existing performance of key intersections on Croydon Street, for example at Milton Road and Jephson Street/Sylvan Road is detailed in Table 5-16 of the EIS. Future volumes on Croydon Street without the EIS Reference Project are provided in Table 5-35.

B.5.4 Traffic Forecasting Methodology

B.5.4 Issue 1 – Traffic Model Validation

A submission noted that text (Chapter 5) does not contain detailed information on the validation of the model and information on the validation checks and sensitivity tests was requested.

Response

Detailed information on the validation of the Northern Link Traffic Model is included in Appendix C of the EIS Technical Paper No 1. The appendix includes tabulation of observed (2007) traffic counts versus modelled traffic volumes for peak periods and daily traffic across screenlines, noting the % variance (Table C-1). Tables C-2 and C-3 provide journey time checks between the validated model and observed survey day for peak periods. Section C-10 describes the findings of a range of sensitivity tests undertaken using the model to test the changes in model outputs to changes in key parameters and assumptions.

B.5.4 Issue 2 – Traffic Model Network Detail

Connector streets between Frederick Street and Gregory Street have not been included in the traffic model (e.g. Part of Morley Street, Musgrave Street and Victoria Terrace). As Morley Street is a connector street to the tunnel portal, the absence of these streets is a significant flaw in the traffic modelling.

Response

The traffic network modelled within the strategic transport model is suitable to allow the loading and distribution of traffic demands from the local areas in the vicinity of the project portals to the road network connecting to the project. The network detail modelled in the Toowong area north of Milton Road within the Northern Link Traffic Model also allows the indicative traffic generated by existing and potential "rat-running" traffic seeking to avoid use of Frederick Street to be suitably represented as demands at the Morley Street/Milton Road/Croydon Street intersection. Strategic transport models do not typically incorporate all individual streets, and do not rely upon detailed modelling of traffic use of all individual streets to accurately model existing or forecast conditions.

B.5.4 Issue 3 – Improved Public Transport to Western Suburbs

Provision of improved public transport from the western suburbs (e.g. light rail or other form) will be imperative in the near future. Such facility will impact on the viability of Northern Link. Transport modelling in the present study fails to take this future development into account and is therefore flawed.

The Project will increase traffic through Toowong and in Brisbane by simply encouraging people to drive instead of finding more environmentally friendly ways of travelling.

Response

As described in Section 5.4.1 of the EIS, the transport modelling incorporates the effect of future improvements in public transport infrastructure and services planned by TransLink (DTMR) and included in the TransLink Network Plan and SEQIPP. The modelling within the EIS takes into account likely public transport initiatives, and is described in detail in Appendix C of Technical Note 1 of the EIS.

B.5.4 Issue 4 – Limitations of the BSTM

QT questioned whether traffic and transport modelling based on the Brisbane Strategic Transport Model (BSTM) was sufficient to address the complexities of the project, or to assess the likely performance of the project. Particular issues raised were the ability of the model to consider:

- "induced" demand
- intersection constraints, weaving and merging effects associated with ramps or other potential interruptions to uniform flow conditions;
- linkage between demographics and mode choice;
- ability to respond to public transport capacity;
- unconstrained public transport growth assumptions;
- "active" transport; and
- comparison of the proposed development with public transport optimisation or surface road optimisation scenarios.

Response

The traffic and transport modelling used for the EIS incorporated use of a strategic transport model, termed the Northern Link Traffic Model – a project model based upon the Brisbane Strategic Transport Model (BSTM), SIDRA intersection analysis modelling and micro-simulation modelling using Paramics of the connections between the Project and the Western Freeway and Inner City Bypass. The specific issues are considered in the following manner:

- The BSTM based Northern Link traffic model is able to incorporate the effects of induced demand via incorporation of a specific induced demand module, which is described on Page 5-61 of the EIS and detailed in Section 6.1.6 of the EIS Technical Paper No 1. This model applies accepted techniques for estimating induced traffic effects using an elasticity approach.
- Intersection delays/constraints and link mid-block travel times are incorporated in the BSTM based Northern Link traffic model via incorporation of a delay calculation procedure for intersections. This is described in detail in Section C.4 of the EIS Technical Paper No 1, and it incorporates the calculation of delays at intersections to allow travel time on competing routes to be represented more accurately than using only a link based delay estimate. To assess weaving and merging effects, micro-simulation modelling has been applied for the Project, as described in Chapter 4 of the EIS Supplementary Report, using peak period input demands forecast from the BSTM based Northern Link traffic model.
- The most up-to-date demographic forecasts have been sourced and used as input to the BSTM based Northern Link traffic model. These were obtained from the State Government's Population and Information Forecasting Unit (PIFU) and the SEQ Economic and Employment Forecasting Study (2007/08). Forecasts prepared take into consideration a wide range of factors influencing demographic distribution, including the SEQ Regional Plan, and transport infrastructure programs (such as SEQIPP) and transport policy considerations that influence mode choice.
- The BSTM based Northern Link traffic model incorporates a mode choice model and public transport assignment which allows the effects of planned improvements in public transport infrastructure and service provision on mode share to be assessed. Details are provided in Section C.3.1 of the EIS Technical Paper No 1, and planning assumptions were sourced from TransLink. The model does not assume that there are constraints in public transport capacity, and allows the potential "best" effect of planned or proposed improvements in public transport on reduction in vehicular travel demand within metropolitan Brisbane to be estimated Application of this enhanced mode share scenario in the BSTM based Northern Link traffic model provides an appropriate planning case for assessment of the performance of the project that takes into account future public transport growth.
- Active transport is incorporated within the model as a component on person trip making. Within the BSTM a proportion of travel is assumed as related to active transport, based upon the findings of the 2004 SEQ Travel Surveys, with individual factors applied at a sector level. The amount of active transport is forecast to increase substantially during the period to 2026.
- Detailed modelling of the effects of public transport or surface road widening alternatives would be possible using the traffic model (for example, as part of detailed feasibility investigations for such projects) if detailed plans were available. In the absence of detailed plans for such options, a broad strategic assessment of such alternatives, rather than detailed modelling, has been provided in Section 2-25 of the EIS.

B.5.4 Issue 5 – Commercial Vehicle Classifications

A submission suggested that many forms of transport (including certain types of heavy vehicles, vehicles carrying dangerous goods and livestock, etc.) would be excluded from the Northern Link tunnel and information on these exclusions is sought.

Clarification is required on the basis for classification of business light vehicles and regional freight and associated statistics, and whether transport modelling has extrapolated a general percentage for types of transport on above ground routes and applied this to the Northern Link modelling.

Response

The types of vehicles to be excluded from use of Northern Link would be consistent with exclusions applied for other tunnels within the Brisbane metropolitan area. This includes vehicles carrying dangerous goods (referred to as placarded vehicles).

The Northern Link Traffic Model assigns a single class of commercial (or freight) vehicles, incorporating vehicles of Austroads classes 3 to 12, also referred to as heavy commercial vehicles. Light commercial vehicles (such as business cars and utility vehicles) are not modelled separately and are incorporated in the overall modelling of light vehicles. Based on traffic counts, it is estimated that light commercial vehicles would comprise approximately 7% of total vehicle flows.

B.5.4 Issue 6 – Commercial Vehicle Modelling

The EIS does not make allowance for the anticipated slower traffic speed in the tunnel as a result of a higher proportion of heavy vehicles

Response

The strategic transport model takes into account the effect that the proportion of forecast commercial vehicles using individual road links (including Northern Link) would have on the utilisation of link capacity and traffic speed.

B.5.4 Issue 7 – Model Demographic and Land-Use Inputs

The increased population densities planned for the inner suburbs, and forecast population growth in the Western Corridor and Ipswich has been identified. This will result in a significant increase in traffic using Northern Link, which has not been factored into the traffic volume modelling and thus air quality predictions.

A submission requested that the relevance of Suncorp Stadium events to the traffic modelling is clarified given that events at the Stadium do not generally coincide with peak hour traffic flows

Response

The demographic forecasts of future population, education enrolments and employment applied in the Northern Link Traffic Model have been sourced from the State Government's Planning Information Forecasting Unit (PIFU) 2007/08 forecasts and the SEQ Economic and Employment Forecasting Study (2007/08). These data sets take into account the expected population distribution and growth expected within the metropolitan area, including increased densities in inner suburbs and forecast population growth in the Western Corridor and Ipswich. Data is input for each traffic zone, with over 1,500 zones covering the Brisbane metropolitan area which extends to Caboolture in the north, Beenleigh in the south, Ipswich to the west and Redlands to the east. Forecast traffic use of Northern Link and the overall traffic network therefore takes into account the expected population growth and distribution.

Suncorp Stadium operates with a public-transport focussed transport management plan for events, with over 80% of patrons consistently utilising public transport for travel to/from events. These is minimal parking provision at the Stadium, and during events restrictions are applied to on-street parking in the surrounding area to deter patrons from driving to the venue by private vehicle. Traffic generation associated with Suncorp Stadium, as incorporated within the traffic model, includes that associated with normal weekday activities at the facility, rather than event based days. It is noted that private vehicle traffic generation on event days however is not significant due to the transport management plan in place for the Stadium.

B.5.4 Issue 8 – Reduced Vehicle Kilometres of Travel

A submission has identified that the EIS assumes that dependence on private vehicle travel will continue to predominate and that distance travelled by private vehicle will continue to increase. However, latest statistics for Queensland indicate that total kilometres travelled private passenger vehicles have been reducing since 2005 (especially in Brisbane City). The implications of this phenomenon should be investigated, especially in testing the sensitivity of the cost-benefit assessment and business case models

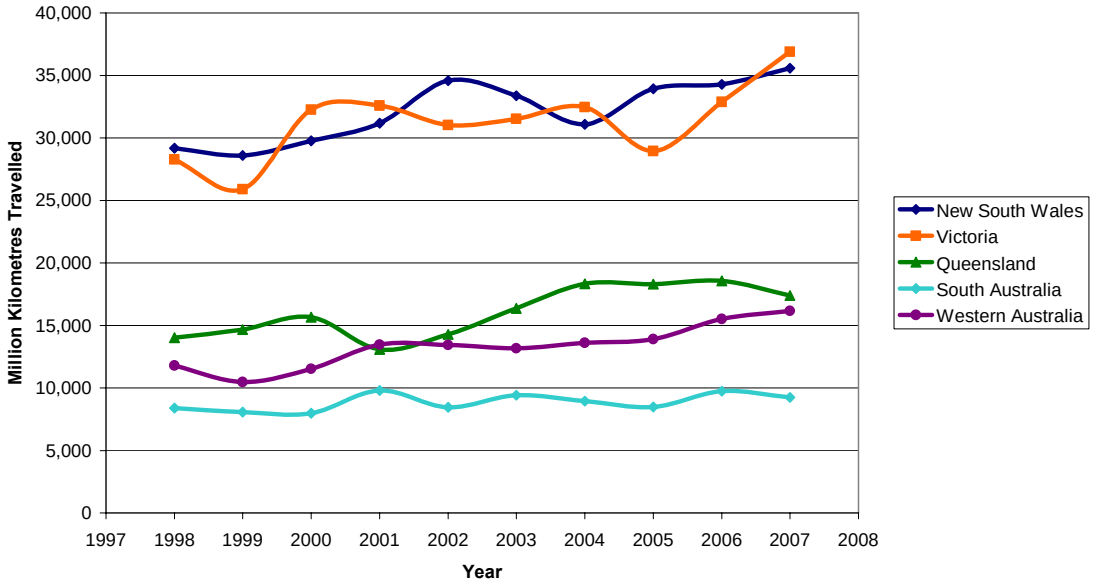
Response

The reported reduction in Brisbane VKT presented in the 2008 edition of Queensland Travel Facts[8] (QTF) does not appear to indicate a trend which would affect the Northern Link traffic modelling, for the following reasons:

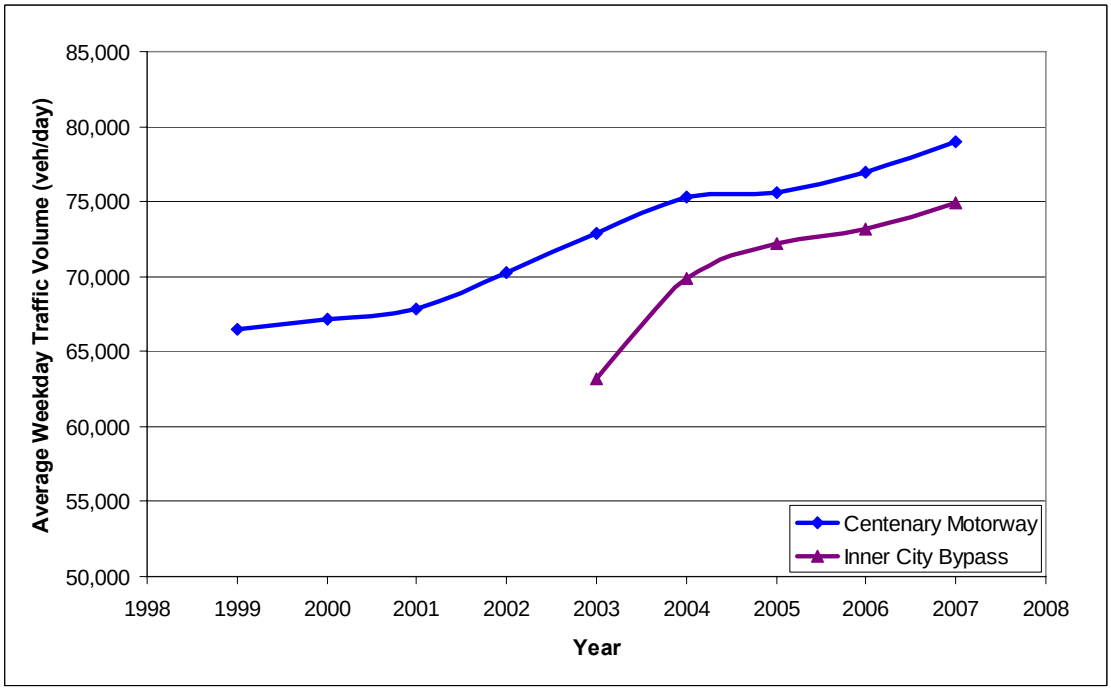
- Both QTF and its key source, the ABS "Survey of Motor Vehicle Use", explicitly warn of the dangers of year-to-year comparisons. Such comparisons are subject to high relative errors due to the survey methodology, as well, in the case of the QTF, as methodology changes over time.
- Examination of capital city VKT figures over time, from the ABS data, shows that the apparent recent decrease in VKT in Brisbane is not unusual compared to other apparent changes in other years in other states. As **Figure 3** shows, the data indicates apparent growth in other capital cities in the last few years.
- Historical traffic volumes on Northern Link's key connecting routes do not show a reduction in usage in these years, but rather indicate continuing growth, as illustrated in **Figure 4**.

[8] Appelbaum Consulting Group Pty Ltd (May 2008) Queensland Transport Facts 2008

- **Figure 3 Road Vehicle Usage in Largest Five Capital Cities : ABS Data**



- **Figure 4 Traffic Growth on Key Northern Link Connecting Routes**



B.5.4 Issue 9 – Supplementary Assessment of Effect of Updated Network Projects

The submission identifies that details of the Hale Street Link Project has been revised subsequent to the EIS traffic forecasting, potentially affecting delays and traffic operations in the Coronation Drive corridor. The tidal flow system on Coronation Drive has also been decommissioned since the EIS traffic forecasting, also affecting the road system capacity in this corridor. The submission requests that EIS traffic forecasting be revised to consider these matters.

Response

Additional modelling has been carried out using the Northern Link Traffic Model in order to update the future base network assumptions, and to examine alternative Northern Link scenarios. These additional model runs have been carried out for the years 2014 and 2026, using travel demand matrices and tolling assumptions as applied in the EIS.

The base future road networks have been updated to incorporate contemporary descriptions of key future projects, which date from after the EIS modelling was undertaken. Such contemporary descriptions of key future projects include:

- Hale Street Link (HSL) – July 2008 Changed Project including Coronation Drive viaduct and right turn from Hale Street to Coronation Drive outbound
- Coronation Drive – removal of tidal flow operation (as at October 2008) resulting in three traffic lanes inbound and two traffic lanes outbound
- Airport Link – BrisConnections Conforming Design as per the Airport Link Request for Project Change (May 2008)
- Airport Roundabout Upgrade (ARU) – BrisConnections design including Fast Diamond interchange
- Ipswich Motorway Upgrade – based on public information from DTMR (as at October 2008)
- BCC Road Action Plan updates as at October 2008, including the latest concept plans for the Kingsford Smith Drive, Tilley Road, Manly-Green Camp-Rickett Road, Wynnum Road, Progress Road, Blunder Road, Boundary Road, and Inala-King-Learoyd Road projects; and
- Updating of the expected timing of future network projects consistent with Council's programs.

The impact of the updated assumptions on future traffic demand and intersection performance in the study area in the base (without Northern Link) scenario is summarised in **Table B-12** and **Table B-13**.

These comparisons show that the updated traffic forecasts prepared using the latest descriptions of future base road network projects are very similar to those reported in the EIS. The changes in screenline totals are very small, while for individual roads, the forecast volumes on higher order routes are very similar to the EIS forecasts. There are small changes on Coronation Drive, particularly towards the northern end, as a result of the changes to the Hale Street Link northern intersection and the removal of tidal flow, which have consequent impacts on the eastern end of Milton Road and on flow patterns on some local streets. Intersection performance in the corridor remains similar and the overall description of traffic performance without Northern Link remains generally as described in the EIS.

- **Table B-12 Forecast Growth in Traffic Volumes at Screenlines – Effect of Updated Network Projects**

Average Weekday Traffic							
	2007	2014			2026		
Screenline		EIS Without NL (from Table 5-38)	Updated Without NL	% change	EIS Without NL (from Table 5-38)	Updated Without NL	% change
1 - Indooroopilly	162,400	178,400	178,300	-0.1%	198,900	196,900	-1.0%
2 - St Lucia and University	73,800	81,600	81,700	0.1%	88,100	88,100	0.0%
3 - Toowong	174,200	210,400	211,000	0.3%	230,900	230,000	-0.4%
4 - Milton	205,500	244,900	245,800	0.4%	269,700	266,400	-1.2%

Table Notes
Source: Northern Link Traffic Model

Table B-13 Forecast Traffic Growth on Key Roads Without Northern Link – Effect of Updated Network Projects

Hierarchy	Reporting Point	Road	Location	Average Weekday Traffic					
				2014			2026		
				EIS Without NL (from Table 5-26)	Updated Without NL	% change	EIS Without NL (from Table 5-26)	Updated Without NL	% change
State Strategic									
	A	Western Freeway	North of Moggill Road Interchange, Indooroopilly	90,100	91,000	1.0%	105,200	104,500	-0.7%
Regional Radial									
	B	Moggill Road	East of Russell Terrace, Indooroopilly	42,200	42,700	1.2%	47,000	47,400	0.9%
	D	Moggill Road	East of Brisbane Boys College Entrance, Toowong	47,000	46,600	-0.9%	50,100	49,500	-1.2%
	F	High Street	West of Benson Street, Toowong	35,000	34,200	-2.3%	37,300	36,800	-1.3%
	J	Milton Road	East of Croydon Street, Toowong	64,500	64,800	0.5%	68,200	67,700	-0.7%
	WF4	Milton Road	West of Croydon Street, Toowong	61,400	61,600	0.3%	63,900	62,900	-1.6%
	K	Coronation Drive	West of Land Street, Auchenflower	70,300	67,700	-3.7%	74,000	72,200	-2.4%
	O	Milton Road	East of Castlemaine Street, Milton	68,200	68,200	0.0%	72,500	70,800	-2.3%
	P	Coronation Drive	East of Cribb Street, Milton	92,100	93,800	1.8%	96,400	101,100	4.9%
	T	Kelvin Grove Road	North of School Street, Kelvin Grove	45,700	45,400	-0.7%	51,400	52,600	2.3%
	U	Musgrave Road	West of Hale Street	30,000	31,000	3.3%	31,200	31,400	0.6%

Hierarchy	Reporting Point	Road	Location	Average Weekday Traffic					
				2014			2026		
				EIS Without NL (from Table 5-26)	Updated Without NL	% change	EIS Without NL (from Table 5-26)	Updated Without NL	% change
Regional Ring									
	R	Inner City Bypass	Landbridge, Spring Hill	108,000	109,300	1.2%	116,900	117,800	0.8%
	19	Hale Street	South of Caxton Street	84,100	85,400	1.5%	83,500	86,200	3.2%
	C	Walter Taylor Bridge	Indooroopilly	33,800	33,800	0.0%	33,800	33,700	-0.3%
	E	Miskin Street	North of Ascog Terrace, Toowong	10,200	10,300	1.0%	10,800	10,400	-3.7%
	I	Frederick Street	South of Victoria Crescent, Toowong	33,900	35,400	4.4%	37,400	39,000	4.3%
City Distributor									
	G	Brisbane Street	North of Josling Street, Toowong	43,100	42,600	-1.2%	45,900	45,700	-0.4%
	H	Sylvan Road	East of Milton Road, Toowong	5,500	5,200	-5.5%	6,300	6,600	4.8%
	Q	Caxton Street	West of Hale Street, Paddington	33,700	33,400	-0.9%	38,900	38,500	-1.0%
	S	Jephson Street	North of Sherwood Road, Toowong	22,500	23,700	5.3%	23,700	25,000	5.5%
	31	Sherwood Road	West of Jephson Street	6,000	5,900	-1.7%	7,900	7,000	-11.4%
Local Streets									
	L	Eagle Terrace	West of Roy Street, Auchenflower	6,600	7,400	12.1%	9,100	8,900	-2.2%
	M	Haig Road	West of Barona Road, Milton	12,600	14,000	11.1%	14,500	17,100	17.9%

Hierarchy	Reporting Point	Road	Location	Average Weekday Traffic					
				2014			2026		
				EIS Without NL (from Table 5-26)	Updated Without NL	% change	EIS Without NL (from Table 5-26)	Updated Without NL	% change
	N	Park Road Mid-block	North of Gordon Street, Milton	15,000	12,900	-14.0%	19,000	17,200	-9.5%
	36	Morley Street	North of Milton Road	6,300	7,700	22.2%	6,700	6,200	-7.5%

Table Notes:
Source: Northern Link Traffic Model

The impact of the updated network projects on forecast use of Northern Link is presented in **Table B-14**.

The updated results are very similar to those presented in the EIS. All directional demand changes are less than 1,000 vpd, and only of the order of 100 vph in peak periods. These changes would not result in a significant difference to traffic performance or effects described within the EIS.

- **Table B-14 Northern Link Overall Traffic Use Summary for Average Weekday – Effect of Updated Network Projects for EIS Reference Project**

EIS Assessment (from Table 5-31)					
Project Element	**2014 Daily[1] [2]**	**2026 Daily[1]**	**2026 AM Peak vph**	**2026 PM Peak vph**	**2026 % CV[3]**
Eastbound tunnel	29,900	39,200	3,200	3,000	5.0%
Westbound tunnel	27,100	36,700	2,300	3,000	5.9%
Total Northern Link	57,000 (39,900)	75,900	5,500	6,000	5.4%
EIS Reference Project with Updated Base Future Network Projects					
Project Element	2014 Daily[1] [2]	2026 Daily[1]	2026 AM Peak vph	2026 PM Peak vph	2026 % CV[3]
Eastbound tunnel	29,000	38,600	3,300	2,900	5.1%
Westbound tunnel	26,800	35,900	2,400	3,000	5.8%
Total Northern Link	55,800 (39,100)	74,500	5,700	5,900	5.4%
% and/or absolute change between EIS and assessment with updated network projects					
Project Element	2014 Daily[1] [2]	2026 Daily[1]	2026 AM Peak vph	2026 PM Peak vph	2026 % CV[3]
Eastbound tunnel	-900 (-3.0%)	-600 (-1.5%)	+100 (3.1%)	-100 (-3.3%)	+0.1% (2.0%)
Westbound tunnel	-300 (-0.7%)	-700 (-2.2%)	+100 (4.3%)	0 (0.0%)	-0.1% (-1.7%)
Total Northern Link	-1,200 (-2.1%)	-1,300 (-1.7%)	+200 (3.6%)	-100 (-1.7%)	0.0% (0.0%)

Table Notes:
1Average Weekday Traffic Volumes.
22014 model volumes exclude adjustment for ramp-up effects. At opening, volumes would be typically 70% of the traffic model forecast and these adjusted volumes are indicated in brackets below the modelled volume. Ramping up to the modelled 2014 volumes would typically occur over an 18 month to 2 year period.
3CV = medium and heavy commercial vehicles as per AustRoads Class 3 and above.
4Forecast based on toll of $3.93 expressed in $2008 including GST.

Traffic modelling with the updated future base projects indicates that the function of EIS Reference Project remains almost identical to that described in the EIS. Cross-City travel would be the predominant usage, with the same proportion (81%) of users related to Northern Link's primary purpose of connecting the western suburbs and Western Corridor to the northern and eastern suburbs of Brisbane (including the ATC North precinct). This breakdown is illustrated in **Table B-15**.

The forecast use of the Northern Link on and off ramps at the eastern and western ends of the facility, from both the EIS and for the EIS Reference Project with the updated future base projects, is summarised in **Table B-16**. As these results show, the forecast function of the EIS Reference Project connections is not significantly changed by the inclusion of the updated network projects in the modelling. The relative usage of the ramps remains very similar to the EIS forecasts.

Table B-15 Daily Travel Patterns for EIS Reference Project (2026) with Updated Future Base Network Projects

From \ To	Inner West	Central City	West Brisbane	Airport/ATC North/Eagle Farm	North Brisbane	South of Brisbane River	Total
Inner West	- (-)	3% (1%)	- (-)	1% (5%)	8% (3%)	4% (1%)	17% (9%)
Central City	2% (1%)	- (-)	2% (-)	- (-)	- (-)	5% (1%)	9% (3%)
West Brisbane	- (-)	2% (-)	- (-)	1% (2%)	3% (2%)	2% (1%)	9% (6%)
Airport/ATC North/Eagle Farm	2% (6%)	- (-)	1% (2%)	- (-)	- (-)	7% (9%)	10% (17%)
North Brisbane	8% (4%)	- (-)	3% (2%)	- (-)	- (-)	11% (22%)	22% (28%)
South of Brisbane River	4% (2%)	5% (2%)	2% (1%)	8% (8%)	10% (23%)	4% (1%)	33% (37%)
Total	16% (13%)	10% (3%)	8% (6%)	11% (15%)	22% (28%)	32% (35%)	100%

Table Key:

- Radial or CBD related travel
- Cross-City travel
- Airport/ATC North travel
- Local travel

(x%) - % commercial vehicles

Table Notes:
Source: Northern Link Traffic Model

Table B-16 EIS Reference Project Connections Traffic Summary – 2026 Average Weekday with Updated Future Base Network Projects

Project Element	Daily Traffic 2026 EIS Assessment (from Table 5-33)	%	EIS Reference Project Daily Traffic 2026 with Updated Future Base Network Projects	%
Western Connections (on-ramps)				
Western Freeway (west facing on-ramp)	27,800	71%	27,900	72%
Milton Road (east facing on-ramp)	940	2%	1,000	3%
Croydon Street (east facing on-ramp)	10,500	27%	9,700	25%
Total Western Connection Traffic (on raps)	39,200	100%	38,600	100%
Western Connections (off-ramps)				
Western Freeway (west facing off-ramp)	26,500	72%	25,700	71%
Croydon Street (east facing off-ramp)	10,200	28%	10,300	29%
Total Western Connection Traffic (off-ramps)	36,700	100%	36,000	100%
Eastern Connection (on-ramps)				
ICB (east facing on-ramp)	19,400	53%	19,100	53%

Project Element	Daily Traffic 2026 EIS Assessment (from Table 5-33)	%	EIS Reference Project Daily Traffic 2026 with Updated Future Base Network Projects	%
Kelvin Grove Road (north facing on-ramp)	8,000	22%	8,500	24%
Kelvin Grove Road (south facing on-ramp)	2,500	7%	2,700	7%
Musgrave Road (south facing on-ramp)	6,800	18%	5,700	16%
Total Eastern Connection Traffic (on-ramps)	36,700	100%	36,000	100%
Eastern Connection (off-ramps)				
ICB (east facing off-ramp)	22,500	57%	22,600	59%
Kelvin Grove Road (north facing off -ramp)	8,000	21%	7,500	19%
Kelvin Grove Road (south facing off -ramp)	8,700	22%	8,500	22%
Total Eastern Connection Traffic (off-ramps)	39,200	100%	38,600	100%

Table Note:
1Forecast based on toll of $3.93 expressed in $2008 including GST.

The effect of inclusion of updated base future network projects with the EIS Reference Project on forecast weekday volumes on regional roads is presented in **Table B-17**. This tabulation shows that the updated forecast volumes are generally very similar to the results presented in the EIS. The most significant differences are on the East-West Arterial, which is directly affected by the changed layout of the Airport Roundabout Upgrade. There are small differences on forecast traffic on Kingsford Smith Drive and Lutwyche Road, mainly influenced by the inclusion of updated Airport Link and Airport Roundabout Upgrade.

Table B-17 Volumes on Key Surface Roads in the Regional Network - EIS Reference Project with Updated Future Base Network Projects

Road	Location	Average Weekday Traffic						
		2007	2014			2026		
			EIS (from Table 5-34)	EIS Reference Project With Updated Future Base Network Projects	% Difference	EIS (from Table 5-34)	EIS Reference Project With Updated Future Base Network Projects	% Difference
State Strategic Roads								
Centenary Highway	Centenary Bridge	86,800	110,400	111,400	0.9%	137,400	139,200	1.3%
Western Freeway	South of Mt Coot-tha Road	76,500	114,500	114,400	-0.1%	137,800	138,000	0.1%
Ipswich Mwy	at Oxley Creek, Oxley	93,700	110,800	109,900	-0.8%	125,200	123,900	-1.0%
Logan Mwy	at Oxley Creek, Larapinta	23,500	45,500	43,600	-4.2%	75,300	73,000	-3.1%
Kessels Road	E of Lowndes Street, Coopers Plains	62,300	67,000	68,400	2.1%	66,500	68,100	2.4%
Gateway Mwy	at Gateway Bridge	105,800	170,500	168,600	-1.1%	239,100	237,400	-0.7%
Airport Link	in Main Line Tunnel	X	77,500	78,500	1.3%	97,900	98,800	0.9%
East-West Arterial	E of Widdop Street	28,800	94,400	81,400	-13.8%	128,700	120,100	-6.7%
Regional Radial Roads								
Pacific Mwy	at Captain Cook Bridge	164,000	166,700	165,600	-0.7%	168,200	168,800	0.4%
Riverside Expressway	N of the Merivale Bridge	96,000	97,500	98,200	0.7%	101,900	99,200	-2.6%
Kelliher Road	S of Ipswich Mwy, Darra	36,200	38,800	37,800	-2.6%	92,600	84,800	-8.4%
CLEM7	at Brisbane River	X	66,800	66,700	-0.1%	79,100	80,100	1.3%
ICB	Land Bridge	79,200	126,000	125,200	-0.6%	143,100	142,800	-0.2%
Hale Street Link	at Brisbane River	X	19,200	18,800	-2.1%	25,000	23,900	-4.4%
Gympie Road	N of Broughton Road, Kedron	63,400	94,900	92,900	-2.1%	103,400	102,900	-0.5%
Lutwyche Road	N of Stoneleigh Street, Lutwyche	60,600	49,600	46,400	-6.5%	50,100	47,700	-4.8%
Kingsford Smith Drive	E of Cooksley Street, Hamilton	62,400	62,900	66,500	5.7%	71,200	72,100	1.3%
Regional Ring Roads								
Stafford Road	E of Beaconsfield Terrace, Kedron	19,200	37,500	36,800	-1.9%	41,900	41,700	-0.5%

Road	Location	Average Weekday Traffic						
		2007	2014			2026		
			EIS (from Table 5-34)	EIS Reference Project With Updated Future Base Network Projects	% Difference	EIS (from Table 5-34)	EIS Reference Project With Updated Future Base Network Projects	% Difference
Coonan Street	at Walter Taylor Bridge	32,500	33,800	33,600	-0.6%	33,900	33,700	-0.6%
Ipswich Road	N of Gainsborough Street, Moorooka	31,800	37,500	37,100	-1.1%	44,500	43,700	-1.8%
Jubilee Terrace	N of Coopers Camp Road, Ashgrove	27,700	25,900	26,500	2.3%	27,900	27,900	0.0%
City Distributor Roads								
Fairfield Road	N of Sherwood Road, Yeerongpilly	17,400	20,500	20,500	0.0%	23,900	23,500	-1.7%

Table Note: Source: Northern Link Traffic Model

Table B-18 shows the effect of the updated network projects on forecast weekday traffic volumes for roads and streets in the areas connecting to the EIS Reference Project. The effects are generally minor, although for some local streets the percentage changes are significant.

The most significant example is Morley Street. Indirect effects, propagating mainly from changes in the Hale Street Link project, modify the balance of local streets used by traffic filtering through the area north of Milton Road, which results in a reduction of forecast usage of Morley Street of up to approximately 800 vpd – a very small change in overall strategic model volumes, but a significant proportion of total usage on this local street.

Generally the updated forecasts remain very similar to the results presented in the EIS.

The effects of the updated network projects on forecast volumes on roads and streets within the study area is shown in **Table B-19**. As previously observed for regional and connecting roads, the effects are generally very small, with overall traffic patterns for the EIS Reference Project remaining essentially as reported in the EIS.

The most significant differences result from the changed configuration of the Coronation Drive / Hale Street intersection in the updated Hale Street Link project. This increases forecast demands on the eastern end of Coronation Drive compared to usage of Milton Road.

With the EIS Reference Project in place and an inbound bus lane re-instated on Coronation Drive, the effect of the removal of tidal flow operation of Coronation Drive in the updated network scenario results in secondary effects on route selection via lower order streets, in most cases leading to slightly smaller forecast volumes on local streets within the study area, although the scale of the changes is generally very small to negligible.

The changes in overall traffic through the study area is shown by the comparison of screenline totals in **Table B-20.** There are no significant changes in screenline totals, which are generally within 1% of the forecasts reported in the EIS for the reference project. For commercial vehicles, similarly, the screenline totals are not significantly changed by the update, with a maximum difference of approximately 300 vpd (less than 3%).

The impact of the updated assumptions on forecast travel times with the EIS Reference Project in place is shown in **Table B-21** and **Table B-22**, for regional/cross-city and central city/inner west routes respectively. These tabulations show that the impact of the incorporation of updated base future network projects on travel times is not significant. Almost all of the forecast travel times vary from the EIS forecasts by less than 1 minute, with a maximum change of less than 2 minutes.

In summary, supplementary traffic modelling for the EIS Reference Project incorporating the effects of the updated descriptions of projects such as Hale Street Link and the removal of the Coronation Drive tidal flow system indicate only minor changes in traffic forecasts compared with the EIS. The traffic and transport performance characteristics detailed in the EIS, both without and with the EIS Reference Project, remain essentially as described, and the conclusions presented in the EIS remain appropriate.

Table B-18 Volumes on Key Connecting Roads to the EIS Reference Project with Updated Future Base Network Projects

Reporting Point	Road	Location	2007	Average Weekday Traffic					
				2014			2026		
				EIS (from Table 5-35)	EIS Reference Project with Updated Base Future Network Projects	% Change	EIS (from Table 5-35)EIS Project	EIS Reference Project with Updated Base Future Network Projects	% Change
Western Connection									
A	Western Freeway	South of Mt Coot-tha Road	76,500	114,500	114,400	-0.1%	137,800	138,000	0.1%
BB	Centenary Bridge		86,800	110,400	111,400	0.9%	137,400	139,200	1.3%
39	Croydon Street	South of Milton Road	12,000	43,000	42,700	-0.7%	45,900	44,900	-2.2%
36	Morley Street	North of Milton Road	3,900	4,600	3,800	-17.4%	5,000	4,600	-8.0%
S	Jephson Street	North of Sherwood Road	13,000	27,900	27,200	-2.5%	30,400	29,600	-2.6%
W	Sylvan Road	South of Croydon Street	10,900	12,500	13,200	5.6%	12,000	12,100	0.8%
4	Burns Road	East of railway	4,400	5,800	6,000	3.4%	6,200	6,400	3.2%
Eastern Connection									
R	ICB	Land Bridge	79,200	126,000	125,200	-0.6%	143,100	142,800	-0.2%
DD	Kelvin Grove Road	South of Blamey Street[(1)]	53,000	59,300	60,600	2.2%	67,400	68,200	1.2%
T	Kelvin Grove Road	North of School Road	50,500	51,400	52,800	2.7%	58,600	59,800	2.0%
27	Kelvin Grove Road	South of Ithaca Street	35,300	37,600	37,900	0.8%	40,500	40,200	-0.7%
25	Kelvin Grove Road	off ramp to College Road	5,000	9,000	10,300	14.4%	11,800	12,200	3.4%
23	College Road	East of 5 ways	31,600	45,300	46,700	3.1%	54,700	55,100	0.7%
24	Musgrave Road	West of 5 ways	32,900	37,100	37,900	2.2%	41,600	41,500	-0.2%
26	Petrie Terrace	South of 5 ways (one-way northbound)	12,900	13,600	13,500	-0.7%	18,500	19,100	3.2%
22	Countess Street	South of College Road (one-way southbound)	37,300	37,700	38,400	1.9%	39,300	39,500	0.5%
40	Musgrave Road loop to NL, KGR and ICB	West of Hale Street (one-way from Musgrave Road)	5,000	9,700	9,300	-4.1%	13,400	12,500	-6.7%

- **Table B-19 Volumes on Surface Roads within the Inner West Transport Study Area – EIS Reference Project with Updated Future Base Network Projects**

Hierarchy	Reporting Point	Road	Location	2007	Average Weekday Traffic					
					2014			2026		
					EIS (from Table 5-37)	EIS Reference Project with Updated Future Base Network Projects	% Change	EIS (from Table 5-37)	EIS Reference Project with Updated Future Base Network Projects	% Change
Regional Radial										
	B	Moggill Road	East of Russell Terrace, Indooroopilly	40,700	40,400	40,500	0.2%	44,800	45,300	1.1%
	D	Moggill Road	East of Brisbane Boys College Entrance, Toowong	38,500	40,000	40,500	1.3%	43,400	44,000	1.4%
	F	High Street	West of Benson Street, Toowong	32,400	26,100	27,200	4.2%	27,400	29,000	5.8%
	X	Milton Road	West of Croydon Street, Toowong	54,900	58,300	58,800	0.9%	60,600	61,700	1.8%
	J	Milton Road	East of Croydon Street, Toowong	52,900	58,100	57,400	-1.2%	63,500	64,000	0.8%
	O	Milton Road	East of Castlemaine Street, Milton	51,500	61,100	58,900	-3.6%	65,900	65,700	-0.3%
	K	Coronation Drive	West of Land Street, Auchenflower	62,600	56,000	58,700	4.8%	57,900	60,200	4.0%
	P	Coronation Drive	East of Cribb Street, Milton	90,100	80,900	83,900	3.7%	83,800	86,700	3.5%
Regional Ring										
	C	Walter Taylor Bridge	Indooroopilly	32,500	33,800	33,600	-0.6%	33,900	33,700	-0.6%
	E	Miskin Street	North of Ascog Terrace, Toowong	10,500	8,400	8,200	-2.4%	9,500	9,300	-2.1%
	I	Frederick Street	South of Victoria Crescent, Toowong	33,500	32,900	33,700	2.4%	33,200	33,400	0.6%
	19	Hale Street	South of Caxton Street	76,900	81,600	82,700	1.3%	86,800	88,000	1.4%
	30	Jubilee Terrace	North of Coopers Camp Road	27,700	25,900	26,500	2.3%	27,900	27,900	0.0%
	31	Sherwood Road	West of Jephson Street	5,400	4,200	4,400	4.8%	6,000	5,900	-1.7%
City Distributor										
	G	Brisbane Street	North of Josling Street, Toowong	37,100	42,200	42,000	-0.5%	45,000	45,100	0.2%

Hierarchy Reporting Point		Road	Location	2007	Average Weekday Traffic					
					2014			2026		
					EIS (from Table 5-37)	EIS Reference Project with Updated Future Base Network Projects	% Change	EIS (from Table 5-37)	EIS Reference Project with Updated Future Base Network Projects	% Change
	W	Sylvan Road	South of Croydon Street, Toowong	10,900	12,500	13,200	5.6%	12,000	12,100	0.8%
	Q	Caxton Street	West of Hale Street, Paddington	22,900	29,200	29,200	0.0%	31,600	31,400	-0.6%
	32	Latrobe Terrace	West of Enoggera Terrace	14,200	16,700	16,400	-1.8%	18,200	17,900	-1.6%
Local Streets										
	L	Eagle Terrace	West of Roy Street, Auchenflower	4,100	6,000	6,000	0.0%	6,900	6,800	-1.4%
	M	Haig Road	West of Barona Road, Milton	6,500	9,400	9,300	-1.1%	10,200	9,700	-4.9%
	N	Park Road Mid-block	North of Gordon Street, Milton	12,100	13,400	12,900	-3.7%	14,800	13,800	-6.8%
	33	Sir Samuel Griffith Drive	North of Birdwood Terrace	5,300	4,900	4,600	-6.1%	6,500	6,600	1.5%
	34	Stuartholme Road	North of Birdwood Terrace	3,600	3,100	3,500	12.9%	4,000	4,100	2.5%
	35	Enoggera Terrace	North of Latrobe Terrace	5,100	5,800	5,700	-1.7%	7,300	7,100	-2.7%
	28	Rainworth Road	East of Rouen Road	4,300	4,200	3,800	-9.5%	5,700	5,800	1.8%
	36	Morley Street	North of Milton Road	3,900	4,600	3,800	-17.4%	5,000	4,600	-8.0%
	37	Lang Parade	North of Coronation Drive	6,800	9,000	8,100	-10.0%	10,000	9,800	-2.0%
	29	Birdwood Tce	East of Gregory Street	1,600	3,000	2,400	-20.0%	2,800	2,400	-14.3%
	38	Heussler Terrace	West of Castlemaine Street	8,000	11,200	9,500	-15.2%	11,200	10,200	-8.9%
	H	Sylvan Road	East of Milton Road, Toowong	8,400	4,500	4,400	-2.2%	3,900	4,000	2.6%

Table Note: Source: Northern Link Traffic Model

Table B-20 Surface Traffic Changes within the Inner West Transport Study Area with Updated Future Base Network Projects

Screenline[1]	2007	Average Weekday Traffic					
		2014			2026		
		EIS (from Table 5-38)	With Updated Future Base Network Projects	% Change	EIS (from Table 5-38)	With Updated Future Base Network Projects	% Change
1 – Indooroopilly	162,400	201,400	199,500	-0.9%	229,600	228,200	-0.6%
2 – St Lucia and University	73,800	81,300	81,300	0.0%	87,700	87,800	0.1%
3 – Toowong	174,200	174,700	176,000	0.7%	186,900	189,200	1.2%
4 – Milton	205,500	210,600	212,500	0.9%	226,300	227,700	0.6%

Table Notes:
Source: Northern Link Traffic Model
1 A screenline is a notional boundary across roads within the inner west suburbs in the vicinity of the project across which traffic demands can be compared.

- **Table B-21 Effects of EIS Reference Project on Travel Times and Speeds for Key Routes – Regional and ATC/Airport Travel**

Route (Refer to Figure 9-20 of the EIS for travel time routes)	Direction	Without NL		EIS Assessment				With EIS Reference Project and Updated Future Base Network Projects			
				On Surface		Via NL		On Surface		Via NL	
		(min)	(km/h)	(min)	(km/h)	(min)	(km/h)	(min)	(km/h)	(min)	(km/h)
AM Peak Hour											
2014											
D - Western Corridor to Airport	E/B – N/B	58	67	58	68	46	75	56	70	46	76
E - Indooroopilly to Chermside	E/B – N/B	35	33	33	35	20	53	33	35	20	53
F - Toowong to Airport - Milton Road	E/B – N/B	28	41	25	45	14	80	25	45	14	80
F - Toowong to Airport - Coronation Drive	E/B – N/B	29	40	27	42	14	80	27	41	14	80
2026											
D - Western Corridor to Airport	E/B – N/B	70	55	69	56	55	64	66	59	52	67
E - Indooroopilly to Chermside	E/B – N/B	42	28	34	35	20	52	35	34	20	52
F - Toowong to Airport - Milton Road	E/B – N/B	40	28	33	34	19	59	33	34	19	59
F - Toowong to Airport - Coronation Drive	E/B – N/B	38	30	35	32	19	59	35	32	19	59
PM Peak Hour											
2014											
D - Western Corridor to Airport	W/B – S/B	59	66	58	67	47	75	56	70	45	77
E - Indooroopilly to Chermside	W/B – S/B	37	32	35	33	20	51	35	33	20	51
F - Toowong to Airport - Milton Road	W/B – S/B	32	38	31	39	14	81	29	42	14	80
F - Toowong to Airport - Coronation Drive	W/B – S/B	34	35	34	35	14	81	32	38	14	80
2026											
D - Western Corridor to Airport	W/B – S/B	70	55	67	58	53	67	63	61	48	72
E - Indooroopilly to Chermside	W/B – S/B	44	26	36	32	21	51	36	32	20	51
F - Toowong to Airport - Milton Road	W/B – S/B	34	36	34	36	14	81	32	38	14	80
F - Toowong to Airport - Coronation Drive	W/B – S/B	39	31	37	33	14	81	35	35	14	80

- **Table B-22 Effects of EIS Reference Project on Travel Times and Speeds for Key Routes – Central City and Inner West Travel**

Route (Refer to Figure 9-20 of the EIS for travel time routes)	Direction	Without NL				EIS Assessment						With EIS Reference Project and Updated Future Base Network Projects					
		via Coronation Drive		via Milton Road		Coronation Drive		Milton Road		via Northern Link		via Coronation Drive		via Milton Road		via Northern Link	
		(min)	(km/h)	(min)	(km/h)	(min)	(km/h)	(min)	(km/h)	(min)	(km/h)	(min)	(km/h)	(min)	(km/h)	(min)	(km/h)
AM Peak Hour																	
2014																	
A - Centenary Br. to Land Br.	E/B – N/B	24	30	23	33	23	32	19	39	12	62	23	31	20	38	12	61
B - Chapel Hill to Spring Hill	E/B – N/B	21	24	20	26	19	27	16	34	10	54	19	27	16	34	10	55
C - Toowong to Newmarket	E/B – N/B	16	25	16	26	15	27	13	32	9	50	15	27	13	32	9	50
2026																	
A - Centenary Br. to Land Br.	E/B – N/B	26	27	28	27	22	32	19	41	9	79	23	32	18	41	9	79
B - Chapel Hill to Spring Hill	E/B – N/B	24	21	26	20	20	25	16	32	9	57	21	25	16	33	9	57
C - Toowong to Newmarket	E/B – N/B	18	22	21	20	16	25	14	29	9	50	16	25	13	31	9	50
PM Peak Hour																	
2014																	
A - Centenary Br. to Land Br.	W/B – S/B	24	31	20	37	24	31	20	38	11	63	24	30	20	38	12	62
B - Chapel Hill to Spring Hill	W/B – S/B	22	23	20	28	22	23	19	29	11	48	22	23	19	29	11	49
C - Toowong to Newmarket	W/B – S/B	19	23	16	26	19	23	15	28	9	50	19	23	15	28	9	50
2026																	
A - Centenary Br. to Land Br.	W/B – S/B	28	26	20	38	23	31	19	39	10	70	24	30	21	36	11	66
B - Chapel Hill to Spring Hill	W/B – S/B	28	18	21	26	23	22	20	28	11	49	23	22	20	27	11	48
C - Toowong to Newmarket	W/B – S/B	23	19	17	25	19	22	16	27	9	48	20	21	17	25	9	48

B.5.4 Issue 10 – Centenary Motorway HOV Lanes

A submission has requested clarification on assumptions regarding the Centenary Motorway, commenting that throughout the document variously refers to GP lanes, T2 lanes and HOT lanes.

A submission identified that all lanes on the Centenary Motorway/ Western Freeway should be general purpose lanes. Any decision to restrict lanes to high occupancy vehicles or public transport should be evidence based to demonstrate the implications on the level of congestion. A comparison of the project with all general purpose lanes versus a GP + (HOV/HOT) lane option should be undertaken and made available for public discussion.

Response

As identified in Section 5.4.4 of the EIS, a preliminary planning study is in progress by DTMR for the Centenary Motorway and Western Freeway transit lane project identified within SEQIPP. Although this investigation has not been finalised, based upon advice from DTMR for the purposes of traffic modelling for the EIS this project was coded as an upgrading from 4 to 6 lanes, inclusive of a single transit (T2) lane each way between Mt Coot-tha Road and Warrender Street, Darra, just north of the Ipswich Motorway. No upgrading over the existing 4 lane Centenary Bridge was assumed. This project was included in modelling of the base future networks both without, and with, Northern Link from 2016 onwards for the EIS traffic assessment. This assumption for the Centenary Motorway and Western Freeway has also been applied for the traffic modelling for the Project presented in Chapter 4 of the EIS Supplementary Report.

In Section 21.4.3 of the EIS, an assessment of the cumulative effects of Northern Link with corridor options identified in the Western Brisbane Transport Network Investigation (WBTNI) is presented for 2026. In this scenario an additional major link connection to the Western Freeway- Centenary Motorway in the form of the WBNTI Option 3, a new corridor between Toowong and Everton Park was incorporated. With this potential significant network enhancement, it was assumed in the traffic modelling that the Western Freeway and Centenary Motorway would operate as 3 general purpose lanes in each direction, inclusive of the Centenary Bridge. This was considered appropriate to allow the combined effects of the WBTNI corridor options and Northern Link to be examined, in a context where the feeder road capacity on the Centenary Motorway would be matched with the connecting infrastructure. The final form of any upgrading of the Centenary Motorway would require further consideration in the detailed planning for implementation of the WBTNI options. The same assumptions about the Centenary Motorway have been incorporated in the traffic modelling assessment of the cumulative effects of the Project with the WBTNI corridor options presented in Chapter 4 of the EIS Supplementary Report.

Traffic modelling of Northern Link with general purpose lanes on the Western Freeway and Centenary Motorway is presented in response to Issue 7 in Section B5.5.

B.5.4 Issue 11 – Toll Charges

A submission identified that a toll of $3.93 (in 2008 dollars including GST) has been assumed for modelling of traffic demand. However, there does not appear to be any discussion surrounding the derivation of this toll price in the EIS and the cumulative impacts of other toll roads do not appear to have been given consideration in the EIS.

Another submission requested confirmation if modelling was undertaken to assess the effect of cumulative tolls arising from use of multiple toll roads for destination centres (for example, the cumulative toll for the Airport Link and Northern Link between the ATC and Toowong) on Northern Link patronage. Clarification is also sought on vehicle categories used for modelling and toll classifications, particularly the use of the terms 'commercial vehicles' and 'heavy vehicles', and light commercial vehicles

Response

The cumulative effects of other toll roads have been included in the traffic modelling undertaken for the EIS. As described in Section 6.2.3 of the EIS Technical Paper No 1, toll values have been included in the road network description in the traffic model as a monetary charge on particular road segments representing existing or proposed toll collection points.

For this EIS, Northern Link traffic forecasts have been prepared assuming a toll of $3.93 (expressed in 2008 dollars including GST). This toll level is within the range under consideration within the Business Case. It equates to a toll of $3.30 (expressed in 2002 dollars including GST) which was the toll level applied in Council's TransApex Feasibility Study (March 2005)

The value of tolls on Northern Link and other TransApex toll facilities at the proposed year of opening, 2014, were included in the traffic model as:

- Northern Link tolls (2008 dollars including GST): $3.93 for light vehicles, $7.86 for commercial vehicles.
- Airport Link tolls (2008 dollars including GST): full (north-south) journey – $4.24 for light vehicles, $11.23 for commercial vehicles; and partial (east-west) journey – $3.18 for light vehicles, $8.42 for commercial vehicles.
- CLEM7 toll (2008 dollars including GST):$3.93 for light vehicles, $10.41 for commercial vehicles.
- Hale Street Link (2008 dollars including GST): $2.40 for light vehicles, $6.37 for commercial vehicles.

A common basic perceived toll dollar value has been calculated for each year for use in the model. This calculated value takes into account the assumption that tolls will rise with CPI, and increases in average wages (spending power) slightly higher than CPI.

Technical details on the toll choice assignment model, and the manner in which it considers combinations of major route choice options using a single or multiple toll roads in the network, is provided in Section C.5 of the EIS Technical Paper No 1.

Vehicle categories used in the traffic model were light vehicles and commercial vehicles. Two separate toll rates were applied for each vehicle category in the traffic model (as described above) for all toll roads in the network. Commercial vehicles incorporate vehicles of Austroads classes 3 to 12, also referred to as heavy commercial vehicles. Light commercial vehicles (such as business cars and utility vehicles) are not modelled separately and are incorporated in the overall modelling of light vehicles. Based on traffic counts, it is estimated that light commercial vehicles would comprise approximately 7% of total vehicle flows. Similarly motorcycles are not explicitly modelled, and would represent around 0.5% of total traffic.

B.5.4 Issue 12 – Peak Oil Scenario Modelling

The traffic modelling has not taken into account the impact of "peak oil" and the global economic meltdown on the behaviour of drivers of motor vehicles.

Response

The traffic demand forecasts used in the Northern Link EIS are based on demographic data provided by the SEQ Economic and Forecasting Study (2007). The employment growth forecasts in this study, prepared by NIEIR, are based on an economic scenario which includes two world recessions in the next 20 years, including one starting in 2009.

NIEIR's report also identified a 'world financial meltdown' scenario, but stated that this was not appropriate for forecasting as provision of infrastructure to suit this scenario would in itself constrain economic growth. While the timing and intensity of economic downturns may vary from the scenario on which the demographic forecast was based, the model represents a strategic level, long term forecast. Over the 20 year forecast period, aggregate growth is likely to be comparable.

Sensitivity testing on a "peak oil" scenario was undertaken and reported in the EIS Section 5.4.5. These effects were simulated in a model test by doubling the weight applied to route distance within the toll choice assignment model path cost calculation. This explores a potential response to rise in fuel prices. The effect generally across the study area was a consolidation of traffic on the more direct routes. As a result, traffic transferred from longer bypass routes (e.g.: Gateway Motorway) in favour of more direct routes such as via Airport Link. The overall forecast traffic volumes on Northern Link were found to be similar to those forecast with standard operating cost assumptions.

B.5.4 Issue 13 – Induced Demand

Several submissions have raised the issue of induced traffic demand. Issues raised were:

- an explanation (and review as necessary) of the calculation of 'induced' traffic with reference to SEQ examples demonstrating the accuracy of techniques applied. Anecdotal evidence was referenced regarding other projects, for example anticipated 'freed-up' space on Bowen Bridge Road, Breakfast Creek Road and Ann Street filled with general traffic after the Inner City Bypass opened; and the rate of general traffic growth on the Pacific Motorway following its 8-laning. Concerns that the calculation of induced traffic generated by Northern Link seems to be severely understated were raised.
- another submission however identified the opposite effect regarding the incorporation of induced demand effects in the Northern Link modelling. The issue raised was that induced demand is only significant when there is a substantial change in accessibility (to urban activities) being proposed., and given that the Northern Link project is in inner city Brisbane, such modelling cannot be justified without local data. It was requested that modelled volumes on Northern Link with and without induced demand be provided.
- other submissions do not support the EIS assertion that the project would result in "low levels of induced demand" and identify that promoting even greater car dependence for Brisbane is a significant, broad scale impact of the project that is not addressed.

Response

Explanation of Induced Traffic Calculation and Findings

The approach used in calculating induced traffic is described in Section 6.1.6 and 6.1.7 of EIS Technical Paper No 1.

The opening of a major transport infrastructure facility, such as Northern Link can produce several responses from the travelling public. The responses of the travelling public to improvements in network connectivity or reduction in congestion are referred to as induced traffic demand, and can result in increased vehicle kilometres on the road network.

Induced traffic responses directly catered for within the Northern Link Traffic model include:

- Changes in travel route. This is catered for in the trip assignment sub-model.
- Travel to new destinations for the same trip purpose. This is catered for in the trip distribution sub-model.

Responses catered for a supplementary induced traffic estimation process are:

- Changes in the frequency of some journeys and making entirely new journeys. The base demand model used fixed trip generation rates. Both these effects are catered for outside the base demand Model within the induced demand sub-model.
- Changes in journey start times. The base demand model uses fixed factors for the travel time of day for various trip purposes. Changes in travel start time to exploit improved peak travel times are accounted for outside the base demand model within the induced demand sub-model.
- Changes from other modes (public transport, cycling and walking) to private vehicle. This effect is addressed by use of a separate mode choice sub-model.
- Changes in vehicle occupancy. The base demand model uses fixed factors for the number of passengers per vehicle for various trips purposes. Changes in this characteristic are accounted for outside the base demand model within the induced demand sub-model.
- Changes in the pattern of land use. For this study, the base land use patterns reflect the preferred pattern of development for the metropolitan area under the South East Queensland Regional Plan.

The method applied to calculate these supplementary effects and estimate new trips associated with the project has utilised (with some customisation) techniques documented in the New Zealand Project Evaluation Manual[9]. The method applies an elasticity approach with elasticity of demand, E, of -0.2 adopted based on suggested values in the PEM. The parameter adopted is consistent with that applied on other major TransApex feasibility study assessments in Brisbane including NSBT and Airport Link.

The induced demand models have been run for each time period and forecast year to provide revised demand matrices ready for use in the toll choice model time period assignments. The induced demand model has been run for private vehicle demand matrices only. The commercial vehicle demand matrices have not been modified from the base demand model estimates.

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1) [9] Land Transport New Zealand. (October 2005). Project Evaluation Manual Vol 1. Amendment No 9. PFM 2 Appendix A11 Evaluation of Congested Networks and Induced Traffic Effects. http://www.ltsa.govt.nz/funding/project-evaluation-manual/landtransportnz-pfm2-9.chm

Results indicate that the demand induced by the project in the entire Brisbane metropolitan area is relatively small, an estimated 23,100 private vehicle trips on an average weekday by 2026, or an additional 0.4% of vehicle trips within the Brisbane metropolitan area. By comparison, the Airport Link project has been estimated to result in an induced demand of an additional 0.7% of vehicle trips across Brisbane. Induced demands are also forecast to vary by time of day. The project provides most congestion relief within the peaks and, as such, the travel induced in these periods is greater than during off-peak periods. Overall induced demands within the Metropolitan Area in the am peak across the forecast years are in the range 0.5% to 0.6% of the base demand. Induced demand in the pm peak is in the range 0.6% to 0.8%, and the off-peak induced demand is in the range 0.2% to 0.5%.

Inspection of the demand matrices has also been carried out. Key observations include;

- Trip end increases are not isolated to the primary corridor within which the project is located;
- Increases in demand are indicated in secondary areas where traffic relief has occurred due to the project introduction; and
- As a result of the above, the induced traffic would not appear exclusively as additional potential project traffic.

Analysis of the trip lengths of the induced traffic (new trips) orgin-destination pairs within the demand matrix has also been undertaken. The forecast average trip length for the induced (new trips) associated with Northern Link is 15.2 km, compared to the average trip length for private vehicles of 14.2 km in 2026 within the overall metropolitan area.

Comparison with SEQ project examples of induced traffic effects

Limited empirical information on the induced traffic effects of road projects constructed in the SEQ region in recent years is available. Of the major projects recently implemented in and around the Brisbane region, the Pacific Motorway and Gateway Motorway projects are not considered comparable to Northern Link, due to differences in scale and accessibility benefits for relatively underdeveloped areas. Consideration of the induced traffic effects Inner City Bypass is more relevant to the current study, and some assessment of these effects has therefore been undertaken using empirical data as described below.

The Impact Assessment Study[10] carried out for the ICB (then known as the City-Valley Bypass) forecast that that project would "not generate any significant additional traffic; it merely redistributes it, particularly away from the City and the Valley". Traffic entering the study area was forecast to increase by 1.2% or 2.4% if the Sandgate Road cordon crossing was excluded.

Historical traffic count data from QDMR's Traffic Census and BCC's BLISS system has been collected to investigate the induced traffic effect of the Inner City Bypass. Average growth rates up to 1999, prior to the start of construction, have been extrapolated to estimate "without-ICB" volumes, and these compared to the historical data. The implied effect of the project can be compared to the forecast impacts from the IAS. The results of the assessment are summarised in Table B-23**.** Across a comparable cordon, a 0.6% increase in traffic was evidenced based on actual traffic counts (compared to the 2.4% forecast). The findings are not conclusive, as the historical count data also includes a number of other influences on inner city traffic occurring at the same time, both physically (such as bus lane changes) and economically (such as rapid jobs growth and fuel price variations).

[10] Brisbane City Council (August 1998) City Valley Bypass Impact Assessment Study.

Despite this, the available data does not support anecdotal reports suggesting a high induced traffic effect from the ICB. In fact, the results suggest greater than expected decreases in traffic in inner areas, though less concentrated on the Ann/Wickham/Turbot corridor than originally forecast. These results also indicate smaller increases than expected across the study area boundary (as described above). These differences are not due to low usage of the new facility. The Inner City Bypass appears to have been more popular than expected, carrying almost 75,000 vpd in 2007 as compared to the IAS forecast of just over 70,000 vpd by 2011.

In summary, the assessment of the Inner City Bypass indicates that, based upon empirical evidence, a significant induced traffic effect is not apparent.

It is noted that Northern Link is a larger scale project and leads to less intensely developed areas. Slightly more induced traffic could therefore be expected (than has been evidenced for the ICB). It is therefore considered that he approach adopted in the EIS that allows some consideration of the effect remains appropriate.

Table B-23 Assessment of Forecast and Estimated Traffic Effects of Inner City Bypass (Average Weekday Traffic Volumes)

Road	Forecasts from City-Valley Bypass (ICB) Impact Assessment Study						Findings based on Traffic Count Data				
	1995 Base	2011 Base	1995 With ICB	2011 With ICB	Forecast 2003 Impact	Forecast 2007 Impact	1999	2003	2007	Estimated 2003 Impact	Estimated 2007 Impact
City Valley Bypass (ICB) Study Area Boundary											
IAS Total	694,200	768,400	702,500	777,600	1.2%	1.2%	-	-	-	-	-
IAS Total excluding Sandgate Rd[1]	679,000	750,200	693,500	768,600	2.3%	2.4%	657,300	673,200	719,200	-1.4%	0.6%
Selected Key Roads inside ICB boundary											
Ann/Wickham at Montpelier	41,200	45,000	32,700	34,600	-22%	-22%	66,500	59,200	66,000	-17%	-14%
Ann/Turbot at Boundary	31,800	36,500	24,300	31,000	-20%	-17%	38,000	33,300	33,600	-10%	-6%
Turbot/Ann at George	51,800	54,200	48,900	53,000	-4%	-3%	51,900	46,000	40,700	-6%	-12%
Markwell St	33,200	35,400	28,400	31,900	-12%	-11%	20,100	17,400	17,400	-10%	-7%
Brookes St	27,400	29,000	19,500	18,900	-32%	-33%	10,400	10,600	11,700	9%	30%
Bowen Bridge	43,500	50,000	39,200	45,100	-10%	-10%	46,500	46,900	51,200	6%	21%
College St	50,200	55,000	45,200	47,400	-12%	-13%	41,700	33,400	38,700	-24%	-15%
Roma St	18,400	21,300	17,100	21,000	-4%	-3%	31,300	27,600	24,300	-17%	-31%
North Quay	13,100	13,600	18,000	13,100	15%	5%	55,300	57,700	58,000	0%	-4%
Coronation Dve	74,400	77,400	72,700	74,400	-3%	-3%	93,200	96,500	98,200	1%	0%
Victoria Bridge	20,200	27,600	18,300	25,100	-9%	-9%	13,000	12,600	13,600	13%	41%
Captain Cook Bridge	154,400	165,700	154,500	166,400	0%	0%	142,600	147,600	142,900	-11%	-26%
Story Bridge	90,500	103,200	89,200	100,900	-2%	-2%	80,800	99,100	105,400	12%	9%
Total	650,100	713,800	607,900	662,900	-7%	-7%	691,400	687,800	701,600	-5%	-9%

Table Note

1As historical empirical data was not available for one cordon crossing (i.e. Sandgate Road), comparative analysis has been carried out for a cordon excluding this single location.

Provision of Forecasts for Northern Link excluding Induced Traffic Effects

The scale of total induced traffic within the Metropolitan area, as detailed in Section 5.4.6 of the EIS, is small.

In response to the induced traffic issue raised in the DTMR submission, a traffic model run has been carried out excluding induced traffic, in order to identify the impact on traffic volumes for both the EIS reference project and the Project. The results are summarised in **Table B-24** and **Table B-25.** It can be seen that induced traffic makes only a minor contribution to the total forecast usage of Northern Link for both cases (i.e. no greater than 5%).

- **Table B-24 Impact of Induced Traffic for the EIS Reference Project on Average Weekday Traffic Volumes**

Element	With Induced Traffic[1]		Without Induced Traffic[2]		Contribution of Induced Traffic	
	2014 [3]	2026	2014 [3]	2026	2014	2026
Eastbound tunnel	29,000	38,600	28,100	37,100	2.8%	3.9%
Westbound tunnel	26,900	35,900	26,500	34,400	1.5%	4.4%
Total EIS Reference Project	55,800 (39,100)	74,600	54,600 (38,200)	71,500	2.2%	4.1%

Table Notes:
1Updated model run with EIS Reference Design Northern Link (TR_256), including updated base network projects.
2Sensitivity test model run, as TR_256 but excluding demand changes from Induced Traffic Sub-model (TR_300)
32014 model volumes exclude adjustment for ramp-up effects. At opening, volumes would be typically 70% of the traffic model forecast and these adjusted volumes are indicated in brackets below the modelled volume. Ramping up to the modelled 2014 volumes would typically occur over an 18 month to 2 year period.
4Forecast based on toll of $3.93 expressed in $2008 including GST.

- **Table B-25 Impact of Induced Traffic for the Project on Average Weekday Traffic Volumes**

Element	With Induced Traffic[1]		Without Induced Traffic[2]		Contribution of Induced Traffic	
	2014 [3]	2026	2014 [3]	2026	2014	2026
Eastbound tunnel	18,400	26,400	17,900	25,300	2.8%	4.3%
Westbound tunnel	15,800	22,400	15,400	21,000	2.6%	6.7%
Total Northern Link Project	34200 (24,000)	48,800	33300 (23,300)	46,300	2.7%	5.4%

Table Notes:
1Updated model run with the Project without local connections (TR_257), including base network projects.
2Sensitivity test model run, as TR_257 but excluding demand changes from Induced Traffic Sub-model (TR_371)
32014 model volumes exclude adjustment for ramp-up effects. At opening, volumes would be typically 70% of the traffic model forecast and these adjusted volumes are indicated in brackets below the modelled volume. Ramping up to the modelled 2014 volumes would typically occur over an 18 month to 2 year period.
4Forecast based on toll of $3.93 expressed in $2008 including GST.

B.5.5 Future Conditions without Northern Link

B.5.5 Issue 1 – Traffic Growth Trends

Data in the forecast traffic growth tables are not supported by explanations for predictions that run counter to expectations or reverse current traffic trends. In particular, the validity of the traffic generation data provided within the EIS for the Croydon Street/ Milton Road intersection was raised and particularly, the prediction that traffic at this intersection will more than double in the next five years even without Northern Link.

Response

The traffic growth at the Milton Road/Croydon Street intersection without the project has been influenced by the assumptions included in the strategic traffic model in relation to the base future network. In particular, the base future networks incorporate previously planned Council intersection safety and efficiency improvements at the Milton Road/Croydon Street and Milton Road/Sylvan Road intersections. The forecast increase in traffic on Croydon Street is due to a combination of overall traffic growth resulting from demographic changes, and local traffic re-routing effects with the improvement project that would incorporate provision of a right turn from Milton Road to Croydon Street (currently a banned movement), and the closure of the right turn from Milton Road to Sylvan Road.

B.5.5 Issue 2 – Future Intersection Performance

Queries have been raised regarding future intersection performance as follows:

- Clarification on the change in level of service forecast for the Mt Coot-tha Road Roundabout - without NL being constructed, the EIS forecasts that the Mt.Coot-tha Road roundabout would go from LoS A in 2007 to LoS E in 2014.
- Table 5-29. Milton Road and Frederick Street. – explain why is intersection performance better in 2026 than in 2014, as it is generally indicated by the max DoS and LoS values.

Response

Table 5-41 identifies that the Mount Coot-tha Road Roundabout level of service changes from A in 2007 to E in 2014 without the project. In the future increased right turn traffic demand from Mt Coot-tha Road in combination with increased eastbound traffic from the Western Freeway would lead to this forecast deterioration in performance. Congestion on Frederick Street and through the Toowong Roundabout area if forecast to result in a redistribution of traffic away from these routes, with more traffic likely to use a Mt Coot-tha Road route to access to the Western Freeway.

Table B-26 compares peak period volumes at this intersection and shows that large increases in demands are forecast without the project, up to 20% higher in 2014, whereas the Project would result in relief in traffic, particularly during the PM peak.

- **Table B-26 Forecast Change in Volumes at Mt Coot-tha Road roundabout**

Peak Time Period	2007	2014 with Updated Base Network	2014 with EIS Reference Project	2014 with the Project
	Volume (vph)			
AM	3,400	4,100	3,500	3,700
PM	3,700	4,300	3,300	3,300

Table Note:
Source: Northern Link Traffic Model.

B.5.6 Effects of Northern Link

B.5.6 Issue 1 – Effects of Tolling on Demand

Submissions have raised the effect on tolling on usage of Northern Link and its effectiveness of the project in achieving desired objectives. Issues include:

- There is no mechanism in place in Northern Link to sift out excessive private car travel from the more meaningful necessary motor vehicle trips. The toll is the only encumbrance to usage and this could be argued that the toll is low for most users and offers an alternative to 'above ground' access. This has a negative effect of encouraging driving as an easy alternative and discouraging cycling.
- The percentage of potential users not prepared to pay the toll could be much higher than 32%. If the purpose of Northern Link is to alleviate congestion, any toll should be priced to ensure the tunnel is not under-utilised. This conflicts with the financial imperative to set the toll at a rate that maximises profits.

Response

The potential for the Project to encourage more private vehicle trips (i.e. either by more frequent trip making by vehicle, making entirely new journeys or change from use of other modes such as public transport, cycling or walking) has been considered in the EIS Section 5.4.6 using an assessment of induced and suppressed demand. Results indicate that the demand induced by the project in the entire Brisbane metropolitan area is relatively small, an estimated 23,100 private vehicle trips on an average weekday by 2026, or an additional 0.4% of vehicle trips within the Brisbane metropolitan area.

The traffic forecasts prepared for the EIS were based upon modelling of traffic route choice using parameters derived from user surveys undertaken in Brisbane to gain an understanding of route choices on the proposed TransApex facilities particularly with regards to values of travel time savings and willingness to pay toll. A cross-section of potential toll road users was surveyed, covering variations in home location, trip origin and destination, trip purpose, and whether tolls are regularly paid. Survey quota segmentation was designed to capture samples of different movements deemed relevant to future TransApex route choice, and allow testing sensitivity to directly related alternatives on the proposed facilities. Quotas were set to achieve respondents across the full range of trip times and purposes, in sufficient numbers for conclusions within the segment to be drawn with statistical significance. The EIS findings regarding the estimated percentage of potential users not prepared to pay a toll to use Northern Link are based on modelling that incorporates parameters that reflect average driver behaviour with respect to the willingness to pay a toll to improve travel time, avoid congestion and use higher quality roads during different periods of the day.

B.5.6 Issue 2 – User Types and Catchment

Several submissions have stated that the EIS has not included data on locations of potential users of the Northern Link tunnel.

The proposition that the local access tunnel will benefit local residents has been challenged. The role of the Toowong Connection in serving catchment areas has been raised in a negative manner. A lack of evidence to support the claims in the EIS that the Toowong connection will facilitate traffic movements to and from the Toowong Regional Centre and the University of Queensland was raised.

The net benefit in terms of reduced traffic on Milton Road and Coronation Drive (3% - from -18% to -21%) is marginal and well within standard errors of the traffic models used for the project.

Response

The origins and destinations of potential users of the EIS Reference Project are summarised (in matrix form) in Table 5-32 of the EIS. This identified that 34% of EIS Reference Project users had a trip origin

or destination in the inner west. Local residents, Toowong Regional Centre and University of Queensland travellers using the facility would have been included in this category.

Chapter 4 of the EIS Supplementary Report provides the origin and destinations of potential users of the Project. This shows that 16% of the Project users would have an origin or destination in the inner west.

Northern Link would result in benefits in terms of reduced traffic on Milton Road and Coronation Drive because some traffic both from the inner west (as described above) would divert to use the alternative route, as well as longer distance (or through traffic). The strategic traffic model is the appropriate forecasting method to assess the re-assignment of traffic, and forecast expected traffic changes on surface routes.

B.5.6 Issue 3 – Bus Priority Measures

A submission requested clarification on whether bus priority measures were to be reinstated on Coronation Drive. The submission also queried whether measures were considered for Milton Road using some of the 'capacity gap' between current and forecast LoS on Milton Road for bus priority or transit measures.

It was also submitted that reintroduction of transit priority initiatives, e.g. an inbound High Occupancy Vehicle Lane, on Coronation Drive is unjustifiable based on the relatively small reduction over current traffic volumes when Northern Link opens, the several purposes of this corridor, the traditionally low vehicle utilisation of HOV lanes and the re-routing of bus trips from Coronation Drive to Northern Link or other busways. It is suggested that a comparison of a project with all general purpose lanes versus a GP and HOV lane option be undertaken.

Response

Section 5.4.4 of the EIS describes the opportunities that would have existed for re-allocation of lane designations to improve public transport operations on Coronation Drive under the tidal flow lane system which was in operation up until late 2008. It also identifies the assumptions on bus priority measures incorporated for Coronation Drive. No specific measures were considered or modelled for Milton Road, as during peak periods the Rocket bus services that currently using Milton Road would have the opportunity to use the EIS Reference Project and the Kelvin Grove Road connection to access the Inner Northern Busway. The analysis presented in the EIS found that public transport users would benefit from sound travel time savings on surface routes, and via use of Northern Link, with the implementation of these public transport opportunities in conjunction with the reference project. Improvements in surface road travel times for general traffic along Coronation Drive and Milton Road was also found to be improved compared to the scenario without Northern Link. As both general traffic and public transport benefits were evident, detailed assessment of combinations was not considered necessary to illustrate the types of benefits that could be realised for all transport users if bus priority measures were implemented in the network with Northern Link operational.

The assessment of the effects of the Project, as detailed in Chapter 4 of the Supplementary Report, includes assumptions about the potential re-instatement of bus priority measures on Coronation Drive. While a policy decision has yet to be made on an inbound bus lane or T3 lane, the opportunity to re-introduce bus priority on Coronation Drive has been included in the surface road network assumptions undertaken for the updated traffic model and traffic assessment of the Project in the Supplementary Report. The Coronation Drive tidal flow scheme was de-commissioned in late 2008, and Coronation Drive currently operates as 3 inbound lanes and 2 outbound lanes, with dedicated right turn lanes at

intersections. The traffic assessment of the Project has incorporated an inbound bus lane on Coronation Drive, with 2 general traffic lanes operating both inbound and outbound to lock in the benefits of reduced surface volumes on Coronation Drive to provide for improved transit priority and to allow maximum traffic impacts to be assessed. This bus lane initiative has been included in transport modelling of the Project. Sensitivity testing indicates that similar strategic traffic effects would be expected with a T3 inbound transit lane.

As described in Chapter 4 both general traffic travel time and public transport travel time benefits on the surface network are forecast with the Project and implementation of inbound public transport priority initiatives on Coronation Drive. Detailed assessment of other combinations on lane allocations was not considered necessary to illustrate the types of benefits that could be realised for all transport users with the Project operational.

B.5.6 Issue 4 – Operation of the Kelvin Grove Ramp Connection

A submission identified that the EIS discussion does not indicate the impact of the Kelvin Grove ramp (to the CBD) on the performance of Kelvin Grove Road inbound and in particular the impact on public transport. Requests the impacts on Kelvin Grove Road traffic, including public transport, must be articulated.

Other submissions raise that the Kelvin Grove portal is that a six km tunnel terminates at a set of traffic lights. A traffic accident at the intersection of Kelvin Grove Road and Musk Avenue would have the potential to create a lengthy build up of cars unable to exit from the tunnel. Exit roads from the tunnel at the Kelvin Grove connection would create a permanent traffic hazard and continual traffic jams as Brisbane traffic continues to increase.

Response

As the Project does not incorporate connections to Kelvin Grove Road this issue is no longer applicable.

B.5.6 Issue 5 – Western Freeway Diverges and Merges

A submission requested that an assessment is provided on diverges and merges on the Western Freeway near the tunnel portal ramps and the ramps at Moggill Road. This is required so that Main Roads is assured that they would work safely and efficiently and that impacts have been addressed.

It is not clear what the impact is for the merge on the Western Freeway between Northern Link portals and Milton Road outbound traffic is. The matter of sufficient capacity to cater for both volumes is raised.

Response

Dynamic traffic modelling using the Paramics micro-simulation software has been undertaken for the Project to check the effects on the Western Freeway near the tunnel portal ramps and at Moggill Road, including the adequacy of the design to cater for weaving and merging movements. The findings are detailed in Chapter 4 of the EIS Supplementary Report.

B.5.6 Issue 6 – Inner City Bypass Capacity

A submission requires confirmation that forecast Inner City Bypass 'link' volume capacity takes into account limitations introduced by ramps/interchanges/intersections. The forecast LoS on the link is questioned.

Response

As described in Appendix C.4 of the EIS Technical Paper No 1, the Northern Link Traffic Model incorporates a process that explicitly incorporates the calculation of delays at intersections. This inclusion allow allows travel time on competing routes to be represented more accurately (than using only a link based approach), particularly in the context of representing inner city congestion delays. It includes coding of intersection types and lane allocations into the network representation; calculation of intersection approach capacities based on available lanes by turns, hierarchy of intersecting links, and intersection control; and separate calculation of intersection delays and link mid-block travel times using a volume delay function. Within the model the link capacities of ramps are coded separately to the capacities coded for lanes on the motorways. As this approach has been applied throughout the strategic transport model, it has been incorporated in the modelling of capacity on the Inner City Bypass.

The forecast impacts of Northern Link on ramp and interchange volumes along the Inner City Bypass are summarised in **Table B-27** for the EIS Reference Project and **Table B-28** for the Project. From **Table B-28** it can be seen that the Project does not significantly increase traffic volumes through the surface interchanges at Abbotsford Road, Kingsford Smith Drive or Sandgate Road. At the Herston Road and Bowen Hills interchanges, some ramp terminal intersections do experience moderate increases in peak hour volumes. Supplementary intersection analysis using SIDRA has been undertaken and is reported in Chapter 4 of the EIS Supplementary Report for relevant locations as follows – ICB exit ramp/Herston Road, Herston Road roundabout, Bowen Bridge Road/Herston Road, Bowen Bridge Road/Butterfield Street, Lutwyche Road/Northey Street/ICB-CLEM7 ramp, Lutwyche Road/Gallway Street-Northern Busway access. The analysis confirms that satisfactory operation is forecast with the Project.

Dynamic traffic modelling using the Paramics micro- simulation software has also been undertaken for the Project to check the effects on the Inner City Bypass near the tunnel portal ramps, including the adequacy of the design to cater for weaving and merging movements. The findings are detailed in Chapter 4 of the EIS Supplementary Report, including details of forecast traffic speeds during peak period and level of service, and show that satisfactory performance is forecast with the Project.

Table B-27 Effect of Northern Link on Inner City Bypass Ramp and Interchange Peak Hour Volumes for EIS Reference Project

	2014								2026							
	Without NL		With EIS Reference Project		% Change		Critical Peak V/C		Without NL		With EIS Reference Project		% Change		Critical Peak V/C	
	AM	PM	AM	PM	AM	PM	No NL	NL	AM	PM	AM	PM	AM	PM	No NL	NL
Herston Road Interchange																
EB Off Ramp	400	100	600	200	43%	156%	0.44	0.62	400	100	700	300	65%	182%	0.43	0.71
Sum of Key Intersection Totals	7,200	6,700	7,600	7,000	6%	4%			7,600	6,900	7,800	7,300	3%	6%		
Bowen Hills Interchange																
EB On Ramp	800	300	700	300	-13%	-6%	0.49	0.43	1,100	400	1,000	400	-9%	-7%	0.57	0.53
EB Off Ramp 1 to N	1,400	2,400	1,800	2,800	28%	18%	0.64	0.76	1,500	2,400	2,300	3,000	56%	26%	0.58	0.74
EB Off Ramp 2 to S	100	600	200	700	34%	31%	0.30	0.40	200	700	200	800	45%	26%	0.33	0.41
WB On Ramp	3,400	2,000	3,600	2,400	6%	18%	0.62	0.66	3,400	2,200	4,100	3,000	22%	37%	0.57	0.70
WB Off Ramp	600	1,300	600	1,200	4%	-4%	0.71	0.68	600	1,500	600	1,500	-9%	-1%	0.77	0.77
Sum of Key Intersection Totals	15,000	16,800	15,900	17,000	6%	2%			15,400	17,400	16,500	17,800	7%	2%		
Abbotsford Road Interchange																
EB Off Ramp	900	900	900	900	2%	7%	0.94	0.95	1,100	900	1,000	1,000	-7%	2%	1.05	0.99
WB On Ramp	1,100	1,000	1,100	1,000	1%	1%	1.01	1.01	1,100	1,200	1,100	1,200	-2%	0%	1.09	1.09
Surface Interchange Total	5,200	5,500	5,200	5,600	1%	2%			5,600	6,000	5,500	6,100	-3%	1%		
Sandgate Road Interchange																
EB On Ramp	100	0	200	0	35%	-4%	0.12	0.16	0	0	0	0	0%	5%	0.11	0.12
WB Off Ramp	100	0	100	0	-10%	5%	0.08	0.07	100	0	100	0	9%	7%	0.10	0.10
Surface Interchange Total	400	600	500	600	6%	11%			400	600	400	700	1%	9%		
Kingsford Smith Drive Interchange																
EB Off Ramp	1,500	700	1,400	800	-4%	7%	0.49	0.47	1,600	800	1,500	800	-2%	4%	0.52	0.51
WB On Ramp	1,000	1,900	1,100	1,900	2%	-2%	0.59	0.58	1,100	2,000	1,100	2,000	0%	1%	0.63	0.63
Key Intersection Total	5,100	5,700	5,200	5,700	1%	0%			5,400	6,000	5,400	6,000	0%	1%		

Table B-28 Effect of Northern Link on Inner City Bypass Ramp and Interchange Peak Hour Volumes for the Project

	2014								2026							
	Without NL		With NL		% Change		Critical Peak V/C		Without NL		With NL		% Change		Critical Peak V/C	
	AM	PM	AM	PM	AM	PM	No NL	NL	AM	PM	AM	PM	AM	PM	No NL	NL
Herston Road Interchange																
EB Off Ramp	400	100	900	400	96%	277%	0.44	0.83	400	100	1,000	400	135%	277%	0.43	0.98
Sum of Key Intersection Totals	7,200	6,700	7,700	7,300	7%	9%			7,600	6,900	8,100	7,500	8%	9%		
Bowen Hills Interchange																
EB On Ramp	800	300	700	300	-12%	-10%	0.49	0.44	1,100	400	900	400	-17%	-6%	0.57	0.48
EB Off Ramp 1 to N	1,400	2,400	1,900	2,900	37%	21%	0.64	0.77	1,500	2,400	2,600	3,300	77%	38%	0.58	0.81
EB Off Ramp 2 to S	100	600	200	700	27%	26%	0.30	0.38	200	700	300	800	64%	24%	0.33	0.41
WB On Ramp	3,400	2,000	3,700	2,800	10%	36%	0.62	0.69	3,400	2,200	4,300	3,300	27%	54%	0.57	0.73
WB Off Ramp	600	1,300	500	1,200	-13%	-4%	0.71	0.68	600	1,500	600	1,600	-9%	7%	0.77	0.83
Sum of Key Intersection Totals	15,000	16,800	15,700	17,100	5%	2%			15,400	17,400	16,400	17,900	6%	3%		
Abbotsford Road Interchange																
EB Off Ramp	900	900	900	900	0%	3%	0.94	0.94	1,100	900	1,000	900	-9%	-1%	1.05	0.97
WB On Ramp	1,100	1,000	1,000	1,000	-5%	0%	1.01	0.96	1,100	1,200	1,100	1,200	-2%	2%	1.09	1.11
Surface Interchange Total	5,200	5,500	5,200	5,600	0%	2%			5,600	6,000	5,400	6,000	-3%	1%		
Sandgate Road Interchange																
EB On Ramp	100	0	100	0	11%	-3%	0.12	0.14	0	0	0	0	5%	4%	0.11	0.12
WB Off Ramp	100	0	100	0	16%	1%	0.08	0.09	100	0	100	0	7%	-14%	0.10	0.09
Surface Interchange Total	400	600	500	600	5%	12%			400	600	400	700	2%	3%		
Kingsford Smith Drive Interchange																
EB Off Ramp	1,500	700	1,400	800	-3%	3%	0.49	0.48	1,600	800	1,500	800	-4%	2%	0.52	0.50
WB On Ramp	1,000	1,900	1,000	1,900	0%	-1%	0.59	0.59	1,100	2,000	1,000	2,100	-2%	5%	0.63	0.65
Key Intersection Total	5,100	5,700	5,100	5,800	0%	1%			5,400	6,000	5,400	6,000	-1%	1%		

B.5.6 Issue 7 – No Widening of Western Freeway

A submission has raised the issue of project effects if the Centenary Motorway is not widened to 6 lanes and what mitigation measures Northern Link would trigger for the motorway and its interchanges under these circumstances.

Modelling was requested using the assumption that the Centenary Motorway is not widened to 6 lanes over 12.5km section between the Ipswich Motorway and Toowong by 2016.

Response

As described in Section 5.4.4 of the EIS, a preliminary planning study is in progress by DTMR for the proposed Centenary Highway and Western Freeway transit lane project identified within SEQIPP. Although this investigation has not been finalised, based upon advice provided by DTMR during the EIS, for the purposes of modelling within the EIS an upgrading from 4 to 6 lanes inclusive of a single T2 lane each way between Mount Coot-tha Road and the Ipswich Motorway was assumed, with no upgrading of the Centenary Bridge. This project was incorporated in the traffic model runs and analysis presented in the EIS for 2016, 2021 and 2026.

A sensitivity test has been undertaken to examine the scenario where no changes to the current lane provision on the Centenary Motorway and Western Freeway over the 12.5 km section between Ipswich Motorway and Toowong are undertaken.

The forecast impacts of Northern Link on ramp and interchange volumes along the Centenary Motorway south of Moggill Road in this scenario for 2016 and 2026 are summarised in for the EIS Reference Project and **Table B-30** for the Project.

Effects at the Moggill Road interchange on ramp level of service and intersection delay have been analysed in detail separately using micro-simulation analysis and SIDRA, and the results are provided in Chapter 4 of the EIS Supplementary Report.

The analysis shows that project would not significantly increase traffic volumes through any of the surface interchanges south of Moggill Road to the extent that ramp utilisation is significantly changed. Volume to capacity ratios remain well within practical capacity. In some cases, surface interchange volumes are reduced due to lower flows on south facing ramps. The analysis illustrates that Northern Link would not be expected to have any significant effect on overall interchange performance and thus no mitigation measures are necessary on the Centenary Motorway interchanges in the scenario if there were no widening of the Western Freeway or Centenary Motorway.

Traffic volumes on Northern Link and other key roads in the network for the sensitivity test runs are summarised in **Table B-31** for the EIS Reference Project and **Table B-32** for the Project.

The key effect is the rerouting of traffic away from the Centenary Bridge to more easterly routes including Ipswich Motorway, Fairfield Road, Ipswich Road, and CLEM7. Small increases in usage are forecast on the Walter Taylor Bridge and the Gateway Bridge. The increase in traffic on the Walter Taylor Bridge, combined with a shift from the Western Freeway to the eastern sections of Moggill Road, would result in an increase in forecast traffic flows through Toowong (e.g. as shown in the tables for Jephson Street).

The sensitivity test shows that if the upgrade of the Centenary Motorway does not proceed, forecast 2026 daily traffic volumes on the Western Freeway would be 7,800 vpd (7.5 %) lower in the base case scenario, and 10,700 vpd (7.8%) lower with the EIS Reference Project and 11,600 vpd (8.5%) lower with the Project .

The effect on Northern Link traffic volumes in 2026 if the upgrade of the Centenary Motorway does not proceed would be a reduction of 4,500 vpd (-6%) in 2026 with the EIS Reference Project and 6,900 vpd (14%) with the Project in 2026. The impact of Northern Link at both the regional and local scale is expected to be similar with or without an upgrade of the Centenary Motorway. The overall pattern of effects remains the same, with slight reductions in the magnitude of the change created by Northern Link (within 5% of the background flow for all of the key links above). For example, Northern Link increases traffic on the Western Freeway by approximately 3,000 vpd less without the Centenary Motorway upgrade compared to the EIS scenario with the project in place, and reduces traffic on CLEM7 and Frederick Street by just under 2,000 vpd less than in the EIS scenario. The benefits of Northern Link on Milton Road and Coronation Drive are even less affected. Thus, if an upgrade of the Centenary Motorway were not to proceed by 2016 as assumed in the EIS, it is expected that the effect on both the usage of Northern Link and the community benefits provided by it would be small.

- **Table B-29 Effect of EIS Reference Project on Centenary Motorway Ramp and Interchange Peak Hour Volumes, with No Centenary Motorway Upgrade**

	2016								2026							
	Without NL		With NL		NL Impact %		Critical Peak V/C		Without NL		With NL		NL Impact %		Critical Peak V/C	
	AM	PM	AM	PM	AM	PM	No NL	NL	AM	PM	AM	PM	AM	PM	No NL	NL
Moggill Road Interchange																
Sum of Ramp Terminals	11,700	12,300	11,600	12,900	0%	5%			11,600	12,500	11,100	13,000	-5%	4%		
Fig Tree Pocket Rd Interchange																
NB On Ramp	200	100	200	200	7%	16%	0.13	0.14	200	100	200	200	6%	16%	0.13	0.13
NB Off Ramp	200	300	300	300	56%	-6%	0.17	0.19	200	200	400	200	58%	-1%	0.15	0.23
SB On Ramp	1,300	900	1,200	800	-7%	-9%	0.74	0.69	1,200	1,000	1,100	900	-7%	-10%	0.67	0.63
SB Off Ramp	100	300	100	300	22%	-2%	0.19	0.19	100	300	100	300	13%	-1%	0.18	0.18
Sum of Ramp Terminals	3,200	2,800	3,200	2,600	1%	-6%			3,100	2,800	3,100	2,700	1%	-5%		
Sinnamon Road Interchange																
NB On Ramp	600	500	600	500	6%	5%	0.35	0.37	600	500	700	500	5%	13%	0.36	0.38
NB Off Ramp	100	200	100	200	-2%	-6%	0.10	0.09	200	200	200	200	-3%	-8%	0.10	0.09
SB On Ramp	200	200	200	200	-17%	-2%	0.14	0.12	200	200	100	200	-35%	-1%	0.14	0.13
SB Off Ramp 1	100	100	100	100	3%	30%	0.08	0.10	100	200	100	300	2%	57%	0.20	0.31
SB Off Ramp 2	300	700	300	700	4%	-5%	0.45	0.43	300	700	400	500	30%	-22%	0.42	0.33
Sum of Ramp Terminals	2,900	3,300	3,000	3,300	3%	2%			3,000	3,500	3,200	3,800	5%	7%		
Dandenong Rd Interchange																
NB On Ramp	500	700	500	700	7%	4%	0.37	0.38	500	600	600	600	16%	3%	0.34	0.35
NB Off Ramp	900	800	800	800	-5%	-4%	0.49	0.46	900	1,000	900	900	-5%	-4%	0.54	0.51
SB On Ramp	800	1,200	700	1,100	-10%	-2%	0.64	0.63	800	1,100	700	1,000	-13%	-3%	0.57	0.56
SB Off Ramp	600	800	600	800	7%	5%	0.42	0.44	600	700	600	800	6%	15%	0.37	0.43
Surface Interchange Total	2,800	3,600	2,800	3,600	-2%	0%			2,900	3,500	2,900	3,600	-1%	2%		

	2016								2026							
	Without NL		With NL		NL Impact %		Critical Peak V/C		Without NL		With NL		NL Impact %		Critical Peak V/C	
Sumners Rd Interchange																
NB On Ramp	400	300	400	400	13%	11%	0.21	0.23	300	300	300	400	-2%	11%	0.20	0.20
NB Off Ramp	400	600	400	500	-6%	-12%	0.32	0.28	400	700	400	600	-4%	-16%	0.36	0.30
SB On Ramp	700	400	600	400	-16%	-9%	0.46	0.39	700	400	600	400	-13%	-5%	0.47	0.41
SB Off Ramp	200	200	300	200	8%	13%	0.17	0.18	200	200	200	100	6%	-8%	0.16	0.17
Sum of Ramp Terminals	3,100	2,800	3,100	2,800	-2%	0%			3,100	3,100	3,000	3,000	-4%	-4%		
Ipswich Mwy Interchange																
NB On Ramp from Ipswich Mwy EB	2,100	1,700	2,300	2,000	8%	20%	0.52	0.56	1,700	1,700	1,800	2,100	5%	23%	0.42	0.49
NB On Ramp from Kelliher Rd NB	1,100	1,000	1,100	1,100	-1%	5%	0.28	0.28	2,100	1,600	2,200	1,700	0%	2%	0.52	0.53
NB On Ramp from Ipswich Mwy WB	1,000	1,200	900	1,100	-11%	-5%	0.64	0.61	600	700	600	600	-13%	-7%	0.37	0.35
SB Off Ramp to Ipswich Mwy EB	1,400	900	1,300	800	-13%	-13%	0.35	0.31	1,000	200	800	200	-20%	-18%	0.24	0.19
SB Off Ramp to Kelliher Rd SB	800	900	800	900	3%	-2%	0.22	0.23	1,300	2,400	1,200	2,400	-3%	-1%	0.57	0.57
SB Off Ramp to Ipswich Mwy WB	1,700	2,500	2,000	2,600	13%	5%	0.60	0.63	1,800	1,800	2,100	1,900	16%	3%	0.45	0.52

Table Note

1Sum of ramp terminals = sum of approach volumes to ramp terminal intersections, including surface roads and off ramps.

- **Table B-30 Effect of the Project on Centenary Motorway Ramp and Interchange Peak Hour Volumes, with No Centenary Motorway Upgrade**

	2016								2026							
	Without NL		With NL		NL Impact %		Critical Peak V/C		Without NL		With NL		NL Impact %		Critical Peak V/C	
	AM	PM	AM	PM	AM	PM	No NL	NL	AM	PM	AM	PM	AM	PM	No NL	NL
Moggill Road Interchange																
Sum of Ramp Terminals	11,700	12,300	12,000	13,500	3%	9%			11,600	12,500	12,000	13,600	3%	8%		
Fig Tree Pocket Rd Interchange																
NB On Ramp	200	100	300	200	11%	16%	0.13	0.14	200	100	300	200	11%	14%	0.13	0.14
NB Off Ramp	200	300	300	300	30%	1%	0.17	0.17	200	200	300	200	25%	-2%	0.15	0.19
SB On Ramp	1,300	900	1,200	900	-4%	-5%	0.74	0.72	1,200	1,000	1,100	900	-4%	-6%	0.67	0.64
SB Off Ramp	100	300	100	400	22%	2%	0.19	0.19	100	300	100	300	11%	-4%	0.18	0.17
Sum of Ramp Terminals	3,200	2,800	3,200	2,700	2%	-2%			3,100	2,800	3,100	2,700	1%	-4%		
Sinnamon Road Interchange																
NB On Ramp	600	500	600	500	6%	4%	0.35	0.37	600	500	700	500	3%	10%	0.36	0.37
NB Off Ramp	100	200	100	200	0%	-3%	0.10	0.10	200	200	200	200	-2%	-7%	0.10	0.10
SB On Ramp	200	200	200	200	-17%	1%	0.14	0.12	200	200	100	200	-34%	-1%	0.14	0.13
SB Off Ramp 1	100	100	100	100	3%	1%	0.08	0.08	100	200	100	300	2%	54%	0.20	0.31
SB Off Ramp 2	300	700	300	700	2%	-2%	0.45	0.44	300	700	400	500	38%	-21%	0.42	0.33
Sum of Ramp Terminals	2,900	3,300	3,000	3,300	3%	1%			3,000	3,500	3,200	3,700	5%	6%		
Dandenong Rd Interchange																
NB On Ramp	500	700	500	700	6%	3%	0.37	0.38	500	600	600	600	8%	2%	0.34	0.34
NB Off Ramp	900	800	800	800	-4%	-3%	0.49	0.47	900	1,000	900	900	-2%	-3%	0.54	0.52
SB On Ramp	800	1,200	700	1,200	-10%	-1%	0.64	0.64	800	1,100	700	1,000	-11%	-3%	0.57	0.55
SB Off Ramp	600	800	600	800	6%	4%	0.42	0.44	600	700	600	800	3%	12%	0.37	0.42
Surface Interchange Total	2,800	3,600	2,800	3,700	-2%	0%			2,900	3,500	2,900	3,600	-2%	1%		
Sumners Rd Interchange																

	2016								2026							
	Without NL		With NL		NL Impact %		Critical Peak V/C		Without NL		With NL		NL Impact %		Critical Peak V/C	
NB On Ramp	400	300	400	400	11%	9%	0.21	0.23	300	300	300	300	0%	8%	0.20	0.20
NB Off Ramp	400	600	400	500	-4%	-7%	0.32	0.30	400	700	400	600	-2%	-10%	0.36	0.32
SB On Ramp	700	400	600	400	-14%	5%	0.46	0.39	700	400	600	400	-10%	-5%	0.47	0.42
SB Off Ramp	200	200	300	200	6%	7%	0.17	0.18	200	200	200	100	5%	-7%	0.16	0.17
Sum of Ramp Terminals	3,100	2,800	3,100	2,800	-2%	0%			3,100	3,100	3,100	2,900	-2%	-5%		
Ipswich Mwy Interchange																
NB On Ramp from Ipswich Mwy EB	2,100	1,700	2,200	1,900	4%	15%	0.52	0.55	1,700	1,700	1,700	2,000	-1%	16%	0.42	0.47
NB On Ramp from Kelliher Rd NB	1,100	1,000	1,100	1,100	1%	5%	0.28	0.28	2,100	1,600	2,200	1,700	3%	2%	0.52	0.54
NB On Ramp from Ipswich Mwy WB	1,000	1,200	900	1,100	-9%	-2%	0.64	0.63	600	700	600	700	-8%	-2%	0.37	0.36
SB Off Ramp to Ipswich Mwy EB	1,400	900	1,300	900	-11%	-4%	0.35	0.31	1,000	200	800	200	-18%	-14%	0.24	0.19
SB Off Ramp to Kelliher Rd SB	800	900	800	900	2%	3%	0.22	0.22	1,300	2,400	1,200	2,400	-2%	0%	0.57	0.57
SB Off Ramp to Ipswich Mwy WB	1,700	2,500	2,000	2,500	12%	0%	0.60	0.60	1,800	1,800	2,100	1,900	14%	2%	0.45	0.51

Table Note

1Sum of ramp terminals = sum of approach volumes to ramp terminal intersections, including surface roads and off ramps.

Table B-31 Effect of Centenary Motorway Upgrade on Forecast Traffic Volumes With and Without EIS Reference Project

Road	Location	Average Weekday Traffic – 2026					
		No Northern Link			With EIS Reference Project		
		Base Future Network[1]	Base Future with No CM Upgrade[2]	Difference	Base Future with NL [3]	Base Future With No CM Upgrade with NL [4]	Difference
Northern Link	Mainline Tunnel	-	-	-	74,500	70,000	(-6.0%)
State Strategic Roads							
Centenary Highway	Centenary Bridge	119,200	111,200	-8,000 (-6.7%)	139,200	128,100	-11,100 (-8.0%)
Western Freeway	South of Mt Coot-tha Road	104,500	96,700	-7,800 (-7.5%)	138,000	127,300	-10,700 (-7.8%)
Ipswich Mwy	at Oxley Creek, Oxley	142,700	146,200	3,500 (2.5%)	123,900	128,800	4,900 (4.0%)
Gateway Mwy	at Gateway Bridge	238,300	239,300	1,000 (0.4%)	237,400	238,800	1,400 (0.6%)
Regional Radial Roads							
Kelliher Road	S of Ipswich Mwy, Darra	82,800	80,400	-2,400 (-2.9%)	84,800	80,400	-4,400 (-5.2%)
CLEM7	at Brisbane River	92,300	92,400	100 (0.1%)	80,100	82,100	2,000 (2.5%)
ICB	Land Bridge	117,800	116,900	-900 (-0.8%)	142,800	139,900	-2,900 (-2.0%)
Hale Street Link	at Brisbane River	25,400	26,600	1,200 (4.7%)	23,900	23,900	(0.0%)
Coronation Drive	West of Land Street, Auchenflower	72,200	71,200	-1,000 (-1.4%)	60,200	59,500	-700 (-1.2%)
Kelvin Grove Road	South of Blamey Street[(1)]	59,600	58,800	-800 (-1.3%)	68,200	66,900	-1,300 (-1.9%)
Moggill Road	East of BBC Entrance, Toowong	49,500	51,000	1,500 (3.0%)	44,000	46,000	2,000 (4.5%)
Milton Road	East of Croydon Street, Toowong	67,700	66,100	-1,600 (-2.4%)	64,000	62,700	-1,300 (-2.0%)
Regional Ring Roads							
Coonan Street	at Walter Taylor Bridge	33,700	34,700	1,000 (3.0%)	33,700	35,200	1,500 (4.5%)
Ipswich Road	N of Gainsborough Street, Moorooka	56,600	58,700	2,100 (3.7%)	43,700	48,500	4,800 (11.0%)
Frederick Street	South of Victoria Crescent, Toowong	39,000	37,200	-1,800 (-4.6%)	33,400	33,300	-100 (-0.3%)
City Distributor Roads							

Road	Location	Average Weekday Traffic – 2026					
		No Northern Link			With EIS Reference Project		
		Base Future Network[1]	Base Future with No CM Upgrade[2]	Difference	Base Future with NL [3]	Base Future With No CM Upgrade with NL [4]	Difference
Fairfield Road	N of Sherwood Road, Yeerongpilly	30,800	32,500	1,700 (5.5%)	23,500	25,000	1,500 (6.4%)
Jephson Street	North of Sherwood Road	25,000	26,600	1,600 (6.4%)	29,600	32,300	2,700 (9.1%)

Data Sources:
Northern Link Traffic Model (Run TR_255) 'Updated Future Base'.
Northern Link Traffic Model (Run TR_292) based on 'Updated Future Base', without Centenary Motorway HOV Project.
Northern Link Traffic Model (Run TR_256) 'Updated Base with EIS Reference Project'
Northern Link Traffic Model (Run TR_293) based on 'Updated Base with EIS Reference Project', without Centenary Motorway HOV Project.

Table B-32 Effect of Centenary Motorway Upgrade on Forecast Traffic Volumes with the Project

Road	Location	Average Weekday Traffic – 2026					
		No Northern Link			With the Project		
		Base Future Network[1]	Base Future with No CM Upgrade[2]	Difference	Base Future with NL [3]	Base Future With No CM Upgrade with NL [4]	Difference
Northern Link	Mainline Tunnel	-	-	-	48,800	41,900	-6,900 (-14.1%)
State Strategic Roads							
Centenary Highway	Centenary Bridge	119,200	111,200	-8,000 (-6.7%)	135,300	124,300	-11,000 (-8.1%)
Western Freeway	South of Mt Coot-tha Road	104,500	96,700	-7,800 (-7.5%)	136,700	125,100	-11,600 (-8.5%)
Ipswich Mwy	at Oxley Creek, Oxley	142,700	146,200	3,500 (2.5%)	127,900	132,500	4,600 (3.6%)
Gateway Mwy	at Gateway Bridge	238,300	239,300	1,000 (.4%)	236,800	238,700	1,900 (.8%)
Regional Radial Roads							
Kelliher Road	S of Ipswich Mwy, Darra	82,800	80,400	-2,400 (-2.9%)	84,700	80,500	-4,200 (-5.%)
CLEM7	at Brisbane River	92,300	92,400	100 (.1%)	82,000	82,800	800 (1.%)
ICB	Land Bridge	117,800	116,900	-900 (-.8%)	153,500	146,700	-6,800 (-4.4%)
Hale Street Link	at Brisbane River	25,400	26,600	1,200 (4.7%)	24,000	25,600	1,600 (6.7%)
Coronation Drive	West of Land Street, Auchenflower	72,200	71,200	-1,000 (-1.4%)	62,300	61,600	-700 (-1.1%)
Kelvin Grove Road	South of Blamey Street[(1)]	59,600	58,800	-800 (-1.3%)	58,000	57,700	-300 (-0.5%)
Moggill Road	East of BBC Entrance, Toowong	49,500	51,000	1,500 (3.%)	40,800	42,800	2,000 (4.9%)
Milton Road	East of Croydon Street, Toowong	67,700	66,100	-1,600 (-2.4%)	63,400	64,100	700 (1.1%)
Regional Ring Roads							
Coonan Street	at Walter Taylor Bridge	33,700	34,700	1,000 (3.%)	34,000	35,300	1,300 (3.8%)
Ipswich Road	N of Gainsborough Street, Moorooka	56,600	58,700	2,100 (3.7%)	46,300	51,100	4,800 (10.4%)
Frederick Street	South of Victoria Crescent, Toowong	39,000	37,200	-1,800 (-4.6%)	35,600	34,700	-900 (-2.5%)
City Distributor Roads							

Road	Location	Average Weekday Traffic – 2026					
		No Northern Link			With the Project		
		Base Future Network[1]	Base Future with No CM Upgrade[2]	Difference	Base Future with NL [3]	Base Future With No CM Upgrade with NL [4]	Difference
Fairfield Road	N of Sherwood Road, Yeerongpilly	30,800	32,500	1,700 (5.5%)	25,300	26,300	1,000 (4.%)
Jephson Street	North of Sherwood Road	25,000	26,600	1,600 (6.4%)	24,100	27,200	3,100 (12.9%)

Data Sources:
Northern Link Traffic Model (Run TR_255) 'Updated Future Base'
Northern Link Traffic Model (Run TR_292) based on 'Updated Future Base', without Centenary Motorway HOV Project.
Northern Link Traffic Model (Run TR_257) 'Updated Base with the NL Project.
Northern Link Traffic Model (Run TR_365) based on 'Updated Base with the NL Project', without Centenary Motorway HOV Project.

B.5.6 Issue 8 – Forecast Traffic Growth

A submission has queried the reason for growth in the average weekday traffic from 2007 to 2014 and 2026. The figures are considered to be high and clarification of the assumptions in relation to forecast traffic growth is requested.

Clarification on use of traffic counts undertaken in 2008 was sought.

Response

The key driver in growth in traffic forecast from 2007 to 2014 and 2026 is the forecast demographic growth and the overall effect this has on travel demand within the Brisbane metropolitan area.

Table 5-21 in the EIS summarises forecast population and employment growth, and Table 5-25 in the EIS summarises the forecast growth in travel demand in terms of total person trips (all modes), and the growth in forecast vehicle trips from 2007 to 2014 and 2026.

A population growth of 13% is forecast between 2007 and 2014 (1.88 million to 2.13 million), and by 35% between 2007 and 2026 (to 2.53 million). Employment is forecast to grow by 23% between 2007 and 2014 (0.96 million to 1.19 million), and by 54% between 2007 and 2026 (to 1.48 million).

The overall growth in average weekday vehicle trips is forecast to increase by 13% between 2007 and 2014 (4.1 million to 4.6 million), and by 34% between 2007 and 2026 (to 5.5 million), even with increased public transport mode share (i.e. a forecast doubling in public transport trip-making and mode share rise from 8% to 11% by 2026).

Traffic counts and travel time surveys for use in the EIS and traffic model validation were undertaken in October 2007. A range of existing traffic count, pedestrian survey, accident data and public transport patronage information from other sources including Brisbane City Council and TransLink was also compiled for use in the EIS.

B.5.6 Issue 9 – Centenary Motorway Measures

A submission has questioned what measures have been included within the Northern Link project to mitigate impacts on the Centenary Motorway and requested further information for locations such as;

- at the Moggill Road interchange - information on the reduction in LoS and spare capacity at the Moggill Road interchange.
- along the Centenary Motorway to the south of Moggill Road – information on the reduction in LoS and spare capacity at other interchanges south of Moggill Road due to Northern Link
- in general - any managed motorways initiatives being employed as part of the Northern Link project to mitigate the traffic impact, e.g. variable speed limits, transit queue jump, hard shoulder running, ramp metering.

Response

Effects at the Moggill Road interchange on ramp level of service and intersection delay have been analysed in detail separately using micro-simulation analysis and SIDRA, and the results are provided in Chapter 4 of the EIS Supplementary Report. Mitigation measures associated with the on-ramp and off-ramps at the Moggill Road interchange are described in Chapter 4.

The forecast impacts of Northern Link on ramp and interchange volumes along the Centenary Motorway south of Moggill Road in this scenario for 2016 and 2026 are summarised in **Table B-33** for the EIS Reference Project and **Table B-34** for the Project. The analysis shows that project would not significantly increase traffic volumes through any of the surface interchanges south of Moggill Road to the extent that ramp utilisation is significantly changed. Volume to capacity ratios remain well within practical capacity and it would not be expected that the level of service would change significantly. In some cases, surface interchange volumes are reduced due to lower flows on south facing ramps. The impact on the Centenary Motorway falls with distance from project. For example, in 2026, the change in daily Motorway interchange volumes (Motorway approaches plus on ramps) varies from 28% at Moggill Road to 12% at Sumners Road, and less than 1% at the Ipswich Motorway interchange.

The analysis illustrates that Northern Link would not be expected to have any significant effect on overall interchange performance on the Centenary Motorway interchanges south of Moggill Road. and thus no mitigation measures are necessary.

No managed motorways initiatives are proposed for implementation as part of the Northern Link project.

Table B-33 Effect of EIS Reference Project on Centenary Motorway Ramp and Interchange Peak Hour Volumes

	2014								2026							
	Without NL		With NL		NL Impact %		Critical Peak V/C		Without NL		With NL		NL Impact %		Critical Peak V/C	
	AM	PM	AM	PM	AM	PM	No NL	NL	AM	PM	AM	PM	AM	PM	No NL	NL
Moggill Road Interchange																
Sum of Ramp Terminals	11,400	12,200	11,300	12,900	-1%	5%			11,400	12,400	11,400	13,300	-1%	7%		
Fig Tree Pocket Rd Interchange																
NB On Ramp	200	100	200	200	6%	15%	0.13	0.13	300	200	300	200	16%	17%	0.14	0.16
NB Off Ramp	200	300	300	300	30%	-5%	0.15	0.15	200	200	200	200	-4%	-1%	0.14	0.14
SB On Ramp	1,300	900	1,200	800	-7%	-6%	0.74	0.69	1,200	1,000	1,100	800	-6%	-17%	0.68	0.64
SB Off Ramp	100	300	100	300	18%	1%	0.18	0.18	100	300	100	400	10%	6%	0.18	0.19
Sum of Ramp Terminals	3,200	2,600	3,100	2,500	-1%	-3%			3,100	2,900	3,100	2,600	-2%	-10%		
Sinnamon Road Interchange																
NB On Ramp	600	500	600	500	8%	5%	0.33	0.36	600	500	600	500	8%	4%	0.32	0.35
NB Off Ramp	100	200	100	200	-4%	-3%	0.09	0.09	200	200	200	200	-6%	-3%	0.10	0.10
SB On Ramp	200	200	200	100	-4%	-17%	0.13	0.13	200	300	200	200	-20%	-12%	0.18	0.16
SB Off Ramp 1	100	100	100	100	3%	33%	0.07	0.07	100	100	100	100	3%	21%	0.07	0.07
SB Off Ramp 2	300	700	300	700	2%	-3%	0.45	0.44	300	700	300	800	-3%	5%	0.47	0.50
Sum of Ramp Terminals	2,800	3,100	2,900	3,100	3%	0%			2,900	3,400	2,900	3,500	1%	1%		
Dandenong Rd Interchange																
NB On Ramp	500	700	500	700	5%	3%	0.36	0.37	500	600	500	700	3%	4%	0.34	0.35
NB Off Ramp	800	800	800	800	-6%	-2%	0.47	0.45	1,000	1,000	900	1,000	-6%	-2%	0.55	0.53
SB On Ramp	800	1,100	700	1,100	-8%	0%	0.62	0.62	800	1,300	800	1,200	-3%	-7%	0.68	0.63
SB Off Ramp	600	700	600	700	9%	2%	0.39	0.40	500	700	500	700	8%	2%	0.38	0.39
Surface Interchange Total	2,800	3,500	2,700	3,500	-2%	1%			2,900	3,700	2,900	3,700	-1%	-2%		
Sumners Rd Interchange																
NB On Ramp	300	400	400	400	11%	10%	0.20	0.22	400	300	400	400	14%	13%	0.21	0.24
NB Off Ramp	400	600	400	600	-7%	-5%	0.33	0.31	500	700	500	600	-10%	-5%	0.36	0.34

	2014								2026							
	Without NL		With NL		NL Impact %		Critical Peak V/C		Without NL		With NL		NL Impact %		Critical Peak V/C	
SB On Ramp	700	500	600	400	-14%	-6%	0.45	0.39	800	500	800	500	1%	-13%	0.53	0.53
SB Off Ramp	200	200	200	200	6%	16%	0.16	0.17	200	100	200	200	26%	29%	0.14	0.16
Sum of Ramp Terminals	3,100	2,800	3,000	2,800	-3%	1%			3,300	3,100	3,400	3,100	3%	2%		
Ipswich Mwy Interchange																
NB On Ramp from Ipswich Mwy EB	2,100	1,500	2,300	1,800	9%	20%	0.51	0.56	2,000	1,900	2,200	2,300	14%	22%	0.47	0.54
NB On Ramp from Kelliher Rd NB	1,200	1,100	1,200	1,200	0%	5%	0.29	0.29	2,500	1,700	2,600	1,800	3%	6%	0.61	0.63
NB On Ramp from Ipswich Mwy WB	1,000	1,100	800	1,100	-14%	-1%	0.61	0.61	800	800	700	800	-15%	-2%	0.45	0.43
SB Off Ramp to Ipswich Mwy EB	1,400	900	1,300	800	-7%	-12%	0.35	0.32	1,100	400	1,100	300	-1%	-36%	0.27	0.26
SB Off Ramp to Kelliher Rd SB	800	900	900	900	3%	-1%	0.22	0.23	1,400	2,800	1,400	2,900	1%	2%	0.66	0.67
SB Off Ramp to Ipswich Mwy WB	1,700	2,500	1,900	2,600	10%	4%	0.60	0.63	2,000	2,300	2,400	2,400	21%	6%	0.53	0.58

Table Note

1Sum of ramp terminals = sum of approach volumes to ramp terminal intersections, including surface roads and off ramps.

Table B-34 Effect of the Project on Centenary Motorway Ramp and Interchange Peak Hour Volumes

	2014								2026							
	Without NL		With NL		NL Impact %		Critical Peak V/C		Without NL		With NL		NL Impact %		Critical Peak V/C	
	AM	PM	AM	PM	AM	PM	No NL	NL	AM	PM	AM	PM	AM	PM	No NL	NL
Moggill Road Interchange																
Sum of Ramp Terminals	11,400	12,200	11,700	13,300	3%	9%			11,400	12,400	12,100	13,800	5%	11%		
Fig Tree Pocket Rd Interchange																
NB On Ramp	200	100	200	200	9%	14%	0.13	0.14	300	200	400	200	35%	29%	0.14	0.19
NB Off Ramp	200	300	200	300	11%	-1%	0.15	0.15	200	200	200	200	-3%	-1%	0.14	0.14
SB On Ramp	1,300	900	1,200	800	-3%	-4%	0.74	0.72	1,200	1,000	1,100	900	-5%	-12%	0.68	0.65
SB Off Ramp	100	300	100	300	20%	0%	0.18	0.18	100	300	100	400	7%	7%	0.18	0.20
Sum of Ramp Terminals	3,200	2,600	3,200	2,600	1%	-2%			3,100	2,900	3,200	2,800	1%	-6%		
Sinnamon Road Interchange																
NB On Ramp	600	500	600	500	7%	4%	0.33	0.36	600	500	600	500	7%	4%	0.32	0.35
NB Off Ramp	100	200	100	200	-3%	-2%	0.09	0.09	200	200	200	200	-5%	-2%	0.10	0.10
SB On Ramp	200	200	200	100	-11%	-8%	0.13	0.12	200	300	200	200	-19%	-10%	0.18	0.16
SB Off Ramp 1	100	100	100	100	2%	49%	0.07	0.08	100	100	100	100	2%	31%	0.07	0.07
SB Off Ramp 2	300	700	300	700	5%	-5%	0.45	0.43	300	700	300	800	-1%	5%	0.47	0.49
Sum of Ramp Terminals	2,800	3,100	2,900	3,100	4%	1%			2,900	3,400	2,900	3,500	1%	1%		
Dandenong Rd Interchange																
NB On Ramp	500	700	500	700	4%	2%	0.36	0.37	500	600	500	600	3%	3%	0.34	0.35
NB Off Ramp	800	800	800	800	-4%	-1%	0.47	0.46	1,000	1,000	1,000	1,000	-5%	-2%	0.55	0.54
SB On Ramp	800	1,100	700	1,100	-7%	-1%	0.62	0.62	800	1,300	800	1,200	-3%	-5%	0.68	0.65
SB Off Ramp	600	700	600	700	8%	3%	0.39	0.40	500	700	500	700	7%	0%	0.38	0.38
Surface Interchange Total	2,800	3,500	2,800	3,500	-1%	0%			2,900	3,700	2,900	3,700	-1%	-2%		
Sumners Rd Interchange																
NB On Ramp	300	400	400	400	10%	9%	0.20	0.22	400	300	400	400	12%	11%	0.21	0.23

	2014								2026							
	Without NL		With NL		NL Impact %		Critical Peak V/C		Without NL		With NL		NL Impact %		Critical Peak V/C	
NB Off Ramp	400	600	400	600	-7%	-5%	0.33	0.31	500	700	500	600	-10%	-4%	0.36	0.35
SB On Ramp	700	500	600	400	-14%	-6%	0.45	0.40	800	500	800	500	1%	-10%	0.53	0.54
SB Off Ramp	200	200	200	200	7%	13%	0.16	0.18	200	100	200	200	26%	30%	0.14	0.16
Sum of Ramp Terminals	3,100	2,800	3,000	2,800	-3%	1%			3,300	3,100	3,400	3,100	3%	3%		
Ipswich Mwy Interchange																
NB On Ramp from Ipswich Mwy EB	2,100	1,500	2,300	1,800	8%	16%	0.51	0.55	2,000	1,900	2,300	2,200	15%	18%	0.47	0.54
NB On Ramp from Kelliher Rd NB	1,200	1,100	1,200	1,200	0%	5%	0.29	0.29	2,500	1,700	2,500	1,800	1%	6%	0.61	0.62
NB On Ramp from Ipswich Mwy WB	1,000	1,100	800	1,100	-13%	-1%	0.61	0.61	800	800	700	800	-14%	1%	0.45	0.44
SB Off Ramp to Ipswich Mwy EB	1,400	900	1,300	800	-7%	-11%	0.35	0.32	1,100	400	1,100	300	0%	-32%	0.27	0.27
SB Off Ramp to Kelliher Rd SB	800	900	900	900	3%	1%	0.22	0.23	1,400	2,800	1,400	2,900	1%	1%	0.66	0.67
SB Off Ramp to Ipswich Mwy WB	1,700	2,500	1,900	2,600	10%	3%	0.60	0.62	2,000	2,300	2,300	2,400	17%	4%	0.53	0.56

Table Note

1Sum of ramp terminals = sum of approach volumes to ramp terminal intersections, including surface roads and off ramps.

B.5.6 Issue 10 – Surface Network Effects

Attention needs to be given to addressing the adverse effects of Northern Link on the existing surface road network, remote from the project area that would have significantly increased traffic demands placed on them as a direct result of the project. Roads nominated include Lutwyche Road, Kelvin Grove Road, Enoggera Road, Centenary Motorway and Inner City Bypass. The effects of diversion on traffic from the Ipswich Motorway need to be considered.

Response

Forecast changes in traffic on the existing surface network with the Project are detailed in Chapter 4 of the EIS Supplementary Report. The effects of traffic changes on the nominated roads are as follows:

- Lutwyche Road – on this arterial route, a small increase of 5 to 6% (2,000 to 3,000 vpd) compared to the scenario without the project is forecast. Overall traffic volumes in 2014 and 2026 would be lower than current levels, with the combined effect of Northern Link, Airport Link and CLEM7. Key intersections in the Windsor area have been analysed using SIDRA and no significant change in peak period level of service is forecast with the Project. No mitigation measures to manage the impacts of traffic volume changes were found to be required.
- Kelvin Grove Road and Enoggera Road – the Project would have no adverse effects on Kelvin Grove Road and Enoggera Road, and in general, traffic reductions are forecast along the corridor compared to the scenario without the Project.
- Centenary Motorway and Inner City Bypass – impacts on these connecting links with the Project are described in Chapter 4 of the EIS Supplementary Report.
- Ipswich Motorway – traffic reductions of 10% at Oxley Creek are forecast by 2026, reducing congestion on this key freight and commuter corridor.

B.5.6 Issue 11 – Toowong Traffic Increase

Some submissions have raised concerns about the overall general traffic increases in Toowong. Issues include:

- The Toowong connection conflicts with plans for a Transit Oriented Development node in Toowong and will greatly hinder the potential for TOD developments, including pedestrian and cyclist friendly facilities. This has not been suitably assessed in the EIS. Jephson Street has high potential for TOD developments and widening Jephson Street would conflict with this aim by creating a significant barrier to pedestrians wanting to access the transport and business centre
- The Project will significantly increase traffic through the heart of Toowong, on local streets and on Milton Road and Croydon Street.
- The EIS does not demonstrate effective planning for the significant increase in traffic in Toowong. This is contrary to TransApex Strategic Context Report evaluation's key network outcome of "a reduction in traffic in residential areas." It is also contrary to Brisbane City Council's Brisbane Long Term Infrastructure Plan objectives
- The Toowong connection will only cause increased traffic, more congestion and noise.
- There will be a huge increase in traffic on local streets. Local facilities (i.e. Toowong Shopping Centre) will be a lot more difficult to get to and traffic will be more congested. There are already too many 'rat runs' through local streets and the proposed Toowong connection will encourage more of this

- The Toowong connection will cause significant congestion with no benefit, leading to major disruption of the local area.
- The local access at Toowong will be counterproductive to improving local congestion. The Toowong Connection is not required and Project aims will be better met without it.
- The Toowong connection will ease congestion on Milton Road and Coronation Drive at the expense of increasing traffic through the community of Toowong.
- The Toowong Connection only affords benefits to Toowong residents who will choose to pay a toll and enter Northern Link at Toowong rather than at the entry to the ICB after using Milton Road. Just about all other impacts, including impacts from so called mitigation measures, are negative for Toowong residents and Toowong as a suburb.
- The purpose of the Toowong Connection is to allow passage through Toowong for residents of other suburbs accessing the new infrastructure.

Response

The EIS identified in Section 5.6 that some roads within Toowong would experience increases in traffic use due to the concentration on routes such as Jephson Street and Croydon Street which provided linkage to the Northern Link ramps at Toowong. It was identified however that a large number of local roads would experience traffic relief, and that local users from the Toowong area would benefit from increased accessibility and significant travel time reductions for cross-city travel, either via Northern Link or the less-congested surface road network.

Council has now considered the submissions and undertaken further detailed assessment of the Project, without local connections. In weighing these competing matters, Council has now decided to proceed with the Project, without local connections.

Chapter 4 of the Supplementary Report details the forecast changes in traffic in the Toowong area with the Project. Adverse effects are minor and substantial benefits would be realised. The following effects are highlighted for the Toowong area:

- The Toowong activity centre would benefit from traffic reductions including a forecast decrease by 23% at High Street to 28,300 vehicles per day in 2026, which would be lower than existing traffic levels;
- Traffic on Moggill Road through Toowong would reduce by 18% to 40,800 vehicles per day;
- Traffic reduction on Sylvan Road south of Croydon Street (-10%), would be experienced compared with the scenario without the project. Unlike the EIS reference project, traffic reduction would also be experienced on Jephson Street (-4%) and Burns Road (-4%);
- Small increases in traffic volumes on Croydon Street with the Project (+4% in 2026) are forecast due to re-distribution of local traffic from Moggill Road-Coronation Drive to Milton Road (via Croydon Street). By comparison, with the EIS reference project, a more substantial increase on Croydon Street was forecast (+60% in 2026); and
- As the Project does not have local connections at Toowong and Kelvin Grove the significant time savings offered by trips between Toowong and other destinations such as the Airport and Central Brisbane via Northern Link are not available. Travel time savings are generally offered due to reduced congestion on the surface network in the inner west. Time savings of around 5 minutes on the surface network via both Milton Road and Coronation Drive are provided by the Project in 2026. These surface route travel time savings are slightly less than for the EIS reference project due to the different level of surface traffic relief.

B.5.6 Issue 12 – Consideration of Traffic Management during Planning Phase

The impact of components of the project on traffic management needs to be considered during the planning phase. In particular, the impact of new on and off ramps on traffic flow through existing road infrastructure needs to be examined in detail. This would be more favourable than examining these effects post-construction and would allow the planning of traffic management strategies at the earliest possible opportunity.

Response

During the planning phase, the effects of Northern Link on traffic operations including the impact of the on and off ramps to the Western Freeway and Inner City Bypass have been assessed using micro-simulation modelling of peak period operations using the Paramics software.

For the Project, the findings of the micro-simulation modelling are reported in Chapter 4 of the EIS Supplementary Report. In summary this assessment has show that a satisfactory level of service of operation of the existing Western Freeway at ramp merge and diverges zones (i.e. LoS B to C) is forecast upon opening of Northern Link (2014) with the implementation of some mitigation works at the entry and exit ramps to the Western Freeway from Moggill Road. On the Inner City Bypass a satisfactory level of service of operation of B to C is forecast during peak periods with the Project connections.

B.5.6 Issue 13 – Widening of the Western Freeway

A submission recommends that the Centenary Motorway / Western Motorway must be upgraded if Northern Link is to operate as a successful and viable transport corridor. Upgrading of the Centenary Motorway / Western Motorway to at least a six lane configuration is suggested. Optimally an eight lane configuration from the Moggill Road entry / exit ramps north to the Northern Link Connection is recommended.

The assumption that a four-lane cross river facility could carry an AWDT of up to 140,000 vehicles per day (Centenary Bridge) is questioned, and it is stated that no amount of peak spreading will mitigate regular and extreme delays and congestion on this route.

Response

As described in Section 5.4.4 of the EIS, a preliminary planning study is in progress by DTMR for the proposed Centenary Highway and Western Freeway transit lane project identified within SEQIPP. This investigation has not been finalised, and the ultimate form of the corridor has not yet been determined. WBTNI corridor options (such as the Toowong to Everton Park "Inner Orbital" corridor) would also have an influence on the overall configuration of the Centenary Motorway in the future. Council has worked closely with DTMR to ensure that the engineering layout of the Northern Link connections to the Western Freeway allows flexibility for potential future corridor re-configuration and/or widening.

Based upon advice provided by DTMR, for the purposes of traffic modelling within the EIS an upgrading from 4 to 6 lanes inclusive of a single T2 lane each way between Mount Coot-tha Road and the Ipswich Motorway was assumed, with no upgrading of the Centenary Bridge. This project was incorporated in the traffic model runs and analysis presented in the EIS for 2016, 2021 and 2026. These assumptions have also been applied for traffic modelling of the Project as documented in Chapter 4 of the EIS Supplementary Report.

If the Centenary Bridge is not widened in the future, and/or no other supplementary river crossing capacity is provided in the western reach of the Brisbane River, then traffic modelling identifies that congested conditions would be forecast for this pinch-point in the network within the 2026 time horizon, without or with Northern Link. The future strategy for this location is best addressed in the context of overall planning for the corridor, which is currently in progress by DTMR. The implementation of Northern Link does not trigger the problem, forecast population and employment growth in the Western Corridor under the SEQ Regional Plan will place increased pressure on cross-river capacity in the future in the west of the region. There has been no enhancement of western cross-river transport capacity since duplication of the Centenary Bridge (to 4 lanes) in 1986.

B.5.6 Issue 14 – Operation of the Inner City Bypass

A submission identified that the ability of the Inner City Bypass to operate satisfactorily with the combined loadings of Clem 7, Hale Street Bridge and the Airport Link in addition to Northern Link and the existing orbital role it plays cannot be satisfactorily tested through the strategic model used. The need to test its operation by a detailed dynamic model, taking into account the combined complexity better reflecting the conditions likely to be imposed is identified.

A submission expressed concern that Northern Link will place further demand on the Inner City Bypass to function as the critical / pivotal transport corridor for Brisbane, serving Airport Link, Hale Street / Hale Street Link Bridge, Clem7 Tunnel, Kingsford Smith Drive and Northern Link. It is suggested that if Northern Link is to proceed, the Inner City Bypass must be upgraded from six to eight lanes. The need for development of a detailed incident management plan to ensure that breakdowns and incidents on the Inner City Bypass and in the tunnels are responded to quickly and managed efficiently is identified.

Response

To examine peak period traffic operations at the connections of the Project to the Inner City Bypass dynamic modelling using the Paramics micro-simulation software that has been undertaken to provide a detailed assessment of the traffic operations at the Project connections and assist in the identification of mitigation measures, as appropriate. Results of the micro-simulation modelling are tabulated in **Chapter 4** of the EIS Supplementary Report 2014 and 2026.

The micro-simulation modelling has found that a satisfactory level of service of operation of the existing 6-lane roadway at the Inner City Bypass merge and diverges zones (i.e. LoS B to C) is forecast upon opening of Northern Link in 2014 and for the 2026 time horizon. Due to the orbital function of this motorway standard connection, traffic volumes during peak periods are quite balanced and the temporal distribution of traffic throughout the day leads to a flat demand profile, rather than pronounced commuter peaks. A need for upgrading the ICB to 8 lanes to accommodate the expected traffic flows is not indicated.

Overall, traffic volume changes with the Project can be satisfactorily accommodated within the planned interchange and intersection arrangements in the Bowen Hills area that will be implemented with the CLEM7, Airport Link and Northern Busway projects. A detailed assessment of effects of the Project in this area is provided in Chapter 4 of the EIS Supplementary Report.

An incident management plan to address the procedures to manage breakdowns and incidents in the Northern Link tunnels and the connections would be a requirement of the Operational Environmental Management Plan - Traffic and Transport Management as described in Section 19.8 of the EIS.

B.5.6 Issue 15 – Traffic Increase on Gregory Terrace

Concern has been expressed regarding a 10% increase in traffic along Gregory Terrace as a result of Northern Link. Increased traffic has been identified as a potential safety risk for students specifically during pick up and drop of times.

Response

The EIS identified in Section 5.6 that there would be a forecast increase in traffic along Gregory Terrace and College Road, as traffic using the EIS Reference Project south-facing connections on Kelvin Grove Road would use these roads to access Northern Link.

Council has now considered the submissions and undertaken further detailed assessment of the Project, without local connections. In weighing these competing matters, Council has now decided to proceed with the Project, without local connections.

Chapter 4 of the EIS Supplementary Report details the forecast changes in traffic on various roads in the Kelvin Grove and Spring Hill with the Project, without local connections. A many locations sound benefits would be realised due to reductions in traffic compared to the scenario without the Project. On College Road an average weekday traffic reduction of 5% in 2014 is forecast. Similar reductions are forecast for Gregory Terrace immediately north of College Road, with negligible change in traffic volumes forecast further north due to the Project.

B.5.6 Issue 16 – Traffic Increase on Croydon Street and Jephson Street

A number of submissions have raised specific issues associated with increased traffic levels on Croydon Street and Jephson Street. Key issues are:

- The adverse effects of increasing Croydon Street to seven lanes and increasing traffic on Jephson Street are not adequately dealt with in the EIS. Congestion in Jephson Street would cause cars to bank up at each set of lights. The EIS refers to the potential widening of Jephson Street, however this would impact on the liveability for local residents, as well as those properties removed. It is suggested that diverting traffic out of the Toowong central area makes much more sense and is more consistent with the state and local plans than trying to use roads unsuited to large volumes of traffic as ring roads, distributors, etc.
- Project rationale is to ease congestion and the EIS shows that local traffic on roads around Toowong (i.e. Croydon Street) will increase. This is not an easing of traffic congestion. Suggests that a plan should be implemented to ensure the seven lanes on Croydon Street can go somewhere, i.e. widen Jephson Street.
- Croydon Street has been widened to improve access the University of Queensland, but no other roads have been widened to accommodate the increase in traffic.
- A 60% increase in traffic on Croydon Street as a result of the Project in 2026 will destroy the now very liveable community. Keep Croydon Street as 4 lanes
- Croydon Street is currently only busy for 5-10 minutes each morning and evening. This will significantly increased as a result of the Project and will significantly impact on access to the school.
- Upgrading Croydon Street and Milton Road is not needed as Croydon Street can often have no cars travelling on it at times between 9am and 3pm. This upgrade has been designed to tunnel traffic from Moggill Road at Indooroopilly which will rat run through suburban streets.

- The current plan will effectively create a bottle-neck at the Sylvan Road/Jephson Street intersection as the number of lanes leaving the intersection will be less than the number entering it. The bottle-neck at Moggill Road/Jephson Street intersection will not be reduced as traffic will now have to turn left and travel west towards the tunnel.
- If it is decided that the Toowong connection must proceed, it is requested that consideration be given to ensuring that the right turn to Quinn Street from Sylvan Road and the left turn from Quinn to Sylvan Road are safe (Quinn is proposed to become a cul-de-sac and these turns currently have very short sight distances).
- There will be a greater volume of traffic in adjacent streets to the connection which will affect local access to schools and local services. Croydon, Jephson and Sylvan will become very busy streets.
- Traffic projections at the critical (for Toowong) Jephson St/ Croydon St/ Sylvan Rd South/ Sylvan Rd to Milton Rd connection intersection near the existing Baptist Church are not able to be determined. This data is required to understand the impact on Jephson Street in Toowong both with and without the Toowong-Buranda and Toowong-Everton Park tunnels. Jephson Street traffic volumes are not included in Table 37 [of Chapter 5: Traffic and Transport]
- Future works on Jephson Street and Sylvan Road should be included in the Project. Additional traffic on Jephson Street will make dangerous to turn into Ventnor Street.
- Streets such as Jephson Street and Milton Road, which are directly affected by the proposed infrastructure, should have been included fully in the study corridor so that a full range of the impacts in this area could have been researched and reported. This would have revealed incompatibilities between the project and Brisbane City Council urban renewal projects. In relation to Jephson Street, two additional lanes of motor vehicles on Jephson Street will not only deteriorate pedestrian and cycle safety and air quality, it will also marginalise the road users. This may translate into cycling and walking becoming less popular in and near Toowong Central.
- There will be an increase of traffic volumes on Croydon Street which is unacceptable due to the residential nature of the suburb. This will lead to increased rat running through suburban streets. Suggests that there should be no widening of Jephson Street and that a better local traffic study should be implemented.
- The rationale for the project that it will relieve traffic congestion is not supported for the Toowong area in the EIS, where there is an estimated increase in traffic on both Croydon and Jephson Streets as a direct result of construction of the Toowong Local Access.

Response

The EIS identified in Section 5.6 that there would be a forecast increase in traffic along Croydon Street and Jephson Street, as traffic using the EIS Reference Project local connection to Milton Road at Toowong would use these roads as access routes to Northern Link.

Council has now decided to proceed with the Project, without local connections.

Chapter 4 of the EIS Supplementary Report details the forecast changes in traffic in the Toowong area with the Project. Adverse effects are minor and substantial benefits would be realised. The following effects are forecast for Jephson Street and Croydon Street with the Project, without local connections:

- For Jephson Street north of Sherwood Road, traffic volumes in 2014 would be similar without and with the project. By 2026, the forecast traffic on Jephson Street is 4% lower with the Project compared to the scenario without the Project. With the EIS Reference Project forecast increase in traffic on Jephson Street was 28% by 2026; and

- In 2014, Croydon Street traffic volumes with the Project are forecast at 32,500 vpd, 7% higher than without the project (30,400 vpd) and, in 2026 - 31,000 vpd, 4% higher than without the project (29,700 vpd). By comparison, with the EIS reference project, a more substantial increase on Croydon Street was forecast (+60%), with volumes of 44,900 vpd forecast by 2026 with the local connection at Toowong. The forecast small increase in traffic on Croydon Street with the Project would occur due to a combination of factors - re-distribution of some local traffic from Moggill Road-Coronation Drive to Milton Road (via Croydon Street) due to reduced congestion on the surface network and local effects associated with the assumed re-introduction of an inbound bus/transit lane initiative on Coronation Drive with Northern Link operational.

B.5.6 Issue 17 – Traffic Modelling of Project without Toowong Connection

The EIS does not incorporate traffic modelling for the "without" the connection scenario. This is necessary to enable "proper" decision making about the effects of the project on the Toowong area and the identification of impacts. It is suggested that traffic modelling for the "without" the Toowong connection scenario be included in the Supplementary EIS.

Response

Traffic modelling of the Project, without local connections, is presented in Chapter 4 of the EIS Supplementary Report.

B.5.6 Issue 18 – Rat Running in Toowong and Local Area Traffic Management

Many submissions have raised the issue of potential rat running in Toowong streets as a result of Northern Link. Several submissions stated that rat-running had not been addressed in the EIS, and that issues raised by the community had been ignored. Some submissions highlighted that rat-running was already a problem in the area. Many submissions were of the general theme that rat-running through local streets will occur if the Toowong connection proceeds.

Specific streets or precincts where rat-running was identified as a matter of concern were:

- Morley Street - the local connection would increase "rat running" in Morley Street and surrounding area, particularly associated with traffic coming from Bardon to enter the main tunnel. The proposed right turn from Morley Street into the tunnel will enable the local community to enter the tunnel; however, they will need to rat-run in order to return home as there is no immediate access back to the same location.
- Cadell Street, Bayliss Street, St Osyth Street, Park Avenue, Park Lane, Lissner Street and Bennett Street in the Toowong north area – these will experience a dramatic increase in traffic and residents will have reduced access to their homes. A need for direct access from the tunnels to Milton Road east of Croydon Street instead of re-directing traffic along Cadell and Bayliss Streets was also raised.
- North Toowong – residents would have to drive further and effectively rat run through streets on the southern side of Milton Road to get home.
- Victoria Crescent - it become a rat run with residents travelling from northern suburbs, down Frederick Street, turning into Victoria Crescent to try to enter the secondary tunnel entrance approaching from the east along Milton Road..
- Croydon Street and Jephson Street – traffic increases will result in rat-running in surrounding streets.

- Jephson Street - the loss of the right hand turn from Jephson Street to Sylvan Road would increase rat running through Lissner Street and Bennett Street.
- Croydon Street - widening of Croydon Street will encourage rat-running.
- Croydon Street - rat-running will be essential for Croydon Street residents to access their properties as there will be a median strip in the midline
- Local streets generally - The tunnel will bring more traffic onto the local streets and local residents will be forced to rat-run.

Several submissions suggested that a Local Area Traffic Management Plan should be implemented.

A submission however noted that a high proportion of programmed local area traffic management projects in the precinct extending from Milton Road to Birdwood Terrace and from Frederick Street to Weinholt Street will be unnecessary and lead to increased travel times, vehicle emissions and a loss of amenity for the local community after Northern Link opens. It was suggested that the community must be consulted and advised of the advantages and disadvantages of any local area traffic management treatment before and after Northern Link opens.

Response

The EIS (Volume 1, Chapter 5 Traffic & Transport, Section 5.6.5, subsection ‘‘Traffic effects in Toowong north of Milton Road”) has modelled and reported the findings of the effect of the EIS Reference Project on local roads in the vicinity of the Toowong connection. This analysis was provided to address the issue of potential rat running in Morley Street and other nearby streets that was raised through public consultation undertaken as part of the EIS process. The same subsection of the EIS recommends extension of the planned Local Area Traffic Management measures and identifies that further attention to this issue would be initiated within the Operational Traffic Management Plan as part of the Project implementation.

Council has now decided to proceed with the Project, without local connections.

Chapter 4 of the EIS Supplementary Report details the forecast changes in traffic in the Toowong area with the Project. Without the local connection at Toowong, the issues raised with respect to potential increased use of local roads to gain access to Northern Link become redundant. There is no need for implementation of specific local traffic management measures in association with the Project to assist in the management of existing rat-running problems in the area. There will be relief in surface traffic volumes throughout the inner west with the Project and improvements in travel times on the surface arterial routes, which would reduce the pressure for use of local roads by extraneous through traffic.

B.5.6 Issue 19 – Local level impacts

When local adverse impacts of changed traffic flows are considered, key objectives of the Draft Transport Plan 2006 - 2026 are not met. The EIS traffic modelling does not consider in any detail adverse impacts at the local level. Issues such as the removal of the Caltex service station are only considered in terms of loss of convenience, not impact on traffic. Similarly, increased safety concerns for children walking to school will result in increased number of local vehicle traffic as parents drive their children to and from school. Additionally, there will be reduced safety for pedestrians along Croydon Street and Jephson Street and for cyclists. The tunnel will do nothing to neither alleviate localised traffic nor add to the amenity of the Western Suburbs.

Response

Council has now decided to proceed with the Project, without local connections.

Without the local connection at Toowong the Caltex service station is not affected by the Project. Chapter 4 of the Supplementary Report details the forecast changes in traffic in the inner west with the Project. Many local roads would benefit from reductions in forecast traffic, compared to the scenario without the Project, which improve amenity for local residents.

B.5.6 Issue 20 – Milton Road and Coronation Drive Congestion

A number of submissions have raised concerns regarding increased number of traffic lanes on the western end of Milton Road, and congestion level generally on Milton Road and Coronation Drive. Key issues are:

- The Northern Link tunnel will increase congestion on Milton Road and Coronation Drive.
- Whether congestion on Milton Road will be alleviated as the tunnel delivers traffic to the north of the CBD. The issue of drivers' paying for something that makes them travel further back into the city or whether they would they prefer to continue to use Milton Road or Coronation Drive was raised.
- The necessity to increase the number of lanes on Milton Road – this was identified as potentially encouraging the increased use of Milton Road, rather than the tunnel.
- The EIS has accepted the projected traffic volumes at Croydon Street and Milton Road and has therefore proposed the widening of these roads. However, the EIS has not addressed the traffic 'bottle-neck' that will occur at the city end of Milton Road
- The project will place substantial burdens on the western end of Milton Road and on Croydon Street, compromising their ability to serve connections from the south and west. The EIS does not adequately address the consequent movement patterns or the effect that any traffic management measures might have on local bus service patterns.
- Upon completion of Northern Link, traffic levels on Milton Road are forecast to be 10-20% higher in 2014 than they were in 2007. The key outcome of Northern Link is that the 'people would get their streets back', but this appears not to be the case. It was requested that Brisbane City Council consider measures for Milton Road to decrease total traffic levels below existing.
- Concerns that increases surface traffic will at intersection of Croydon Street and Milton Road will greatly increase pollution in addition to the ventilation outlets.
- This project is supposed to ease congestion on Milton Road and Coronation Drive. If the Toowong Connection is included, more traffic congestion will result on these roads, both in the short term (during construction) and in the long term.

Response

The EIS has considered the effect of Northern Link on both Milton Road and Coronation Drive operations throughout their length, and reported forecast reductions in traffic volumes (EIS Volume 1, Section 5.6.5 and Table 5-37) and intersection performance at key intersections on these routes (EIS Volume 1, Section 5.6.7 and Table 5-41). The show that the traffic volumes on Milton Road and Coronation Drive would be reduced compared to the scenario without Northern Link, and improved operation performance, and hence congestion reduction, at major intersections along both corridors with the EIS Reference Project.

Council has now considered the submissions and undertaken further detailed assessment of the Project, without local connections. In weighing these competing matters, Council has now decided to proceed with the Project, without local connections.

Chapter 4 of the EIS Supplementary Report details the forecast changes in traffic and intersection performance on Milton Road and Coronation Drive with the Project, without local connections.

On the Milton Road-Coronation Drive radial road corridors used by bus routes, and other roads used by east-west traffic, an 11% to 9% reduction by 2026 (26,000 vpd) in the network across the Toowong and Milton screenlines respectively is forecast. This includes traffic relief of about 14% on Coronation Drive and 6% on Milton Road. Further opportunities would exist to reduce traffic use of Milton Road with urban improvement initiatives following the opening of Northern Link. These types of measures could include allowing kerbside parking during off-peak periods, providing greater accessibility for local traffic movements and active transport improvements at intersections. Traffic model sensitivity testing indicates that traffic volumes along Milton Road with Northern Link operational and the creation of a higher traffic friction environment between Croydon Street and Park Road using these types of urban improvement initiatives would reduce traffic volumes on Milton Road to less than 40,000 vpd (compared to current volumes of 50,000 to 60,000 vpd).

B.5.6 Issue 21 – Kelvin Grove Connection configuration

The EIS Reference Design includes entrances to the westbound tunnel for traffic from Musgrave Road outbound and Kelvin Grove Road outbound. No access is provided for traffic from Hale Street northbound. This means that all traffic entering the tunnel from the city direction westbound has to travel through the College Fiveways, a notoriously congested intersection. Moreover, the entrance from Kelvin Grove Road outbound is entirely unnecessary since any traffic travelling northbound on Petrie Terrace could turn left into Musgrave Road and use the Musgrave Road entrance instead. Design amendments are suggested.

Response

Council has now decided to proceed with the Project, without local connections.

Chapter 4 of the EIS Supplementary Report details the forecast changes in traffic and intersection performance in the Kelvin Grove Road, Musgrave Road and Normanby Fiveways area with the Project, without local connections.

In the Kelvin Grove area, with removal of the local connection, several roads that provided connectivity to the EIS reference project would have reductions in traffic compared to the scenario without Northern Link. Key examples of traffic reductions include Kelvin Grove Road (-3 to -7%), Musgrave Road (-9%), College Road (-1%), Petrie Terrace (-10%) and Countess Street (-7%) which are forecast to experience reduction in average weekday traffic in 2026 compared to the scenario without Northern Link. By comparison, these roads were forecast to experience increases in traffic with the EIS reference project.

B.5.6 Issue 22 – Traffic Increases at Croydon Street/Milton Road and decreases on Sylvan Road

Some submissions have highlighted that even without Northern Link changed traffic conditions are forecast at Croydon Street/Milton Road intersection and on Sylvan Road. Key issues identified are:

- The justification in the document is the predicted increase in traffic accessing the Croydon/Milton Road intersection and the predicted destinations of this traffic. Figure 13 identifies that there is a

prediction that traffic at this intersection will more than double in the next five years even without the proposed Northern Link feeder system. Brisbane is growing, but it is not doubling every five years. These increases at this junction are also more than two times greater than that of any other system. The data and assumptions that support such predictions are queried.

- It is noted (Table 5-37, page 5-108) that Sylvan Road, east of Milton Road, is forecast to have decreasing average weekday volumes. These long-term lower forecasts are queried.

Response

In the strategic traffic model, the base future networks incorporate previously planned Council intersection safety and efficiency improvements at the Milton Road/Croydon Street and Milton Road/Sylvan Road intersections. The forecast increase in traffic on Croydon Street is due to a combination of overall traffic growth resulting from demographic changes, and local traffic re-routing effects with the improvement project that would incorporate provision of a right turn from Milton Road to Croydon Street (currently a banned movement), and the closure of the right turn from Milton Road to Sylvan Road.

A sensitivity testing using the strategic traffic model was undertaken excluding the Milton Road Croydon Street improvements. Forecast average weekday traffic volumes in this area are summarised in **Table B-35** and base year (2007) daily volumes are provided for comparison.

The analysis shows that the improvements at the Milton Road /Sylvan Road and Milton Road/Croydon Street intersections would account for just over half of the forecast increase on this section of Croydon Street between 2007 and 2014. The largest single diversion would be southbound traffic from Sylvan Road to Croydon Street, resulting in a significant forecast traffic reduction on Sylvan Road.

- **Table B-35 Traffic Volumes around Milton Road/Croydon Street – EIS Network Assumptions**

	2007	2014 (average weekday traffic)			2026 (average weekday traffic)		
	Base	EIS Base excluding Milton/ Croydon upgrade[1]	EIS Base[2]	EIS Base with EIS Reference Project[3]	EIS Base excluding Milton/ Croydon upgrade[1]	EIS Base[2]	EIS Base with EIS Reference Project[3]
Croydon Street S of Milton Rd	12,000	19,800	28,100	43,000	20,900	28,700	45,900
Sylvan Road S of Milton Rd	8,400	8,500	5,500	4,500	9,200	6,300	3,900
Milton Road E of Croydon St	52,900	63,700	64,500	58,100	66,800	68,200	63,500
Morley Street N of Milton Rd	3,900	5,900	6,300	4,600	5,900	6,700	5,000
Frederick Street N of Milton Rd	33,500	34,200	33,900	32,900	38,400	37,400	33,200
Mt Coot-tha Road W of Frederick St	69,300	77,200	77,700	68,900	86,900	86,200	74,600
Miskin Street N of Ascog Tce	10,500	11,700	10,200	8,400	11,900	10,800	9,500

	2007	2014 (average weekday traffic)			2026 (average weekday traffic)		
	Base	EIS Base excluding Milton/ Croydon upgrade[1]	EIS Base[2]	EIS Base with EIS Reference Project[3]	EIS Base excluding Milton/ Croydon upgrade[1]	EIS Base[2]	EIS Base with EIS Reference Project[3]
Jephson Street N of Ascog Tce	18,200	26,500	29,900	36,500	28,200	31,000	39,500
Benson Street N of High St	59,700	69,400	68,500	58,700	73,700	72,700	61,200
Moggill Road W of Jephson St	38,500	46,700	47,000	40,000	49,300	50,100	43,400

Data Sources:
Northern Link Traffic Model (Run TR_298) based on EIS Future Base scenario, without Milton/Croydon project.
Northern Link Traffic Model (Run TR_135) EIS Future Base.
Northern Link Traffic Model (Run TR_136) EIS Northern Link Reference Project.

B.5.6 Issue 23 – Detailed information on traffic increases in local area

Some submissions include requests for detailed information or clarification on traffic forecasts in the local area as follows:

- Modification of the traffic model to include Morley Street, Musgrave Street, Gilrey Street and other streets connecting to Frederick Street to Gregory Street and re-run of the model to assess the impacts to these streets was requested. Provision of information on the increased traffic numbers on Morley Street west of Gregory Street was requested.
- The forecast of traffic growth shown in table 5-26 appears inconsistent as it predicts a major (22%) growth of traffic at Moggill Rd in Toowong without a commensurate growth in the local community forecast trip ends or traffic at the reporting points at Indooroopilly. This causes concern that the figures are inaccurate and inflated. This figure when it appears on table 5.37 shows a sizeable decrease in traffic at this point with the project constructed.

Response

Strategic transport models do not typically incorporate all individual streets, and do not rely upon detailed modelling of traffic use of all individual streets to accurately model existing or forecast conditions. The network detail modelled in the Toowong area north of Milton Road in the EIS provides sufficient information to enable the indicative traffic generated by existing and potential "rat-running" traffic seeking to avoid use of Frederick Street, without and with Northern Link, to be suitably represented as demands on Morley Street at the Morley Street/Milton Road/Croydon Street intersection. The overall effects on the Toowong North precinct are then described using this information in the EIS (EIS Volume 1, Section 5.6.5, Page 110 Traffic Effects in Toowong North of Milton Road).

Council has now decided to proceed with the Project, without local connections.

Chapter 4 of the EIS Supplementary Report details the forecast changes in traffic on Morley Street for the Project without local connections, and indicates that a reduction in traffic of 11% is forecast in 2026 compared to the scenario without the Project.

On Moggill Road at Toowong, traffic growth is forecast to occur without the Project due to general growth in population and employment, and motorised trip making, throughout the Brisbane area. This overall growth in demand is described in EIS Volume 1, Section 5.5.1 Future Demand for Motorised Travel, P 70. With the Project, traffic volumes on Moggill Road are forecast to decrease compared to

the scenario without the project, as some traffic using the Moggill Road-Coronation Drive or Moggill Road-Milton Road corridors would divert to use Northern Link.

B.5.6 Issue 24 – Victoria Park Road

The issue of increased traffic on Victoria Park Road has been raised in some submissions. It has been raised that since the formation of the Inner City Bypass, the expansion of QUT and the Kelvin Grove Urban Village, traffic in Victoria Park Road has increased in volume and speed. Associated issues raised are:

- Traffic calming and 40km/h speed limits have been implemented with little effect on some motorists;
- Council buses use Victoria Park Road to access QUT despite there being a dedicated bus stop on the Northern Busway and access from Kelvin Grove Road;
- Buses, trucks and semi-trailers often mount the traffic calming obstacles and damage the Keep Left signs due to them being too long and too big for the street to handle; and
- Pollution fallout from greater traffic flow has increased in proportion to the traffic in the street.

Some amelioration is requested in Victoria Park Road for existing and future residents to minimise the impact of Northern Link and Inner City Bypass on quality of life as residents with two options identified:

- Make Victoria Park Road a cul-de-sac at the ICB end. Fixing problems immediately, it would mean that local residents would have to access the Inner City Bypass via Kelvin Grove Urban Village ("Preferred Option") or
- Seriously upgrade traffic calming devices and make Victoria Park Road accessible to local residents only, forcing buses and commercial vehicles to use alternative routes.

Response

The EIS Reference Project does not have an impact on the traffic use of Victoria Park Road as the design permits the existing left-in left-out operations to the Inner City Bypass to be maintained.

The Project without local connections also maintains existing left-in left-out traffic operations at Victoria Park Road.

Northern Link does not give rise to any direct traffic volume or accessibility impacts on Victoria Park Road, therefore implementation of mitigation measures to address residents concerns about existing traffic matters are not warranted in conjunction with this project.

B.5.6 Issue 25 – Removal of Right Turn from Jephson Street to Sylvan Road

Some submissions have highlighted concerns in relation to the removal of the right turn from Jephson Street to Sylvan Road. Key issues are:

- As a result of the right hand turn from Jephson Street onto Sylvan Road being removed, a significant volume of local traffic from West Toowong now accessing Coronation Drive via Jephson Street then Sylvan Road, would rat-run down Quinn Street, adjacent to Toowong State School. This would pose a significant additional hazard for school children as Quinn Street adjacent to Ascog Terrace is a drop-off point.

- If the right hand turn from Jephson Street to Sylvan Road is removed, motorists will be forced to make an equivalent right turn two blocks earlier at Lissner Street, and then be forced to make a second right hand turn from Bennett Street into Sylvan Road, which is often blocked with traffic and would thus encourage rat running.
- Concerned about the removal of the right turn from Jephson Street to Sylvan Road as north bound cars on Jephson Street will have to turn right across the traffic to enter Lissner Street, effectively removing the capacity of one lane of traffic. Traffic wishing to access Coronation Drive from Ascog Terrace will have to turn right into Jephson Street. The EIS does not consider the 416 bus route, which uses this right turn, and the needs of the number of local residents who catch the bus at the Bulldogs bus stop. Preventing the turn will also encourage "rat running" through local streets.
- The proposed removal of the right turn from Jephson Street northbound into Sylvan Road eastbound will have significant impacts on traffic flow around Toowong Village Shopping Centre and will significantly impact accessibility to a number of Toowong amenities and erode the modelling Northern Link traffic benefits of reduced local congestion. No reference is made to the impact on the 416 bus route which uses this right turn. The EIS suggests local access between Jephson Street and Sylvan Road would be along Lissner Street, which presents additional traffic and safety problems

Response

Council has now decided to proceed with the Project, without local connections.

Without the Toowong local connection, no modifications are proposed to existing traffic arrangements at the Jephson Street/Sylvan Road intersection. The right turn from Jephson Street to Sylvan Road would not be removed due to the Project.

B.5.6 Issue 26 – Moggill Road On-ramp Performance

The Main Roads submission identifies that the LoS for the on ramp to the Western Freeway from Moggill Road declines with Northern Link and this is not satisfactory to the State. It is requested that Brisbane City Council consider improvements to the Western Freeway/Moggill Road interchange as part of the Northern Link project

Response

Traffic modelling of the Project, without local connections, is presented in Chapter 4 of the EIS Supplementary Report.

Effects at the Moggill Road interchange on ramp level of service and intersection delay have been analysed in detail separately via micro-simulation analysis using the Paramics software and SIDRA intersection analysis. The results are provided in Chapter 4 of the EIS Supplementary Report and mitigation measures associated with the on-ramp and off-ramps at the Moggill Road interchange with the Project are described in Chapter 4.

B.5.6 Issue 27 – Detailed information on intersection performance

Main Road's submission notes that Table 5-41 information is limited and adds little value when taken out of full context , i.e., the DoS and LoS values do no appear to correspond (DoS 0.80 and LoS B, DoS 0.36 and LoS C). Request table is reviewed to include 'fuller picture rather than selective representations'

Response

Table 5-41 in the EIS (Volume 1, Section 5.6.7 Intersection Performance, Pages 115 to 118) provides an overall individual performance summary for 42 intersections for AM and PM peak periods for 2014 and 2026, without and with Northern Link, using standard reporting data extracted from detailed SIDRA intersection analysis. The SIDRA analysis calculates the degree of saturation (DoS), delays and level of service for each approach direction to each intersection, and then combines results to calculate the overall level of service based upon average delay. The degree of saturation (DoS) reported is the highest degree of saturation for any approach leg.

B.5.6 Issue 28 – Operation of Croydon Street/Sylvan Road intersection

Under the proposed changes introduced by the Northern Link Tunnel, access to the Toowong South precinct, bounded by Miskin Street, Croydon Street/Jephson Street and Ascog Terrace would be adversely affected. Will there be a dedicated right turn lane from Croydon Street into Sylvan Road (westbound) and how would this intersection operate?

Access into the area bounded by Sylvan Road, Ascog Terrace, Jephson Street and Miskin Street will be difficult unless a dedicated right turn access lane and traffic light is formulated.

Response

Council has now decided to proceed with the Project, without local connections.

Without the Toowong local connection, no modifications are proposed to existing traffic arrangements at the Croydon Street/Sylvan Road intersection. The right turn from Croydon Street to Sylvan Road (westbound) would not be removed due to the Project.

B.5.6 Issue 29 – Travel Time Savings

The estimate of travel time savings from Toowong to the Airport is dishonest. Travel times were previously decreased by Hale Street and Inner City Bypass, and Northern Link will not contribute anything new. Vehicle distances and travel times in 2026 are utterly meaningless guesses.

Response

The estimates of travel time savings with Northern Link provided in the EIS (Volume 1, Section 5.6.8 Travel Time Benefits, Page 118) are based on data obtained from the traffic model. The vehicle distances are based on measured GIS route lengths, and peak period travel times have been extracted from the traffic model runs, without and with Northern Link. The graphical representation of morning peak travel time changes included in the EIS as Figure 5-48 was produced as an output from the traffic model.

B.5.6 Issue 30 – Croydon Street Property Access

I will no longer have safe access to my property at 39 Croydon Street due to increased traffic and the widening of Croydon Street. I would like consideration to be given to providing a slip lane for safe access

The proposed median barrier on Croydon Street will significantly inhibit local access and mobility in the local area. It will force traffic from all directions to use circuitous routes on inappropriate local streets, instead of direct routes on higher order roads as it currently can. The "convenient access" referred to in the EIS for access from the south requires an additional 1.5km of travel through inappropriate local

streets. A short bicycle trip from the local activity centre on Sherwood Road will triple in distance. All other alternative routes proposed by the EIS are similarly flawed and will result in exacerbated traffic problems. The submission suggests removing the central median barrier on Croydon Street from the project. It is also suggested that the right turns in and out of Cadell Street, Bayliss Street and St Osyth Street are retained.

Response

Council has now decided to proceed with the Project, without local connections.

Without the Toowong local connection, no modifications due to the Project are proposed along Croydon Street. It is noted that Council have previously proposed upgrading works for the intersection of Croydon Street and Milton Road, and Sylvan Road and Milton Road to improve safety and efficiency. Changes to property access and barrier arrangements on Croydon Street may form part of this separate future Council project.

B.5.6 Issue 31 – Kelvin Grove Local Access Issues

Access for residents in the Federal Street and adjacent street area will no longer have vehicular access to the Kelvin Grove shopping centre which will significantly and adversely impact business owners.

In the local area west of Kelvin Grove Road, several residents in Upper Clifton Terrace will be unable to access Musgrave Road directly and will need to be diverted. Other diversions, such as Victoria Street, will result in rat running through small local streets. This will make it increasingly difficult to travel locally and will impact heavily in a community where streets are very narrow and on road parking at a premium.

Response

Council has now decided to proceed with the Project, without local connections.

Without the Kelvin Grove Road local connection, no modifications due to the Project are proposed in relation to access arrangements along Kelvin Grove Road or Musgrave Road.

B.5.6 Issue 32 – Cat and Fiddle Shopping Centre Access

Access to the Cat and Fiddle Shopping Centre at the corner of Milton Road and Morley Street will be difficult and will cause the demise of this important local community asset.

Access to Toowong State School, Preschool and the Cat and Fiddle shops will be difficult due to the increased level of traffic on the local roads.

Access to the Cat and Fiddle shopping centre and Toowong Village will be greatly impeded by the proposed traffic changes, especially for pedestrians and cyclists who currently enjoy these local services.

Response

Council has now decided to proceed with the Project, without local connections.

Without the Toowong local connection, no modifications are proposed due to the Project to the existing traffic arrangements at the Milton Road/Morley Street/Croydon Street intersection. Access to the Cat and Fiddle shops will remain unaltered by the Project.

B.5.6 Issue 33 – Toowong South Precinct Local Access

The suggested traffic re-routing [in Toowong] is ill-informed (e.g. recommending use of Ascog Terrace, which has traffic calming and a dangerous entry point).

Small changes in traffic patterns (such as the removal of the Caltex service station, the route of the 470 bus, less children walking to school as the result of traffic safety concerns and reduced safety and amenity for pedestrians along Croydon Street and Jephson Street), have broader implications, increasing traffic on the very residential streets that the project cites as benefiting from reduced traffic. An assessment of the likely increase in traffic generated as a result of the "loss of convenience" from the project is suggested.

The implications for local traffic of some traffic changes have been inadequately considered (e.g., turn into Ascog Terrace or St Osyth Street). The proposed traffic routes are problematic, either being unsafe or inappropriately using suburban streets as connection roads, beyond their capacity, Reference to investigations identifying "some adverse effects" in the Technical Report (s12.1 12 - 286) were deleted from the EIS (5 s5.63 p5-94) where the expression "adverse effects" was removed.

The rationale for the tunnel conflicts with the "local access" impacts, which will increase congestion.

Response

Council has now decided to proceed with the Project, without local connections.

Chapter 4 of the EIS Supplementary Report details the forecast changes in traffic in the Toowong area with the Project. Adverse effects are minor and sound benefits would be realised. . Without the local connection at Toowong, the issues raised with respect to potential increased use of local roads to gain access to Northern Link, or undertake re-routing due to intersection changes with the project, become redundant.

B.5.6 Issue 34 – Toowong North Precinct Local Access

Currently much of the traffic using Valentine Street uses the connection with Frederick Street. The changes proposed mean that all traffic must now access Valentine Street via Gregory Street past the front of our property.

Page 13-40 of the EIS state "Similarly all existing properties that rely on access from the north side of Milton Road, between Frederick Street and Morley Street, would be acquired. Vehicular access to the existing residences fronting Milton Road between Gregory Street and Morley Street is via a laneway from Gregory Street or from Morley Street. Therefore, access to these properties during construction and operation would be unaffected." This is incorrect, 553 Milton Road gains access only via Milton Road, is not shown as being resumed in the EIS and to my knowledge, the owner has not been informed that this is likely. This is a historic residence with a limited access driveway. Suggests that this information is incorrect and that this house is not shown as required in the reference design.

If an additional lane is added on Milton Road, it will quite possibly make it impossible to access the property, given the grade/slope of the site and the steepness of the existing driveway. If this happens, it may be necessary to resume the whole property. This will be an expensive exercise and something that we wish to avoid.

Response

Council has now decided to proceed with the Project, without local connections.

Without the Toowong local connection, no modifications due to the Project are proposed along Milton Road or Croydon Street. It is noted that Council have previously proposed upgrading works for the intersection of Croydon Street and Milton Road, and Sylvan Road and Milton Road to improve safety and efficiency. Changes to property access may be required in the future associated with this separate Council project.

B.5.6 Issue 35 – Bus Priority in the Western Corridor

A submission has identified that "freed-up" road space on Milton Road and Coronation Drive might only be marginal as users will tolerate a certain level of congestion before choosing to pay a toll. In order to ensure an improved operating environment for buses, specific provision for bus priority in western corridor is likely to be required. The EIS does not address this issue, but instead assumes the space will continue to be available to the ongoing benefit of bus operations.

The submssion also suggests that Northern Link claims to enable the Western Bus Corridor project to be developed. However, whilst the EIS claims reduced bus travel times on Milton and Coronation Drive, it does not identify how this will be achieved.

Another submission raised issues in regard to bus priority measures, notably the reallocation of road space on Coronation Drive and Milton Road given reduced traffic volumes resulting from the introduction of Northern Link. It is suggested that any enhancements to the public transport network are limited to those already planned by Brisbane City Council and TransLink Transit Authority and should really be treated as 'business as usual' rather than enhancements. Requests the inclusion of analysis on the projects ability to afford any opportunity for improved frequency of existing services or any new public transport services.

Response

The EIS (Volume 1, Section 5.6.11 Bus Travel Effects) identifies that with the EIS Reference Project benefits to bus travel time and travel time reliability due to changed traffic conditions or traffic volumes on the road network were forecast. In particular, with the EIS Reference Project;

- reduced travel times on Milton Road and Coronation Drive with Northern Link would be available due to reduced congestion levels with lower traffic volumes. Examples of the scale of benefits along various bus routes was identified in Table 5-45 for the EIS Reference Project;
- a direct opportunity was also available to divert existing peak period Rocket bus services between the Western Suburbs and CBD via Northern Link from the Western Freeway to the Inner Northern Busway via the Normanby Bus Station, offering significant travel time savings for commuters; and
- as identified in the EIS (Volume 1, Section 5.4.4 Future Road Network Improvements), reductions in traffic demands on the Coronation Drive corridor, with the Project, could allow for re-allocation of the (then tidal flow) lane designations to improve public transport operations.

Chapter 4 of the EIS Supplementary Report describes the bus travel effects of the Project, without local connections which would provide buses travelling via Moggill Road, Coronation Drive and Milton Road with improvements in travel time and travel time reliability due to changed traffic conditions and reduced traffic volumes on the road network in the inner west. For example, bus services travelling along Milton Road and Coronation Drive would experience indicative travel time savings of approximately 5 minutes in the peak direction. As with the EIS reference project, reductions in surface

road demands through the inner west area would create the opportunity to provide for improved bus priority initiatives. Reductions in demand on the Coronation Drive corridor could allow for reallocation of lane designations to improve public transport operations. For example, an inbound bus lane or T3 lane could be designated between Toowong and Milton, west of Hale Street, with two general traffic lanes operating in each direction along Coronation Drive throughout the day.

Unlike the EIS reference project, the Project does not provide the immediate potential for diversion of existing Rocket bus services between the western suburbs and CBD that operate in peak periods to utilise Northern Link as without the Kelvin Grove Road connection there is no "direct" connectivity with the Inner Northern Busway. The potential for future cross-town bus services between key trip generators in the western and northern suburbs (e.g. Chermside to Indooroopilly, Indooroopilly to Australia TradeCoast) to travel via Northern Link and the Northern Busway is however afforded by the Project.

B.5.6 Issue 36 – Effect on Public Transport Patronage

A submission has queried how Northern Link affects public transport patronage volumes, especially when considering the Kelvin Grove Road CBD connection, which may encourage commuter driving.

Response

The EIS (Volume 1, Section 5.6.11, Bus Travel Effects, Pages 131-132) provides information on public transport patronage volume changes from the BSTM mode choice model assessment of the EIS Reference Project with the Kelvin Grove Road CBD connection, and with diversion of Rocket bus services to Northern Link.

B.5.6 Issue 37 – Bus Stops and Bus Routes

A number of submissions have raised issues in relation to bus stops and bus routes in the vicinity of the Toowong Connection such as:

- Given the existing Milton Road outbound bus stop will be removed, pedestrians will avoid walking back to Milton Road, to the only (albeit cumbersome) designated crossing, instead of making unsafe crossings.
- If it is decided that the Toowong connection must proceed, it is requested that consideration be given to ensuring the express buses that currently stop at the Toowong cemetery stop do not bypass the local area.
- Pedestrian access to the relocated Milton Road bus stops near Quinn Park, the bus depot park and ride stop, Dean Street, Mt Coot-tha Gardens and Toowong Village bus stops will be diminished. An increase in walking times to these bus stops of 10 minutes or more is expected

Response

Council has now decided to proceed with the Project, without local connections.

Without the Toowong local connection, the issues raised in relation to the effects on bus stops on Milton Road are no longer relevant. Bus stops along Milton Road would not be changed due to the Project.

B.5.6 Issue 38 – Additional Pedestrian Crossings

Information on investigations into additional underpasses, overpasses or at grade crossing of roads that experience increases in traffic with the Project need to be considered to provide safe crossings at particular intersections, namely;

- Milton Road between Sylvan Road and Croydon Street.
- Croydon street between Milton Road and Sylvan Road

Response

The considerations for pedestrian access, particularly at the Toowong connection, included in Chapter 3 of the EIS were that the options identified were not considered feasible and were not considered further in the concept design. The pedestrian underpass would require a high capital cost, maintenance costs such as cleaning, lighting and surveillance costs, be subject to vandalism and a risk to personal security.

The signalised pedestrian crossing would require the lowest capital cost to implement. However, the crossing could have a negative impact on the road network performance, including the DTMR network, and would have sight distance constraints for the westbound crossing of Milton Road due to the walled structures connecting to the elevated tunnel ramps.

The pedestrian overpass would require high capital cost, maintenance costs and safety concerns particularly at night. The overpass would have visual impacts and depending on the design of the southern ramp approach require more land in Quinn Park.

Council has now decided to proceed with the Project, without the local connections.

B.5.6 Issue 39 – Accessibility for Active Transport Between North and South Toowong

The increased traffic experienced on Milton Road and Croydon Street with the EIS Reference Project and the changes to intersection layouts with the EIS Reference Project give rise to accessibility issues to pedestrian and cyclists. These problems are particularly noted for residents north of Milton Road trying to access south Toowong.

The Main Roads submission also raised concerns about potential changes to the pedestrian journey times around Milton Road / Croydon Street and Jephson Street / Croydon Street / Sylvan Road intersections.

Response

The Project, without local connections, would not result in changes to the configuration of intersections along Milton Road and Croydon Street, therefore provision of pedestrian crossings in this area would not alter, compared to the scenario without the Project.

Reduced traffic volumes are forecast for Milton Road and Sylvan Road with the Project, and these would generally provide some benefit to active transport in the area with potential reduced delays at crossings.

B.5.6 Issue 40 – Toowong Roundabout

Concern has been expressed in regard to pedestrian and cycle accessibility in and around Toowong roundabout with the Project operational. In particular, the effect on accessibility for pedestrian travel to the Toowong cemetery has been raised in submissions.

Response

Traffic volumes using the Toowong roundabout are forecast to reduce with the Project as some traffic that would otherwise travel between Milton Road and Frederick Street and the Western Freeway would divert to use Northern Link. During peak periods a 10-12% reduction in surface volumes using the roundabout is forecast with the Project; however it is likely that congested conditions would remain. Traffic reductions would provide some benefit to on-road cyclists using the road network to reach the Toowong Cemetery via Mount Coot-tha Road.

The Cycle and Pedestrian Bridge will give access to Mt Coot-tha and the Toowong Cemetery and is located to the west of Mt Coot-tha Road roundabout. Access from the west is provided via the off-road routes of the Western Freeway bikeway and from the east via pedestrian pathways and on road cycle paths along Sylvan Road.

B.5.6 Issue 41 – Kelvin Grove Road Pedestrian and Cycle Amenity

Some submissions have highlighted concern over pedestrian and cyclist amenity around Kelvin Grove Road portals with the Project, for example:

- The designs increase the volumes of traffic and number of traffic lanes on Kelvin Grove Road that pedestrians will have to cross. They also contain no specific designs for improvements in amenity for crossing Kelvin Grove Road.
- It is disappointing to see in the EIS that these opportunities (Kelvin Grove Road amenity improvements) have not been taken up. In fact the current tunnel portal infrastructure designs will lead to a lower standard of amenity for the non-motorised users of the ground plane around the tunnel portals at Kelvin Grove.
- The designs deliver no improvements in pedestrian, bicycle or disabled access to the City from the Urban Village or other areas to the north of the tunnel portals.
- The design maintains the currently convoluted route to the Normanby Fiveways surface connection to the city via Kelvin Grove Road which is difficult to access by cyclist, disabled or pedestrians.

Response

The Project, without connections, does not result in any changes to intersection configurations or pedestrian access along Kelvin Grove Road.

In the Kelvin Grove area, with removal of the local connection, several roads that provided connectivity to the EIS reference project would have reductions in traffic compared to the scenario without Northern Link. Decreases in forecast traffic volumes on Kelvin Grove Road by direction are summarised in **Table B-36.**

Key examples of traffic reductions include Kelvin Grove Road (-3 to -7%), Musgrave Road (-9%), College Road (-1%), Petrie Terrace (-10%) and Countess Street (-7%) which are forecast to experience reduction in average weekday traffic in 2026 compared to the scenario without Northern Link. By comparison, these roads were forecast to experience increases in traffic with the EIS reference project.

- **Table B-36 Forecast Directional Traffic Reductions on Kelvin Grove Road**

Road	Direction	2026 AWDT		
		Without NL	With Project	% Difference
Kelvin Grove Road - South of Blamey Street	Northbound	25,300	24,700	-2%
	Southbound	34,300	33,300	-3%
Kelvin Grove Road - South of Musk Avenue	Northbound(1)	30,600	30,700	0%
	Southbound	36,300	35,600	-2%
Kelvin Grove Road - South of Ithaca Street	Northbound	9,500	9,000	-6%
	Southbound	9,800	9,100	-8%

Table Note:
1Includes ramp volumes from Hale Street and Musgrave Road

B.5.6 Issue 42 – Local and State Active Transport Policy

The EIS has not taken into consideration the South East Queensland Principle Cycle Network Plan and Brisbane Active Transport Strategy: Walking and Cycling Plan 2005-2010. These plans outline current and future pedestrian and cyclist policies in regard to new infrastructure and specifically request that they provide priority to pedestrian and cyclist access and safety in all new infrastructure projects.

A submission identifies that narrow roads such as Milton Road and Kelvin Grove Road have long been recognised on existing State and Council cycle plans as needing cycle facilities. As Milton Road should experience a drop in traffic volumes, the opportunity exists for incorporating cycle lanes onto them.

Response

The Project provides priority to pedestrian and cyclist through its commitment to maintaining the operation of the Western Freeway pedestrian and cycle bridge at Mt Coot-tha. The bikeways adjacent to the Inner City Bypass are realigned and maintained with the Project and provide a safe, off road connection between Kelvin Grove and northern suburbs.

Milton Road and Kelvin Grove Road have both been acknowledged as being part of the future principal cycle routes as detailed in Figure 3-23 of the EIS. As both routes are forecast to experience traffic reductions with the Project, opportunities exist for implementation of active transport improvements. Implementation is not within the scope of the Northern Link project and the prioritisation of individual initiatives would be considered in the context of Council's overall active transport program and budget.

B.5.6 Issue 43 – ICB Bicycle Merge with Tunnel Portals

The project will make it much more dangerous for on-road cyclist on the ICB to merge left across traffic coming from the tunnel portals in order to reach the safety of the shoulder. The submission also identified concerns regarding merging for Kelvin Grove Road, around portal entrances.

Response

Off road cycleways are provided for cyclists on the northern and southern side of the ICB accessible from Kelvin Grove Road, Hale Street approaches, College Road and Bowen Bridge Road. The Project does not impact any intersections or on-road cycle facilities on Kelvin Grove Road

Whilst the merging conditions for on-road cyclists on ICB in the proximity of the tunnel portals will be more challenging, the actual use of the ICB by on-road cyclists is very low (approximately 20 cyclists during the AM peak based on recent surveys).

The Project, without local connections, does not result in any merging issues for cyclists along Kelvin Grove Road.

B.5.6 Issue 44 – On-road Cycle Network Effects

A submission requests that the on-road (cycle) network (and main desire lines) relevant to the Project area are listed and that the effects are described. Description of cyclist routes and impacts was also sought. Confirmation that the same or better level of service will be available to cyclists in the project area and not just in specific areas in and around the portals was requested. Areas where a potential decrease in level of service was evident should be listed.

Response

The Project, without local connections, has very limited physical impacts on the on-road cycle network within the study area. The effects are confined to the merge areas for on-road cyclists on the Western Freeway and Inner City Bypass, and these are discussed separately as specific issues.

Table B-37 provides a list of on-road cycle ways and provides assessment of the forecast change of traffic conditions on-road with the Project operational.

For locations where a potential negative effect has been highlighted, **Table B-38** summarises the scale of forecast change in average weekday daily traffic volume, and the likely effect on level of service for on-road cyclists.

The Western Freeway and Inner City Bypass are the only roads where a major effect is highlighted for on-road cyclist level of service. Both of these roads form part of the region's motorway standard road network, and have off-road cycle facilities provided.

- **Table B-37 Listing of effects on On-road Cycle Network**

On Road Cycleway (2)	Link Origin Description	Link Destination Description	Suburb	Approximate Section Length (metres)	Traffic Volume change with the Project (1)	Potential Effect
Haig Rd	Haig Rd	Haig Rd	Auchenflower	510	Decrease	Positive
Boundary Rd	Boundary Rd	Boundary Rd	Bardon	980	Decrease	Positive
Rainworth Rd	Baroona Rd	Dudley St	Bardon	430	Decrease	Positive
Simpson Rd	Macgregor Tce	Macrae Rd	Bardon	2070	Decrease	Positive
Stuartholme Rd	Stuartholme Rd	Stuartholme Rd	Bardon	1080	Decrease	Positive
Herston Rd	College Rd	Herston Rd	Herston	900	Decrease	Positive
Victoria Park Rd to off Road network	Victoria Park Rd	Gilchrest ave	Herston	180	Decrease	Positive
Blamey St	Blamey St	Blamey St	Kelvin grove	330	Decrease	Positive
Normanby Tce	Kelvin Grove Rd	Victoria park Rd	Kelvin grove	420	Decrease	Positive
Windsor Rd	Windsor Rd	Windsor Rd	Kelvin grove	1890	Decrease	Positive
Little Cribb St	Coronation Dve	Little Cribb St	Milton	210	Decrease	Positive
Baroona Rd	Baroona Rd	Baroona Rd	Paddington	1400	Decrease	Positive
Dowse St	Dowse St	Dowse St	Paddington	370	Decrease	Positive
Given Tce / Caxton St	Given Tce Caxton St	Given Tce Caxton St	Paddington	1600	Decrease	Positive
Latrobe Tce	Ellena St	Macgregor Tce	Paddington	900	Decrease	Positive
Carmody Rd	Carmody Rd	Carmody Rd	St Lucia	1270	Decrease	Positive
Hawken Drive	Hawken Dve	Hawken dr	St Lucia	1720	Decrease	Positive
Heroes Avenue	Heroes Ave	Heroes ave	Taringa	220	Decrease	Positive
Bellevue Parade	Heroes Ave	Indooroopilly Rd	Toowong	210	Decrease	Positive
Birdwood Tce	Birdwood Tce	Birdwood Tce	Toowong	2210	Decrease	Positive
Campbell St / Josling St	Whitmore St	Herbert St	Toowong	660	Decrease	Positive
Dean St / Sherwood Rd	Dean St Sherwood Rd	Dean St Sherwood Rd	Toowong	1380	Decrease	Positive
Land St	Coronation Dve	Dean St	Toowong	560	Decrease	Positive
Miskin St	Miskin St	Miskin St	Toowong	530	Decrease	Positive

On Road Cycleway (2)	Link Origin Description	Link Destination Description	Suburb	Approximate Section Length (metres)	Traffic Volume change with the Project (1)	Potential Effect
Mt Coot-tha Rd	Sylvan Rd	Dean St	Toowong	210	Decrease	Positive
Richer St	Richer St	Richer St	Toowong	390	Decrease	Positive
Sylvan Rd	Land St	Milton Rd	Toowong	840	Decrease	Positive
Sylvan Rd	Milton Rd	Land St	Toowong	840	Decrease	Positive
Woodstock Rd	WoodStock Rd	WoodStock Rd	Toowong	370	Decrease	Positive
Hetherington St	Hetherington St	Butterfield St	Herston	670	Increase	Negative
Inner City Bypass Inbound	Horace St	Kelvin grove Rd	Herston	2170	Increase	Negative
Inner City Bypass Outbound	Victoria park Rd	ICB off ramp	Herston	1340	Increase	Negative
Clarence St	Clarence St	Clarence St	Indooroopilly	210	Increase	Negative
Lambert Rd	Oxley Rd	Carnarvon Rd	Indooroopilly	740	Increase	Negative
Western Freeway	Moggill Road	Mt Coot-tha Rd	Mt Coot-tha	3800	Increase	Negative
Indooroopilly Rd	Indooroopilly Rd	Indooroopilly Rd	Taringa	250	Increase	Negative
Stanley Tce	Stanley Tce	Stanley Tce	Taringa	2110	Increase	Negative
Swann Rd	Swann Rd	Swann Rd	Taringa	2480	Increase	Negative
Taringa Parade	Taringa pde	Taringa pde	Taringa	1550	Increase	Negative
Bellevue Parade	Indooroopilly Rd	Alpha St	Toowong	210	Increase	Negative
Sylvan Rd	Land St	Coronation dve	Toowong	150	Increase	Negative
Lorward Avenue	Lorward ave	Simpsons Rd	Bardon	520	-	-
Carraway St	Carraway St	Carraway St	Kelvin grove	390	-	-
Vale St	Vale St	Vale St	Kelvin grove	430	-	-
Bayswater St	Bayswater St	Bayswater St	Paddington	270	-	-
Archer St	Archer St	Archer St	Toowong	190	-	-

Table Note:
1Where no volume information is indicated this is due to local nature or road. Effects due to the Project would be negligible.
2On-road cycle network links as displayed in Figure 3-19 of the EIS.

- **Table B-38 Assessment of Key Effects on On-road Cycle Network**

On Road Cycleway	Traffic Volume change with the Project	Approximate AWDT change (2026)	Scale of Potential LoS change for on-road Cyclists
Hetherington St	Increase	-300	Negligible
Inner City Bypass	Increase	-35,700	Major but off-road facility available
Clarence St	Increase	-290	Negative
Lambert Rd	Increase	-290	Negative
Western Freeway	Increase	-32,200	Major but off-road facility available
Indooroopilly Rd	Increase	-500 to -800	Negative
Stanley Tce	Increase	-100	Negative
Swann Rd	Increase	-100	Negative
Taringa Parade	Increase	-300 to -400	Negative
Bellevue Parade	Increase	-100	Negative
Sylvan Rd	Increase	-3,200	Minor – on-road lanes provided

B.5.6 Issue 45 – Key Pedestrian Crossings

A submission requests clarification that the list of key pedestrian crossings (EIS page 5-36) is representative of the Project impacts. Additional data is also requested for current and future pedestrian desire lines around areas that have no current facilities (e.g. crossovers, roundabouts and mid-block) Also provide clarification as to how the project would impact upon pedestrians at currently un-signalised intersections and mid block crossings (e.g. Dean Street, Miskin Street and Sylvan Road)

Response

The list of key pedestrian crossings on page 5-36 of the project is representative of the Project. Additional data is also given in Figure 4-16 of the EIS in the form of pedestrian crossing volumes at intersections around Milton and Toowong.

Pedestrian effects are as follows:

- Western Connection As discussed in the EIS (page 5-36) the Western Freeway bikeway has low pedestrian volumes (and desire lines) due to the distance between entry and exit points and is predominantly used by cyclists. The crossovers, roundabout and mid-block crossings are limited to Russell Terrace (underbridge) and the bridge crossing west of Mount Coot-tha Roundabout. As these are all off road facilities project impacts are minimal, and construction impacts are to be mitigated through construction management as discussed in section 4.7.7 of the EIS.
- Milton Road, Sylvan Road, Dean Street and Miskin Street are pedestrian routes to Toowong and Coronation Drive. Pedestrian desire lines in the Toowong area would not be affected by the Project, without connections. Many roads which cater for strong levels pedestrian activity would have traffic volume reductions.
- The Inner City Bypass crossovers and mid-block crossings are all elevated off road routes. Realignment of the southern bikeway connecting to the Landbridge would occur with construction

mitigation as described in the section 5.7.7 of EIS. Pedestrian desire lines around the Inner City Bypass would not be affected by the Project.

B.5.6 Issue 46 – Opportunities to enhance pedestrian and cyclist connectivity

A submission requests that Brisbane City Council identify and describe specific improvements for enhanced pedestrian and cycling connectivity that would be derived from Northern Link. This is to be in a form other then indicating traffic congestion or improved movement of traffic on key regional radial roads.

Response

As the Project involves tunnels connecting motorway standard roads with no local connecting ramps to surface arterials, the opportunities for direct pedestrian and cycling connectivity improvements integrated with the project infrastructure are not available.

Reductions in surface traffic with the Project yield amenity benefits along principal cycle routes and pedestrian links identified in Council's Active Transport Strategy: Walking and Cycling Plan 2005-2010.

B.5.6 Issue 47 – On-road Impacts to Cyclists on Centenary Highway

There is an agreement in place between DMR and Bicycle Queensland to allow cyclist to use the Centenary highway on road (sports cyclist and groups are the predominate users). The request asks for an explanation of how the Project impacts on these users and what measures are to be taken to ensure a continued or better level of service for on-road cyclists using the Centenary Motorway. Response

Response

It would be recommended that the agreement for the on-going use of the Western Freeway by sports and group cyclists on weekends is re-assessed with the implementation of Northern Link.

The safety of group cyclists in the vicinity of the merge and diverge lanes at the Northern Link portals would be a matter for DTMR review.

The Project maintains the off-road cyclist facility along the Western Freeway which provides cyclists with a good level of service for travel in this corridor.

B.5.6 Issue 48 – Clarification of Intersection Detail

A submission request clarification of which intersection is discussed in dot point 4 of page 5-36 of the EIS.

Response

The intersection in questions is that of Jephson Street / Sherwood Road with information discussing a pedestrian traffic flow of over 2,000 persons in a 12 hour period. This is also presented in Figure 5-19: Pedestrian Movements at Intersections in the EIS

B.5.6 Issue 49 – Mt Coot-tha Cycling Destination

No mention is made of Mt Coot-tha as a cycling destination. Mt Coot-tha is a popular destination and is used by a range of cyclists. It is also likely to host an annual mass cycle challenge (which attracted 1600

participants it inaugural event). Information on how the Project will impact on cyclist access to Mount Coot-tha via Mount Coot-tha Road Roundabout was requested.

Response

Two options would be available for cyclist access to Mt Coot-tha, the on road surface network currently in place or the Western Freeway pedestrian and cycle overpass. The overpass will provide excellent off road linkage to Mt Coot-tha Road while surface connections are to be as existing with access via Mt Coot-tha Road Roundabout. Reduced traffic use of the Mt Coot-tha Road roundabout is forecast with the Project operational, improving amenity for on-road cyclists.

B.5.6 Issue 50 – Operational Reliability and Vulnerability

Chapter 5 appears not to contain an analysis of the road network sensitivity and operational vulnerability due to incidents (vehicle breakdowns in the tunnel, flooding of the tunnel, equipment failure, closure of the tunnel). It was suggested that sensitivity analysis and system reliability measures should articulate the necessary performance required and design criteria e.g. internal build outs, run out lengths at merges, limited shoulder widths, heavy vehicle usage etc.

Response

Mitigation measures have been included in the design that would minimise the operational vulnerability of the project due to incidents. These measures include;

- 1.5m outside shoulder width for the entire length of the mainline tunnel to allow for the passing of a broken down vehicle in the inside lane. An operational response to an incident in the mainline tunnel may include a decrease in speed to still allow for two lanes of traffic to pass a broken down vehicle. Dynamic control of tunnel speed and hazard advice would be achieved by the use of VMS signage, overhead lane availability and flashing lights etc.

  A 4.0m lane width with 2.0m outside shoulder on the entry ramps is provided to allow the continuation of a single lane operation during a breakdown. A run off area is provided at the ramp connection merges with tha mainline tunnel using full shoulder width and tapered out to match the mainline tunnel shoulders.

  A Traffic Monitoring and Control System (TMCS) is required to monitor, control and respond to traffic movements in the tunnels and the tunnel approaches. It will provide operators with the functionality and capability to identify and respond to all reasonably foreseeable incidents in a manner that meets the requirements for public and staff safety over a range of operational scenarios. This would also include emergency operation of the TMCS by Tunnel Control Centre staff interfacing with the Brisbane Metropolitan Traffic Management Centre (BMTMC);

- 1 in 10,000 flood immunity to the portals is provided. This is recommended as being the most practically achievable immunity level to provide significant protection to the tunnel. This immunity level gives a 1% likelihood of occurrence of flooding within a 100 year project lifespan;
- Back up mains power supply system is provided whereby two transformers in each substation will share the load and each will be capable of picking up the total load in the case of the failure of the second supply;
- Northern Link has not been designated a Hazardous Goods Route. Proponents for the design and construction of the project would need to prevent placarded vehicles from entering the tunnel and

to develop design and operational responses that may be required for incidents with non-compliant vehicles.

B.5.6 Issue 51 – Road Safety Audit

The EIS makes no comment mention of a review of speed limits necessary to address the speed limit interfaces or road safety issues at the merge, diverge and weaving areas to the north of Moggill Road interchange. Main Roads requests confirmation as to whether a road safety audit has been carried out, with specific findings to be reported regarding speed limit issues and merge/diverge/weaving matters on the Western Freeway

Response

A Road Safety Audit (RSA) was undertaken on the design. The actions resulting from the RSA for the Western Freeway are listed below;

- Two lane diverges to the westbound carriageway from Northern Link were increased for 100 km/hr speed;
- Removal of the reverse curves on the westbound tunnel exit to the Western Freeway.

B.5.6 Issue 52 – Effect on Crash Rates

Concern was expressed that the Northern Link EIS concedes a 31% increase in crashes on the Western Freeway west of the Northern Link ramp connection. Any road upgrade should bring wide scale road safety and social benefits to the community and a 31% increase in crashes in completely unacceptable.

A submission suggested that a high standard eight lane Western Motorway from Moggill Road to the Northern Link connection and a six lane Centenary Motorway to the Ipswich Motorway would deliver significant crash savings [through reducing congestion] as well as substantial benefits to travel time and travel reliability along the corridor.

Response

The increase in crashes forecast for the Western Freeway indicated in Table 5-47 of the EIS is a result of the increased VKT forecast for this particular segment of the network. Many other parts of the metropolitan road network outside of the locations listed in Table 5-47 would experience traffic reductions and crash reductions. Table 5—57 shows that for key arterials and motorway links in the inner west there would be a net reduction in crashes with the Northern Link. A similar assessment for the Project, without local connections, in Chapter 4 of the EIS Supplementary Report shows forecast crash reductions of 3.1% and 1.1% respectively on major roads in the inner west, slightly lower than forecast for the EIS Reference Project.

B.5.6 Issue 53 – Kelvin Grove Road and Musgrave Road Safety

The access points to streets between Musgrave Road and Kelvin Grove Road will now only be Windsor Road and Musgrave Road. Both these roads are major incident areas due to blind spots and/or large traffic flows. The result will be a large reduction in value of properties in this area which will be a direct result of the action proposed.

Response

Council has now decided to proceed with the Project, without local connections.

Without the Kelvin Grove Road local connection, no modifications due to the Project are proposed in relation to access arrangements along Kelvin Grove Road or Musgrave Road.

B.5.7 Construction Impacts

B.5.7 Issue 1 – Western Freeway Worksite Access

The proposed left in/left out access arrangements for the Western Freeway worksite are unacceptable to Main Roads due to road safety and congestion impacts. It is requested that this access/egress arrangement be removed. Access/egress to the worksite should not be from the motorway.

The vehicles exiting the worksite would have little acceleration and sight distance before entering the motorway and intersection. This could create safety and operational issues due to large speed differential between the vehicles.

Suggests that access/egress could be achieved via Mt Coot-tha Road, provided mitigation of impacts on the Mt Coot-tha Road roundabout are implemented

Response

As provided in response in B.4 Project Description, Issue 3 - Access to Western Worksite:

A construction entry to/exit from the western worksite is proposed approximately 400 m southwest of Mt Coot-tha Roundabout. Proposed access to the western worksite from the Western Freeway would be by way of a standard taper and deceleration lane, which would be separated from the main carriageway by a physical barrier. Proposed egress from the western worksite to the Western Freeway would be by way of a simple junction to the nearside (outside) lane of the freeway.

As the exit from the Western Worksite would be 400 m (approx), from the stop line at the roundabout, the speed differential is expected to be low. Consultation with QTMR would be required in developing proposals for traffic management at all stages of construction adjacent to the Western Freeway. The approved Construction Traffic Control Plan would define the level of provision of temporary traffic control measures at the site to control vehicle speeds on the approach to the roundabout and maintain road safety for all road users.

B.5.7 Issue 2 – Construction Traffic Management Plan

Road works, diversions and speed restrictions should be clearly signed in accordance with the Manual of Uniform Traffic Control Devices, Part 3 - Works on Roads. Lane closures should be kept to a minimum and preferably only in off-peak or night operations. The Traffic Management plan should attempt to minimise the need to reduce speed limits through Northern Link roadwork sites.

Response

These matters, and other statutory requirements, would be addressed in the development of the Design and Construction Environmental Management Plan – Traffic and Transport. Appendix D, Table D9, Element 2 of the Supplementary Report provides an outline of topics that would be covered in the EMP.

B.5.7 Issue 3 – Construction Traffic Impacts on Local Amenity

The EIS does not identify all the impacts on local amenity during construction. Impacts on local amenity omitted from the EIS include:

- Construction noise beyond 1km of the worksite, particularly at night time when ambient noise is lower and construction noise travels further;
- Night time construction works resulting in sleep disturbance;
- Impacts of construction dust for residents beyond 1km from the worksite, particularly when affected by differing weather patterns such as wind and storm activity;
- Resumption and removal of over 40 character homes;
- Negative changes to local character and visual amenity due to the worksites being "visual eyesores" and their locations; Changes to local character due to loss of trees, greenery and parks;
- Noise and congestion associated with construction traffic, including workers' vehicles and construction vehicles, in and around the worksites;
- Loss of connectivity and access for residents within construction areas.
- Greater congestion on surface roads, particularly [close] to construction activity.
- Suggests construction impacts need to be clearly describes as to enable a comprehensive review of the project.

Response

Council has now decided to proceed with the Project, without local connections.

Without the local connections, the effects of construction activities on local amenity would be reduced. No worksites would be required at Toowong or Kelvin Grove Road. As a result, no construction traffic impacts are expected in these areas. In particular, the changes in local access, public transport and active transport routes in Toowong and the Kelvin Grove area identified for the EIS reference project would not occur with the Project, without local connections. Overall, the impact of the Project on local access, public transport and active transport during construction would be minimal. Effects would be limited to temporary realignments of traffic lanes at the Mount Coot-tha Roundabout and on the ICB, as with the EIS Reference Project. Specific environmental aspects of these effects are addressed in other sections of the Supplementary Report, including Chapter 4 and Sections B8, B9, and B13 of this Appendix.

B.5.7 Issue 4 – Construction Traffic Impacts on Pedestrians and Cyclists

Western Freeway Connection - Detours should be fully signed for the entire route of the detour. The surface of any temporary realignment lasting longer than a month should be to a similar standard as that which is being realigned.

ICB Connection - The proponent gives no reason for the requirement of the realignment of the bikeway on the southern side of the ICB. Detours should be fully signed for the entire route of the detour.

Response

The performance specification will describe the minimum requirements to be met by the proponent during the construction phase of the project. It will also address specific components of the project such as traffic arrangement during construction, including signposting of temporary traffic measures such as detours. The performance specification will also describe the minimum requirements for engineering including roadway design and pavement design for temporary and permanent pavements.

The surface works associated with connecting Northern Link to the ICB would not impact on the off-road bikeway adjacent to the southern side of the ICB. The off-road bikeway on the northern side of the

ICB between Kelvin Grove Road and the ICB land bridge would be realigned to accommodate the works.

B.5.7 Issue 5 – Pedestrian Traffic Management Along Kelvin Grove Road During Construction

During the construction phase there are no specific proposals for the management of pedestrian traffic across Kelvin Grove Road wishing to walk into the city.

Response

Council has now considered the submissions and undertaken further detailed assessment of the Project, without local connections. In weighing these competing matters, Council has now decided to proceed with the Project, without local connections.

Without the Kelvin Grove Road local connection, there would be no impacts during construction to pedestrian traffic movements along Kelvin Grove Road.

B.5.7 Issue 6 – Effect on Western Freeway Pedestrian/Cycle Bridge

A submission raises concerns that during construction of the project maintaining the current level of service of the Western Freeway bikeway and Western Freeway Cycle and Pedestrian Bridge will be difficult.

Closures or realignment, such as the heavily used Western Freeway bikeway, should be quantified in terms of frequency and duration.

The Western Freeway Bikeway is at risk from severe impacts from the construction of the project. The EIS notes that there are no alternative routes, but implies that there would be some closures of the path anyway. The same goes for the connection at the corner of Sylvan Road and Milton Road.

The EIS states that closures of the Bridge will occur during the night time and the EIS needs to state how this will occur and give assurances that the closures will happen during night time only.

Response

As described in the EIS (Volume 1, Section 5.7.7, Construction Impacts on Pedestrian and Cycle Movements, Pages 145), during Northern Link construction the Western Freeway Bikeway and Western Freeway cycle and pedestrian bridge would remain operational. If any temporary closures are required for particular construction works, these would be carried out at night. The frequency and duration would be kept to a minimum and in consultation with key stakeholders.

B.6 Geology and Soils

B.6.1 Description of Existing Environment

B.6.1 Issue 1 – Geotechnical Condition

More geotechnical data should have been provided to allow greater certainty as to where different construction techniques would be employed so allowing more definite assessment of surface impacts in terms of regenerated noise and vibration.

Response

Approximately 50 cored drill holes, specifically for Northern Link, have been completed in and around the alignment of the tunnels. Further geotechnical data was available from earlier drilling in the general vicinity for a variety of different reasons (e.g. construction of Suncorp Stadium, construction of the Normanby underpass, construction of the ICB, nature of ground beneath Toowong bus depot, search for water for the Mt Coot-tha botanic gardens etc.). Collectively this geotechnical database has provided sufficient detail throughout the extent of the proposed tunnels to allow a high level of confidence as to the type of rock that would be encountered. This information has guided the proposed construction methodology.

However, the main factor determining the choice of machinery to be used in constructing the driven tunnels is not the geology but the tunnel cross-section required for the design. A tunnel boring machine (TBM) is the most efficient machine for tunnelling but can only provide a uniform diameter, circular cross-section tunnel. TBMs have therefore, been proposed for the mainline tunnels from the Western Freeway to the ICB because these tunnels are each 2 lanes wide for the full length and require uniform diameter.

The knowledge of construction technique to be used in specific areas has been included in the assessments of vibration and regenerated noise impacts for the EIS Reference Project as presented in the EIS (Volume 1, Chapter 9) as well as further assessment of the Project in the Supplementary Report Chapter 4.

B.6.2 Potential Impacts and Mitigation Measures

B.6.2 Issue 1 – Sediment Basins

Consideration should be given to use of sediment basins among mitigation measures to deal with erosion and sediment-laden stormwater runoff.

Response

The EIS (Volume 1, Section 6.2.3) outlines a range of potential impacts from soil erosion due to the construction works, identifies a minimum range of activities that could be expected in each of the construction areas and provides a range of mitigation measures to guard against environmental damage from soil erosion. In this context the EIS clearly indicates that "installation/construction of stormwater/drainage control and sediment control measures" are expected at each site. To reinforce this necessity the Draft EMP (Appendix D Section B.6) requires development of specific plans for each of the construction sites of a range of these mitigation measures to be included in the detailed EMP to be developed in the detailed design phase and submitted to the Coordinator-General for approval prior to commencement of relevant construction.

The use of sediment basins to deal with sediment-laden stormwater runoff is, therefore, clearly within the range of measures specified to be considered in designing erosion and runoff control measures for the construction sites..

B.6.2 Issue 2 – Acid Sulphate Soils

The volume and depth of likely Acid Sulphate Soil to be removed or interfered with during construction should be identified in the EIS.

Response

As noted in the EIS (Volume 1, Chapter 6 Geology & Soils, Section 6.2.5) the proposed construction does not interfere with areas identified as potentially harbouring ASS. Although there are areas within the Study Corridor identified as potentially harbouring ASS none of them are within the smaller area in which it is planned that construction would disturb the soil. Although it appears that an area of low potential for ASS intersects the alignment of the tunnels in the vicinity of the intersection of Beck Street and Nash Street, Rosalie, the Holocene alluvial sediments that might harbour ASS are less than 5m thick and so are vertically separated by approximately 30m from the tunnel construction. The tunnels, situated beneath this line of Holocene sediment, are expected to penetrate solid rock of the ancient Bunya Phyllite which has no potential for harbouring PASS. Since no interference with any PASS is envisaged in any construction of Northern Link the volume of ASS expected in the spoil is 0%.

B.6.2 Issue 3 – Ground Settlement

Settlement is a major source of damage to monuments in cemeteries. Settlement from the tunnel construction has been identified as a potential impact on the Toowong Cemetery and appropriate mitigation measures must be incorporated into the construction plan including the Environmental Management Plan.

Response

The EIS (Volume 1, Section 6.2.4) has outlined the detailed analysis of potential ground settlement that might occur during tunnel construction throughout the alignment. The findings of this analysis are graphically displayed in the EIS (Volume 2, Sketches EIS-SC-01 to EIS-SC-07). The analysis showed that settlement above the alignment through most of the cemetery would be expected to be less than 10mm which would be expected to produce no impact at all on the ground (or existing monuments) above.

At the edge of the cemetery on Mount Coot-tha Road where the tunnel alignment passes beneath the road, the analysis showed that up to 30mm settlement could be expected. Within the cemetery and close to the boundary of Mt Coot-tha Road, the analysis showed that settlements up to 20-25mm could be expected, with these values decreasing along the alignment within the cemetery to less than 10mm within 60m (EIS, Volume 2, Sketch EIS-SC-01) from the road. These settlements, based on the settlement profile/trough distribution over the tunnel are not expected to be significant enough to cause damage to the existing cemetery structures and monuments. However, because the analysis indicates potential for settlement in this specific location to be the highest anywhere along the alignment it can be expected to lead to improved in-tunnel support to be designed during the detailed design phase, with the view to minimising the magnitude of tunnel induced settlements in this area. The effects of any settlement from tunnelling would be monitored through surveys and other displacement monitoring as outlined in the Draft Outline EMP (Table D10 – Element 3, in Appendix D to the Supplementary Report).

There is no change to this assessment with the Project, without the local connections.

B.6.2 Issue 4 – Quinn Park – Contaminated Site

As a former Council site, Quinn Park is most likely contaminated with cattle dip or other such chemicals.

Response

The allotment of Quinn Park was created in 1877 when a larger holding was subdivided. In 1884 the Toowong Shire Council became Trustee for the land and it was used as an animal pound until the mid 1920s when it fell into neglect before gazettal as a recreational area/park in 1943. The usage was as a holding yard for stray or escaped horses and other animals. Search of available historical records indicates that during the period it was used as an animal pound, no cattle dip was installed on the site and no record exists of any activity employing hazardous chemicals. DERM does not list the site as potentially contaminated.

Regardless, Council has now decided to construct the Project without local connections, and Quinn Park will not be required for the Project.

B.7 Hydrology

B.7.1 Existing Groundwater

B.7.2 Existing Surface Water

B.7.3 Flood Potential

B.7.3 Issue 1 – Langsville Creek Drainage – Croydon Street

No flood potential studies have been carried out for the Croydon Street, Toowong area. The EIS fails to provide an accurate assessment of flood potential associated with construction of the Toowong connection in that there is no reference to potential impacts of changed road heights or of the placement of noise walls along Milton Road or Croydon Street. This accurate assessment is required in view of the Brisbane City Council *Department of Works W10249 (Figure 8), Langsville Creek Catchment Relief Drainage Investigation Overland Flow Paths and Inundation areas to be preserved* showing that parts of Croydon Street and part of the Toowong worksite are within the Q50 level of the Langsville Creek local catchment.

Response

The EIS (Volume 1, Chapter 7, Section 7.3.1 and Section 7.6.1; and Volume 3, Technical Report No 6) reports on the study of flood potential in the area of the Project works including flooding by local drainage from Mt Coot-tha and the Toowong Cemetery and from regional flooding of the Brisbane River. The study concludes that the Project works on the Western Freeway would not affect the flooding potential downstream along the subsurface stormwater drainage system that follows generally Sylvan Road to the Brisbane River.

The Department of Works W10249 (Figure 8), *Langsville Creek Catchment Relief Drainage Investigation Overland Flow Paths and Inundation areas to be preserved* which pre-dates construction of Wivenhoe Dam was considered as part of the EIS study and none of the proposed Northern Link works are in conflict with the findings of that study. The Project without the local connection does not include any works in Croydon Street and thus no impact on flood potential of the area.

B.7.3 Issue 2 – Peak Discharges – Western Connections

The peak discharges calculated for catchment 4 by the RAFTS method are lower than that calculated by the Rational Method. The reason for this difference should be identified.

The HEC-RAS model results show that a 1 in 100 AEP flooding would overtop Milton Road west of the Toowong Roundabout by 300mm. The submission seeks confirmation that adequate flood mitigation measures would be put in place in this area.

Flood mitigation measures during construction and drainage designs for surface roads should comply with standards such as the DTMR drainage design manual (DMR, 2000) and Queensland Urban Drainage Design Manual (DNRW, 2007).

Response

The focus of the hydrologic modelling was the flow through the culvert under the Western Freeway downstream of the Western Connection and the associated flow through the construction site. The majority of this flow is contributed by Catchment 1 through the botanic gardens and west along Mt Coot-tha Road with a small contribution from Catchment 4, which drains the central botanic gardens as far as the quarry. The parameters adopted for the *RAFTS* model are consistent with our understanding

of this site and the catchment is ungauged. The Rational Method was used as an order of magnitude validation tool for the *RAFTS* hydrology. The *RAFTS* model estimate for peak discharge from the combined catchment at the point of interest is 28.8m³/s while the Rational Method estimate is 28.9m³/s. The adopted RAFTS model parameters were considered appropriate for the area modelled.

The results of the HEC-RAS modelling, showing that the 1 in 100 AEP flood level immediately upstream of the Toowong Roundabout would overtop the roundabout by 300 mm, is a model of the existing situation before any Northern Link works begin. The proposed Northern Link works are designed to make no change to this situation, either during construction or operation.

Flood mitigation measures during construction will be designed to comply with the DTMR Drainage Design Manual (DMR, 2000) and Queensland Urban Drainage Design Manual (DNRW, 2007) as appropriate.

B.7.4 Groundwater Impact Assessment and Mitigation

B.7.5 Surface Water Resources – Potential Impacts and Mitigation

B.7.5 Issue 1 – Riverine Protection Permit

Activities proposed within the bed and banks of any reach of a 'non-tidal reach' watercourse that will require a Riverine Protection Permit from NRW are:

- destruction of native vegetation;
- excavation of material; or
- placing of fill material.

However, if the applicant is an 'entity' under the entity guidelines, they will be exempt from this requirement.

The taking of or interfering with water in any 'non-tidal' watercourse will require either a Permit to Take Water (if the activity has a foreseeable end date) or a Licence to Interfere with Water if the activity will be ongoing.

Response

Chapter 4 of the EIS acknowledged that assessable development for operational works also include any kind of work that allows the taking, or interfering with, water under the *Water Act 2000.* Such work may include excavation and or the placement of fill affecting a watercourse, diverting the flow of a watercourse, and the removal of vegetation within a watercourse. A Riverine Protection Permit may also be required. It is further noted that the final details of activities that are to occur in any defined watercourse will be provided to the Department of the Environment and Resources (DERM) in order for the Department to assess the need or otherwise for an authority, including whether the final applicant is an "entity" under the entity guidelines, and would thus be exempt from the requirement for such a permit. This detail and subsequent referral for advice or application will not be known until the detailed design stage of the Project.

B.8 Air Quality and Greenhouse Gases

B.8.1 Description of Existing Environment

B.8.1 Issue 1 – Roadside Air Quality – Toowong State School, Milton Road, Croydon Street

No air quality determinations appear to have been made around the Toowong State School. It seems from the EIS that sections of roads around the school were omitted from the assessment. Similarly air quality has not been assessed for Croydon Street or Milton Road between Miskin Street and Croydon Street.

Response

Roadside air quality modelling was undertaken on several roads in the vicinity of the Toowong Connection and Toowong State School, namely:

- Croydon Street between Milton Road and Sylvan Road;
- Jephson Street between Sylvan Road and Moggill Road;
- Sylvan Road between Croydon Street and Milton Road;
- Sylvan Road between Croydon Street and Land Street;
- Milton Road between Croydon Street and Park Avenue;
- Milton Road near the surface ramps; and
- Milton Road between Frederick Street and Croydon Street.

Changes in ambient air quality were predicted for different planning years, having regard to the predicted traffic flows for each of the selected roads with the local connections included. Predicted increases in traffic flows would lead to predicted increases in the ground-level concentrations of motor vehicle emissions, including pollutants of concern (e.g. nitrogen dioxide and particles). Motor vehicle emissions on the surface road network are released slightly above ground level, except for heavy vehicles, most of which release their emissions several metres above ground level. Even with this low level of release, concentrations of most motor vehicle emissions reduce rapidly with distance from the kerbline.

The roads selected for modelling were chosen in response to the submissions received and in response to the oral inquiries made during the public display of the EIS in 2008.

In considering the findings presented, it is important to note the relevant goal for ambient air quality presented on each graph. As expected the level of pollution decreases away from the kerb on both sides of the road, generally halving in the first 10m and again in the next 20m in most, though not all, cases.

Table B-39 summarises modelling predictions with regards the key indicators of nitrogen dioxide (NO_2) and particulates (PM_{10}). Other findings are presented in **Figure B-5** to **Figure B-11**.

Table B-39 Modelled Changes in Ambient Air Quality for Key Parameters near Selected Roads for the EIS Reference Project

Road	Air Quality Outcomes 2016 (10 m from Western Kerb)		
	Indicator	Goal	Outcome
Croydon Street (Milton Road – Sylvan Road)	NO2 (1hr)	246 µg/m3	minimal increase (0.1µg/m3), no consequence
	NO2 (1yr)	62 µg/m3	negligible increase (<0.1 µg/m3), no consequence
	PM10 (24hr)	50 µg/m3	negligible increase (<0.1 µg/m3), no consequence
	PM10 (1yr)	20 µg/m3	negligible decrease (<0.1 µg/m3), no consequence
Jephson Street (Sylvan Road – Moggill Road)	NO2 (1hr)	246 µg/m3	very small increase (1.8µg/m3), no consequence
	NO2 (1yr)	62 µg/m^3	minimal increase (<0.6µg/m3), no consequence
	PM10 (24hr)	50 µg/m^3	minimal increase (<0.3µg/m3), no consequence
	PM10 (1yr)	20 µg/m^3	minimal increase (<0.2µg/m3), no consequence
Sylvan Road (Croydon Street – Land Street)	NO2 (1hr)	246 µg/m3	very small decrease (1.1µg/m3), no consequence
	NO2 (1yr)	62 µg/m3	minimal decrease (<0.8µg/m3), no consequence
	PM10 (24hr)	50 µg/m3	minimal decrease (<0.2µg/m3), no consequence
	PM10 (1yr)	20 µg/m3	negligible decrease (<0.1 µg/m3), no consequence
Sylvan Road (Croydon Street – Milton Road)	NO2 (1hr)	246 µg/m3	minimal decrease (<0.5µg/m3), no consequence
	NO2 (1yr)	62 µg/m3	minimal decrease (<0.3µg/m3), no consequence
	PM10 (24hr)	50 µg/m3	negligible decrease (<0.1 µg/m3), no consequence
	PM10 (1yr)	20 µg/m3	negligible decrease (<0.1 µg/m3), no consequence
Milton Road (Croydon Street – Park Avenue)	NO2 (1hr)	246 µg/m3	v. small decrease (<7.0 µg/m3), v. small improvement
	NO2 (1yr)	62 µg/m3	v. small decrease (<2.2 µg/m3), negligible improvement
	PM10 (24hr)	50 µg/m3	minimal decrease (<0.9µg/m3), no consequence
	PM10 (1yr)	20 µg/m3	minimal decrease (<0.4µg/m3), no consequence
Milton Road (near surface ramps)	NO2 (1hr)	246 µg/ m3	decrease (~21.4µg/m3), improvement
	NO2 (1yr)	62 µg/ m3	v. small decrease (~3.1 µg/m3), v. small improvement
	PM10 (24hr)	50 µg/ m3	v. small decrease (~3.9 µg/m3), v. small improvement

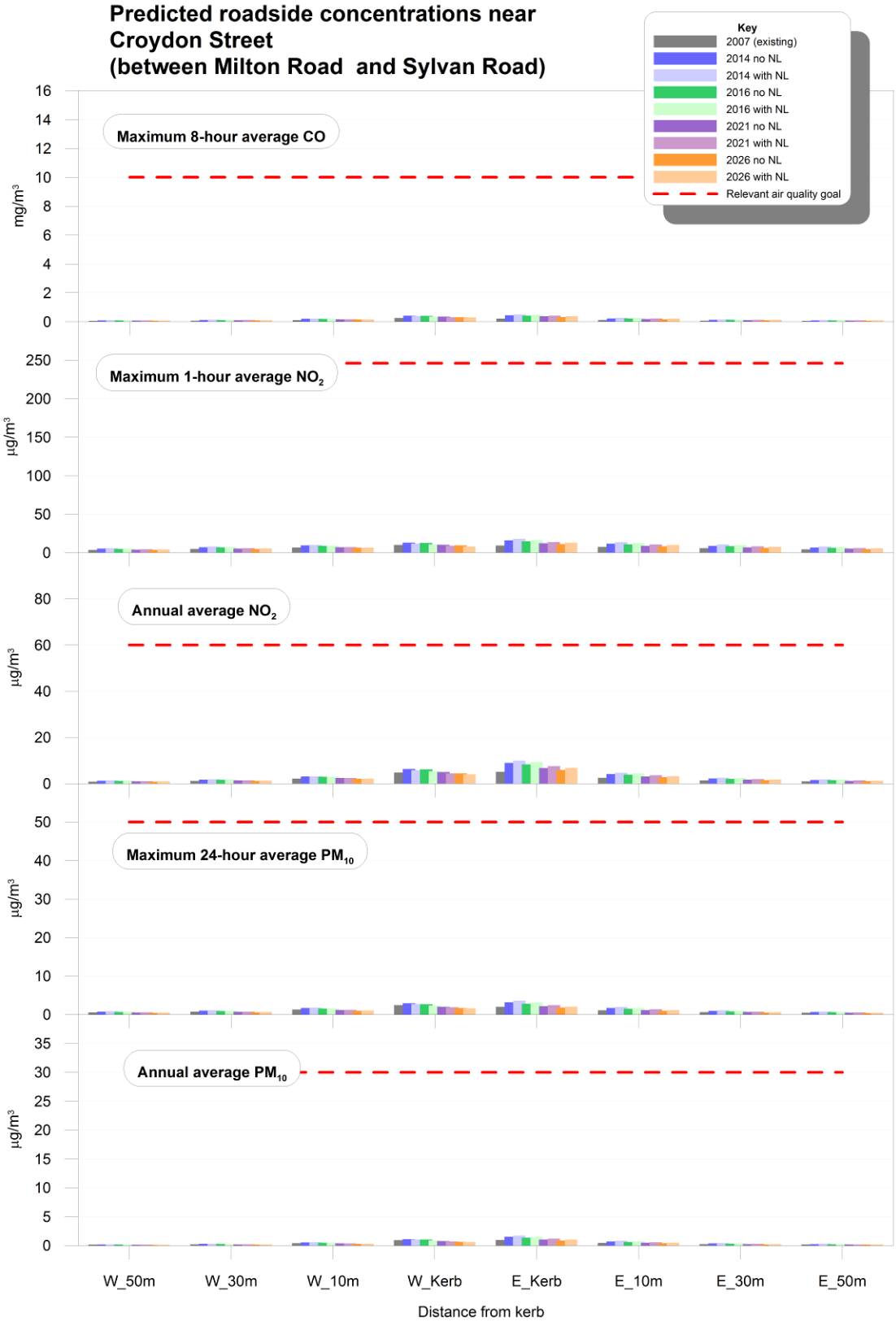
Road	Air Quality Outcomes 2016 (10 m from Western Kerb)		
	Indicator	Goal	Outcome
	PM10 (1yr)	20 µg/ m3	small decrease (~2.1 µg/m3), small improvement
Milton Road (Frederick Street – Croydon Street)	NO2 (1hr)	246 µg/ m3	v. small decrease (~3.2 µg/m3), v. small improvement
	NO2 (1yr)	62 µg/ m3	v. small decrease (~1.2 µg/m3), v. small improvement
	PM10 (24hr)	50 µg/ m3	minimal decrease (<0.4µg/m3), no consequence
	PM10 (1yr)	20 µg/ m3	minimal decrease (<0.2µg/m3), no consequence

The results summarised in the table demonstrate that, with the inclusion of the local connections, most changes would be very small to negligible, and most would be of little consequence. The only substantial change would be a beneficial reduction in nitrogen dioxide (NO_2) over the worst one-hour period on Milton Road. In all modelled scenarios, the changes, both beneficial and adverse, would be well below the goals for ambient air quality for the relevant parameter.

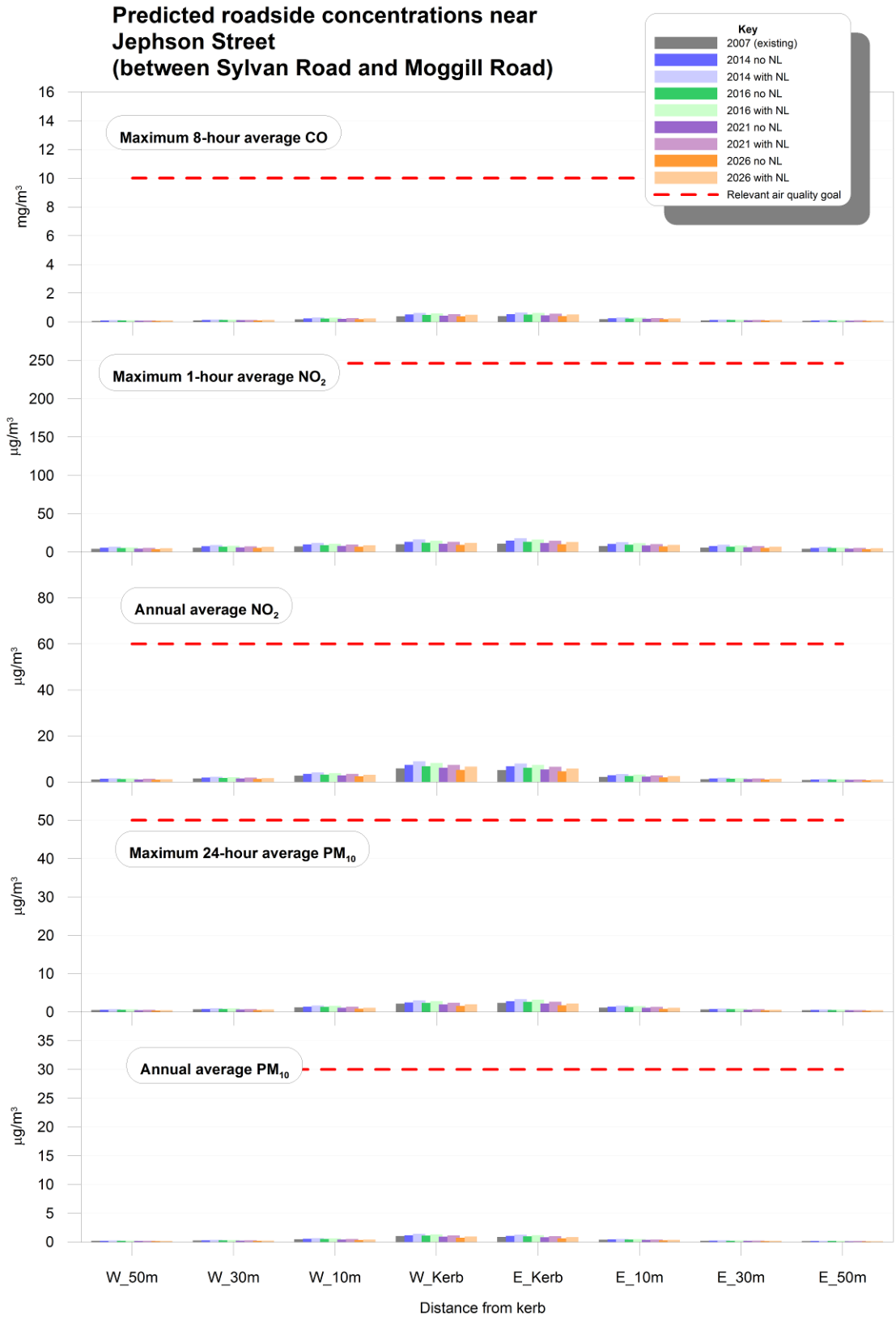
Some submissions raised concerns that ambient air quality in the vicinity of the Toowong State School would be diminished as a consequence of Northern Link. The modelling for Sylvan Road, between Croydon Street and Milton Road, provides relevant predictions of ambient air quality adjacent to the school. The predicted changes indicate minimal to negligible decreases in the concentrations of both nitrogen dioxide and particles (PM_{10}) in response to a forecast minimal reduction in traffic flows on this section of Sylvan Road.

Council has decided to remove the local connections with the effect that there will be minimal to negligible change in detectable ambient air quality associated with forecast changes to local traffic within the areas noted in the submissions.

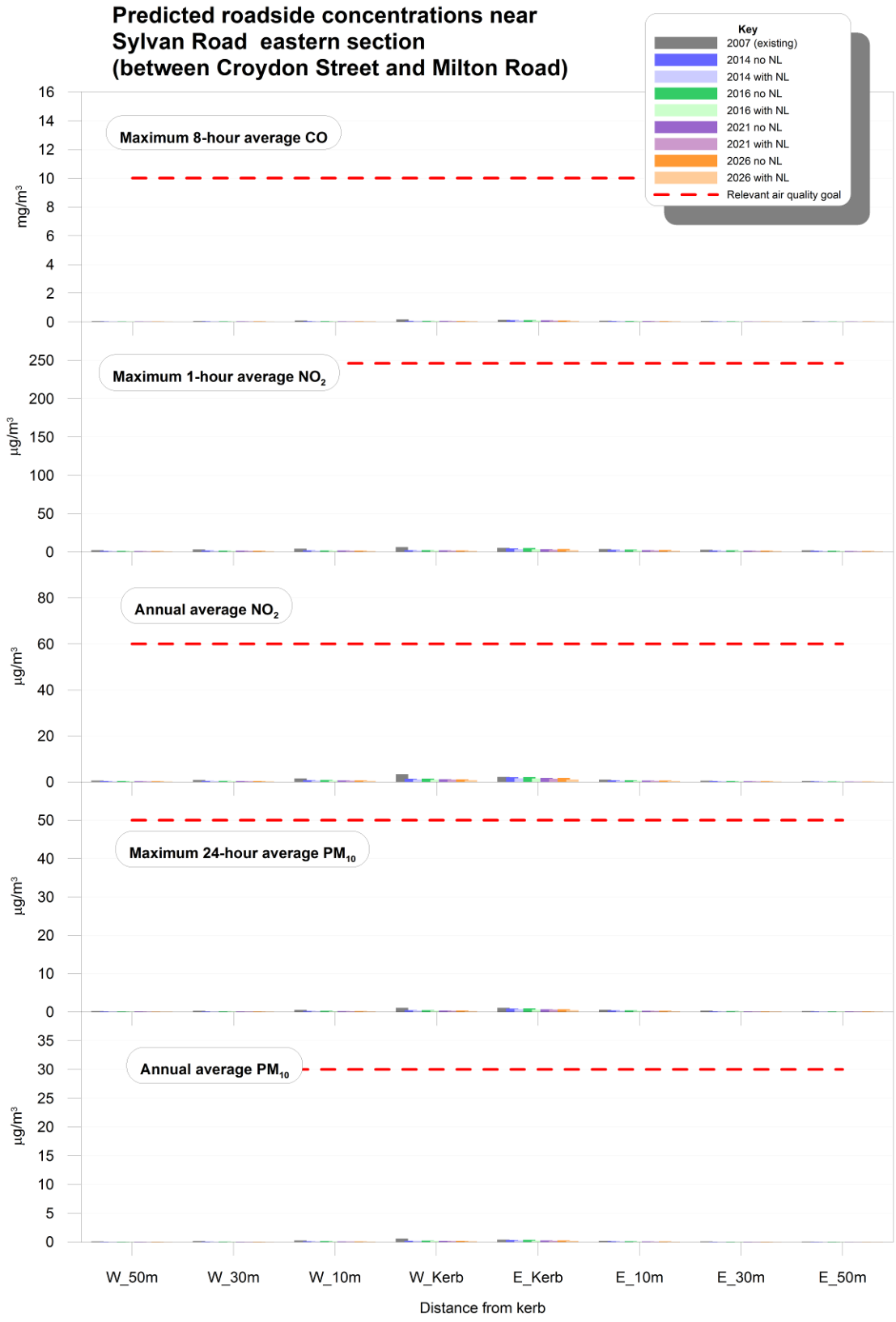
- **Figure B-5 Predicted Roadside Concentrations near Croydon Street for the EIS Reference Project.**



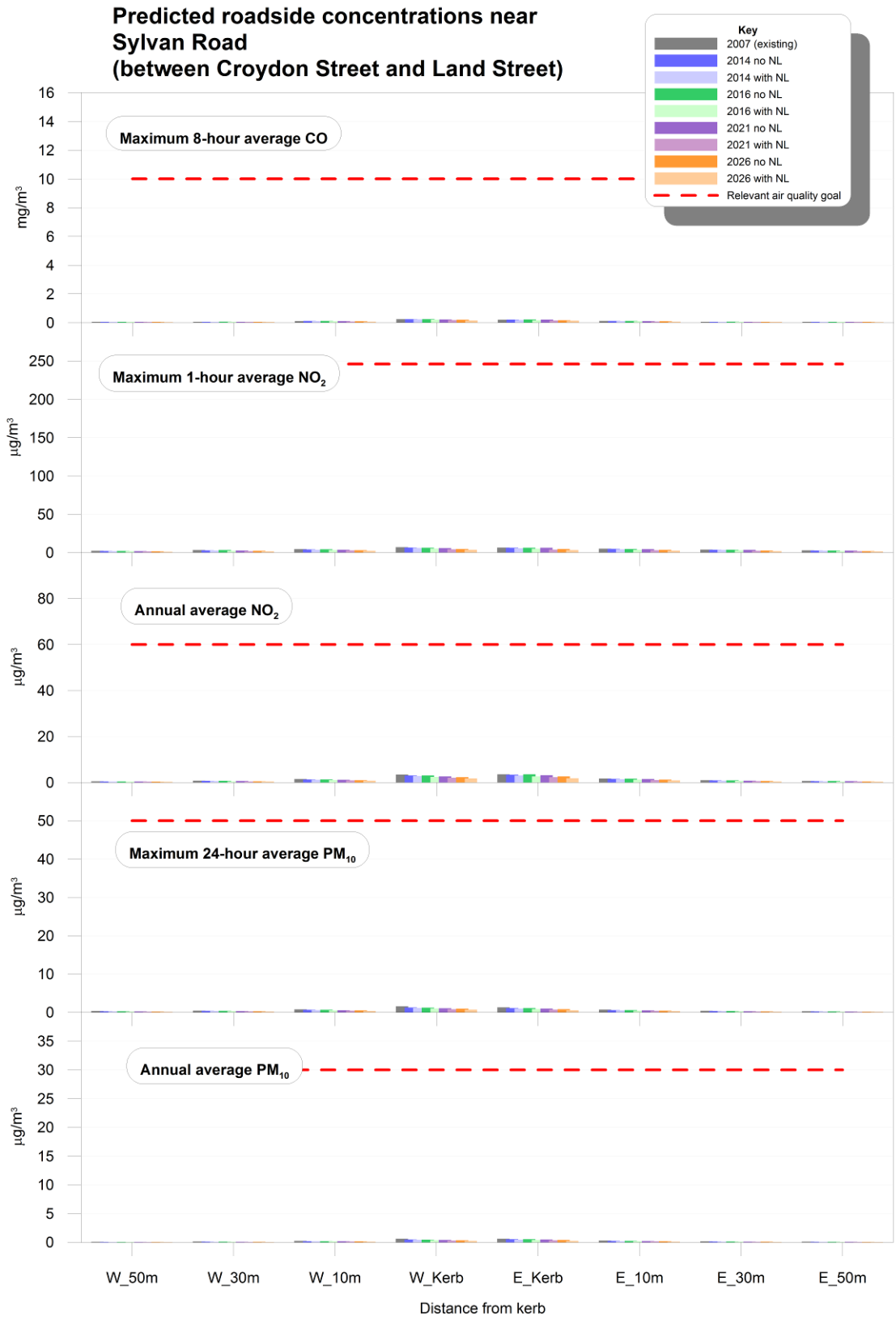
- **Figure B-6 Predicted Roadside Concentrations near Jephson Street for the EIS Reference Project.**



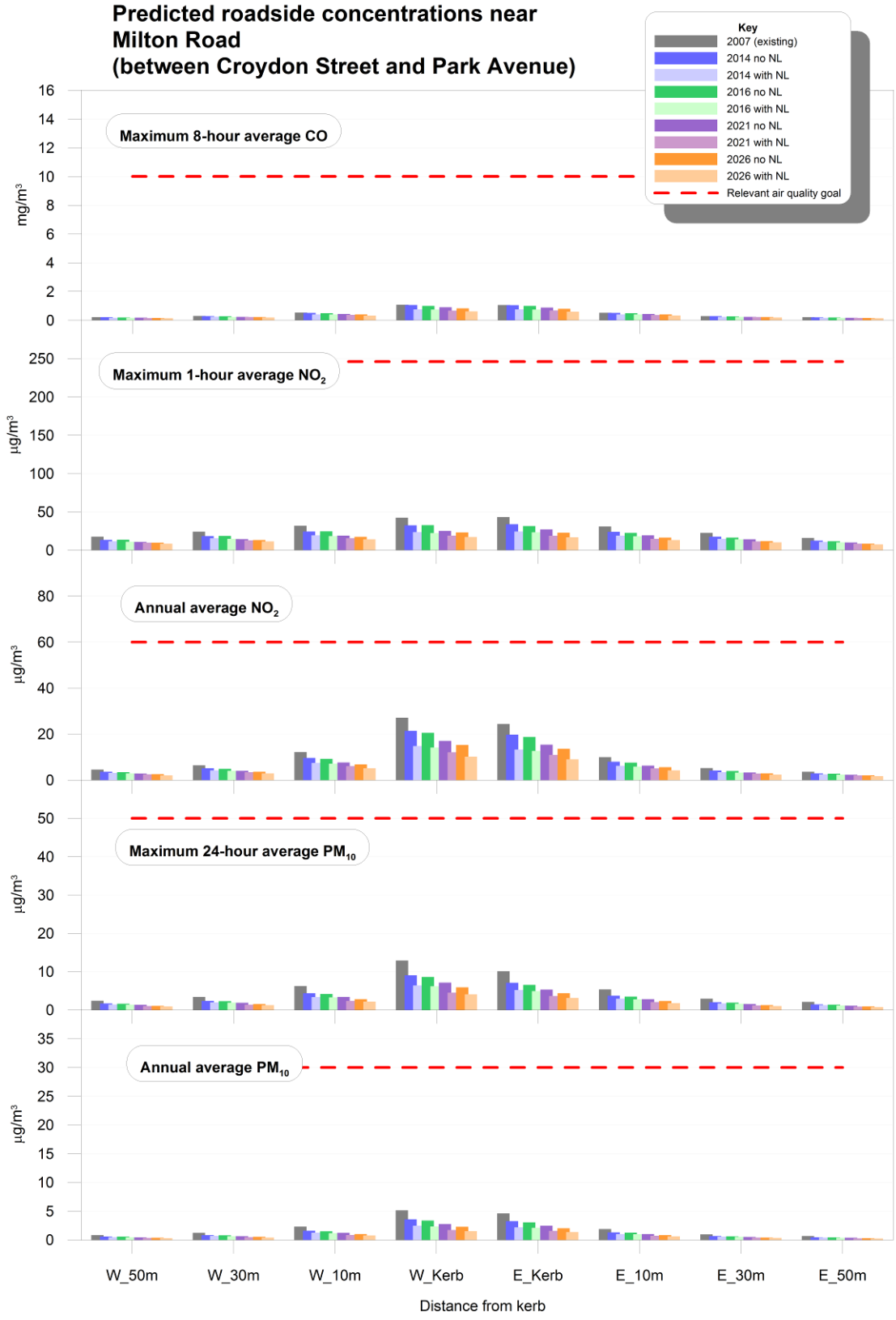
- **Figure B-7 Predicted Roadside Concentrations near Sylvan Road Eastern Section for the EIS Reference Project.**



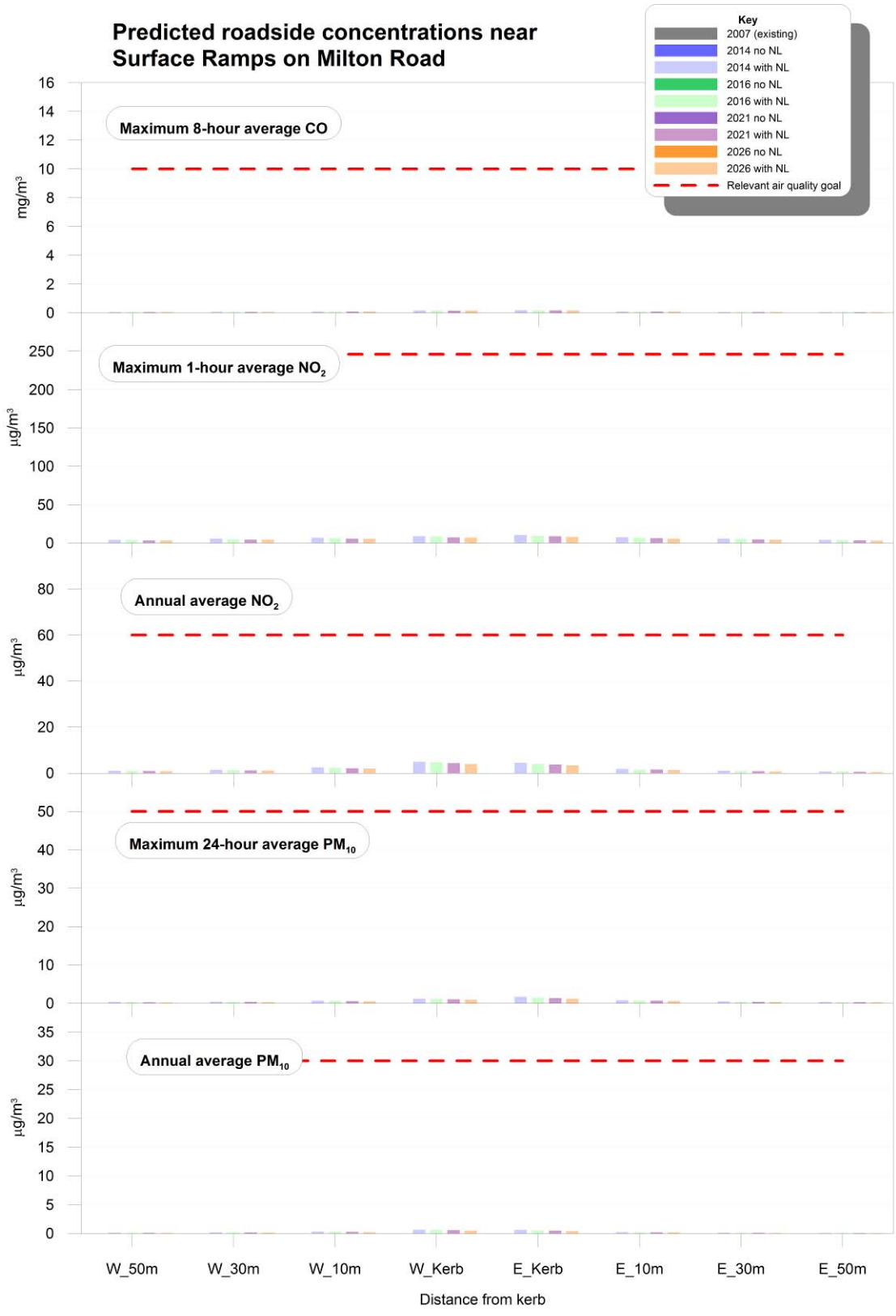
- **Figure B-8 Predicted Roadside Concentrations near Sylvan Road for the EIS Reference Project.**



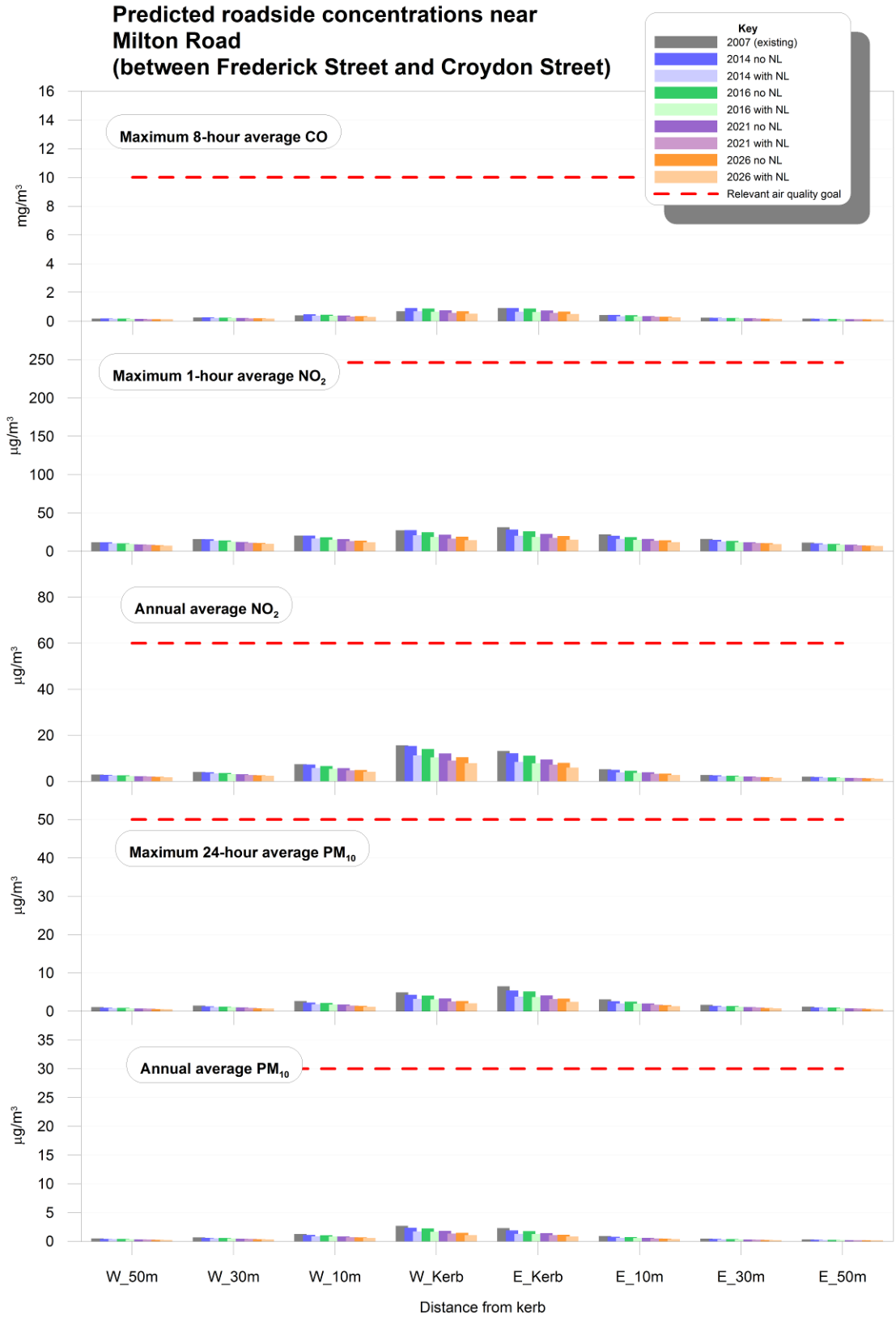
- **Figure B-9 Predicted Roadside Concentrations near Milton Road for the EIS Reference Project.**



- **Figure B-10 Predicted Roadside Concentrations near Surface Ramps on Milton Road for the EIS Reference Project.**



- **Figure B-11 Predicted Roadside Concentrations near Milton Road for the EIS Reference Project.**



B.8.1 Issue 2 – EPP (Air) 2008

The Environmental Protection (Air) Policy 2008 which will come into effect on 1 January 2009 revises the air quality objective for the PM_{10} 24 hr measure from the 150µg/m^3 in the earlier policy quoted in the EIS to 50µg/m^3 in the new policy. The Project will be required to meet the requirements of EPP(Air) 2008 and so the Proponent should be required to identify its ability to meet the goals of the new policy or additional mitigation measures that would be necessary to meet these goals.

EIS Chapter 8 Air Quality and Greenhouse Gases, Technical Report 7 Air Quality Impact Assessment: Brisbane Northern Link Project refers to the WHO annual goal of 25 µg/m^3 in the assessment. The WHO goal is in fact 20 µg/m^3 not 25 µg/m^3.

Response

Ambient air quality criteria adopted for the Project were presented in the EIS (Volume 1, Chapter 8, Section 8.3.1 and Table 8-10). As explained in the EIS, the criteria were drawn from two sources, namely, EPP(Air) 1997 and the National Environment Protection Measures (NEPM). In consultation with State and local government agencies, the more conservative or onerous criteria were adopted where variation between the two occurred.

For example, the NEPM criterion for PM_{10} 24hr is 50µg/m^3 as opposed to 150µg/m^3 in the EPP(Air) 1997 as it existed at the time, the more conservative NEPM criterion was adopted for assessment of Project impacts. The suite of criteria for ambient air quality reviewed for the purposes of impact assessment was presented in the EIS at Chapter 8, Section 8.3.1, Table 8-10. The criteria adopted were presented in the EIS in Chapter 8, Section 8.3.5, Table 8-11. The application of the criteria was demonstrated in the EIS (Volume 1, Chapter 8, Figure 8-2) where the PM_{10} 24hr criterion (dotted red line) is shown as 50µg/m^3 at each of the monitoring sites.

The PM_{10} 24hr criterion of 150µg/m^3 found in EPP(Air) 1997, relevant at the time of preparation of the EIS, for construction air quality is replaced by the new criterion of 50µg/m^3 to align with EPP(Air) 2008. The same approach was taken in the EIS (Volume 1, Chapter 8, Section 8.1.3, p 8-7) to construction air quality criteria, where the PM_{10} 24hr criterion is 50µg/m^3.

A review of the EIS shows that the ambient air quality criteria adopted for the Project comply with Environmental Protection (Air) Policy 2008, including the PM_{10} 24hr criterion.

The WHO air quality guideline for PM_{10} annual mean is 20µg/m^3. Together with the goal of 30 µg/m^3 for PM_{10} adopted by the NSW Department of Environment and Climate Change (DECC), the WHO goal was provided in the EIS as a benchmark for comparison with the NEPM and EPP(Air) 24hr goal of 50µg/m^3. The goal for PM_{10} annual average of 25µg/m^3 adopted in the EIS is consistent with the goals adopted for and approved by the Coordinator-General in respect of both the North South Bypass Tunnel and the Airport Link Project.

B.8.1 Issue 3 – Air Quality Modelling

The air quality modelling has several inaccuracies namely:

- the model grid is too large –the 500 m grid used cannot resolve important topographic features (e.g. narrow valleys) of the Toowong area;

- the model appears to have used 20 m contour intervals for topography which is not sufficient to represent the varied topography of Toowong—BCC has 1m interval contour data which should be used;
- meteorological data used is from stations within Brisbane (Rocklea, CBD, South Brisbane, Woolloongabba) but not in the vicinity of Toowong; data from the Springwood monitoring station should be included to represent an urban area;
- atmospheric stability estimates were based solely on atmospheric profiles at Brisbane Airport which is on flatter ground nearer the coast as opposed to Toowong which is less windy and quite hilly making it more prone to inversions trapping pollutants at ground level; and
- the modelling lacks an error analysis.

Response

- Meteorological data was input to the model at 500 m spacing, but terrain data was resolved within the model at a finer spacing of approximately 200-300 m. The terrain data input to the model were validated on the ground and found to be representative of the terrain in the study area.
- Contours at 20 m intervals were shown on figures in the Technical Report in the EIS for ease of locating specific sites on the base image. The modelling used 1m contours. The larger contour interval was adopted for presentation in the EIS diagrams to aid map and diagram interpretation, whereas 1m contours would have obscured the base map to the extent roads and other features would not be recognisable.
- Because of the distance between Springwood and Toowong (over 10 km), the Springwood meteorological data would not affect the outcomes of the modelling. The meteorological model used in the assessment (CALMET), based on meteorological data available within the modelling domain, interpolated meteorological data to all locations in the study area, including the Toowong area. The Calmet model takes into account local topography and land use in generating meteorological data at grid points over the whole modelling domain.
- A detailed discussion of atmospheric stability was included in the EIS (Volume 3, Technical Report 7, Section 5.2.1). Stable atmospheric conditions which are equivalent to inversions were included in the modelling data.
- Although all models have inherent errors, the approach adopted by regulatory authorities is to accept the results of the modelling without reference to standard errors provided a conservative assessment, that is one which would tend to over-predict rather than under-predict, is undertaken. This approach has been adopted for all roadway tunnels assessed in Australia including Northern Link.
- For operational tunnels, analysis of ambient monitoring data has shown that the impact from the ventilation stack was no more and usually less than predicted. Information on this is provided in:
- the CSIRO modelling study contained within the NSW Department of Health's report on the M5 East ventilation stack (NSW Health, 2006 - Investigation into the possible health impacts of the M5 East Motorway Stack on the Turrella Community: re-analysis of the Phase 2 Cross Sectional Survey of symptom prevalence within the Turrella Community, ISBN 1 7418 7013 5 November 2006; download from www.health.nsw.gov.au); and
- within the PIARC report (World Road Association, 2008 - Road Tunnels: A guide to optimising the air quality impacts upon the environment, PIARC Technical Committee C3.3 Road Tunnel Options, ISBN 2-84060-204-0; download from www.piar.org).

- At the same time, verification of the modelling for Northern Link was performed by comparison of the modelled results with monitored results at specific sites within the model area for which 2007 data were available. This comparison was provided in the EIS (Volume 1, Chapter 8, on page 8-30 and Volume 3, Technical Report 7, pages 42-44, including Table 22).

B.8.1 Issue 4 – Sensitive Places

There are some sensitive places in the Toowong area that are not included in Table 8-1 and being omitted from the EIS, have not been taken into account in the dispersion modelling undertaken for the EIS.

Response

The Terms of Reference for the Northern Link Road Tunnel Project (page 8 of 43) as issued by the Coordinator-General in April 2008 define "sensitive place" as meaning:

- "a dwelling, residential allotment, or other residential premises; or
- an educational institution; or
- a medical centre or hospital."

This definition has been followed throughout the EIS so that all residential sites have been treated as sensitive places in the same way as schools and hospitals whether listed or not. The lists provided in Chapters 8 and 9 of the EIS are indicative of the principal community facilities in the area. A comprehensive list of sensitive places is included in the EIS (Volume 3) as Table 50 in Technical Report 8.

B.8.2 Potential Construction Impacts and Mitigation Measures

B.8.2 Issue 1 – Construction Dust

Construction of the Toowong connection will create nuisance dust in the area for more than three years and may affect the Toowong State School. Handling of tunnel spoil in the Mt Coot-tha quarry may potentially increase dust fall on the Toowong Cemetery and residential areas north of Mt Coot-tha Road. The EIS should quantify expected dust levels during construction and identify potential health impacts.

Dust will also be a major problem at the Kelvin Grove connection where massive excavation into the rising ground of Upper Clifton Terrace will be required before the portal cover shed is constructed.

Construction methods should be clarified for each of the worksites so that the emissions of air pollutants can be estimated from the construction activities, the effect of the mitigation measures to be used and the resultant impacts on air quality and adjacent landholders.

Response

Some creation of dust is inevitable during earthmoving activities to develop worksites on the surface and to carry out necessary road building for connections to the surface road network. The amount of dust produced depends on a wide range of parameters (site management regimes, weather, moisture content in soil, nature and depth of soil, type of machinery used etc). There are no practical means by which a quantitative estimate of dust generation from all construction worksites can be developed.

The Draft Outline Construction EMP (Appendix D in this Supplementary Report recommends that the risk of nuisance arising as a consequence of dust generation from worksites, and from other construction activities, be managed according to accepted dustfall criteria.

The air quality goals for construction activities are outlined in the EIS (Volume 3, Technical Report 7A-Construction Air Quality, Chapter 2). The goals are updated in line with the EPP(Air) 2008 so that the PM_{10} maximum 24-hourly average is 50µg/m^3 rather than 150µg/m^3 as in the EPP(Air) 1997.

The spoil conveyor from the western worksite to the Mt Coot-tha Quarry would be fully enclosed. In some locations through the Botanical Gardens it may be located below existing ground level. Spoil from the driven tunnels, which would be conveyed to the Mt Coot-tha Quarry, would likely be moist due to the tunnelling operations. Therefore dust generation from the spoil conveyor would likely be very limited. Nevertheless, dust monitoring, similar to that documented as having been undertaken around the Mt Coot-tha Quarry in the past would be implemented during the Northern Link construction works. Mitigation measures for the suppression of dust generation from the spoil conveyor would include:

- additional mist sprays along the conveyor route as appropriate and particularly at any spoil conveyor transfer locations;
- minimisation of spoil conveyor transfer locations and/or design of these structures with complete enclosures to ensure containment of dust generation;
- regular and ongoing maintenance of the spoil conveyor; and
- complete enclosure of the spoil conveyor.

The EIS (Volume 3, Technical Report 7A, Chapter 4) outlined the extent of works likely to be undertaken by diesel-powered machinery, identified the potential for impacts on the area and recommended a range of mitigation measures to minimise these impacts. Based on the estimated use of diesel fuel as outlined in the EIS (Volume 3, Technical Report 7B, Table 3-2) consumption across the project might be of the order of 2000 litres per day.

Considered in the metropolitan context, diesel engine emissions from this fuel load would have a negligible impact compared to the diesel fleet operating within Brisbane. Considered in the local context, the bulk of the daily fuel load would be consumed in spoil handling and haulage operations at the Western Freeway and ICB works and along the major arterial roads identified as the haul routes. For the initial site preparation, some plant and equipment, such as excavators and compressors, would be positioned on each of the worksites. Careful positioning of this plant and equipment would maximise the separation distance to sensitive places, such as residences. Noting the rapid dilution rates over distance for roadside pollution in the modelling, separation distances exceeding 10 m would be expected to provide a significant reduction in concentrations.

A management approach was presented in the EIS as an effective means of avoiding, or minimising and managing the risk of adverse impacts on ambient air quality arising from the operation of diesel-powered motor vehicles, plant and equipment during construction.

Vehicles and machinery would be fitted with appropriate emission control equipment to allow compliance with ADR 30/01 for smoke emissions and other appropriate design rules depending on age of vehicle and applicability of the particular rule.

Regular monitoring of air quality on worksites adjacent to sensitive places would assist in managing and avoiding adverse impacts on ambient air quality in those places.

With the decision to proceed with the Project without local connections, there will be no construction worksite at either Toowong or Kelvin Grove, and consequently the issues raised in the submissions regarding the effect of these worksites are no longer relevant.

B.8.2 Issue 2 – Site Workers' Parking

Site workers' private vehicles have the potential to impact on air quality adjacent to worksites. The proponent should consider providing a shuttle service to and from the worksite for each shift from nearby transport hubs to minimise the number of private vehicles to be accommodated.

Response

As outlined in the EIS (Volume 1, Chapter 4, Section 4.3.19 Demand on Resources – Workforce on page 4-49) it is proposed that parking facilities for the workforce would be provided at large remote sites with shuttle bus arrangements provided to deliver workers to worksites and thus avoid the potential for air quality impacts from workers' private vehicles around worksites.

B.8.2 Issue 3 – Monitoring Methodology for Particulates

Real-time monitoring for PM_{10} and $PM_{2.5}$ was established in 2007 at Toowong and Kelvin Grove to provide a baseline for comparing air quality impacts. However, only dust deposition gauges are proposed to be used in residential areas which would make comparison with PM_{10} and $PM_{2.5}$ not possible. Also, in the draft environmental management plan, total suspended particulate monitoring and PM_{10} monitoring is proposed in worksite areas in addition to dust deposition. Inconsistencies in dust measurement techniques at the different sites need to be clarified.

Response

During preparation of the EIS, air quality monitoring was undertaken at Toowong for a period of 13 months to supplement the air quality data available from other projects (Bowen Hills, Kedron) and from the then Environment Protection Agency (Pinkenbar, Rocklea, CBD, Woolloongabba and South Brisbane). In response to community inquiries, and to further calibrate the model, campaign monitoring of 3 months duration was conducted in Herston. The purpose of this monitoring was to inform the modelling of potential impacts on ambient air quality during the operational phase of Northern Link.

During the construction phase, background monitoring of ambient air quality would be required to identify the occurrence of impacts. The most likely construction impact would be dust deposition for places adjacent to worksites. There is a lower potential for engine emissions from construction vehicles and fixed plant and equipment to impact on places adjacent to worksites due to the gaseous nature of the emissions and their susceptibility to dispersion by air movement.

EPP(Air) 2008 provides air quality objectives for ambient air quality to be achieved over the long term. The policy does not differentiate between construction-related impacts and operational impacts.

To achieve the air quality objectives of EPP(Air) during construction, monitoring for a range of construction-related pollutants would be required, in accordance with the Draft Outline Construction EMP. Such pollutants should include dust and total suspended particulates including fine particulates (PM_{10} and smaller) from engine emissions. For effective dust monitoring, a 'campaign' approach based to wind strength and direction may be required to supplement a fixed monitoring station.

The number and location of monitoring stations for the construction phase would be identified during detailed design, having regard for prevailing winds, topography, land use and construction planning.

Dust management techniques, while desirably uniform across the project, must be effective for the range of construction activities anticipated at each worksite and work area. Detailed design and construction planning may dictate some variation in dust management techniques. However, air quality monitoring for the construction phase must be conducted in accordance with accredited procedures, consistent with the objectives and requirements of EPP(Air) 2008.

B.8.3 Potential Operational Impacts and Mitigation Measures

B.8.3 Issue 1 – Air Toxics – PANs

The EIS refers to several air toxics from motor vehicles in relation to ambient air quality changes due to the Project and concludes that they would have an effect too small to be measurable. However, the EIS does not consider PANs (peroxy acetyl nitrate) formed in the atmosphere under the influence of sunlight reacting with primary pollutants (hydrocarbons and oxides of nitrogen) exhausted from motor vehicles.

The EIS omits what instrumentation technique is used for measuring pollutants in the ambient atmosphere.

Response

The findings presented in Technical Paper 7 – Operational Air Quality reflects the widely accepted view that the levels of the primary pollutants such as hydrocarbons and oxides of nitrogen, in the ambient environment are significant indicators. If levels of these primary pollutants are within acceptable levels, levels of the secondary pollutants (e.g. PANs) will be within acceptable limits also.

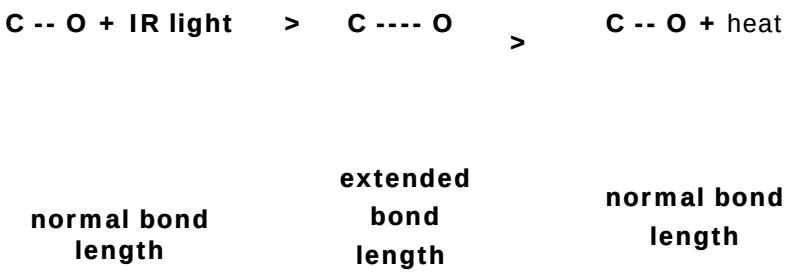
Peroxyacetyl nitrates (PANs) are secondary pollutants formed in the presence of sunlight from primary pollutants, many of which are emitted from motor vehicles. These pollutants are managed in urban areas on an airshed basis rather than a project basis.

Secondary pollutants were discussed briefly in the section on background air quality where it was noted that ozone is formed under these conditions along with other oxidation product which are collectively referred to as photochemical smog. PANs belong to this group of compounds.

While motor vehicle emissions play a significant role in oxidant formation in urban environments, the changes in emissions into an airshed that result from even a major roadway project such as the Northern Link are small. The consequent changes in oxidant formation are also too small to be reliably modelled and assessed for this type of project.

The monitored ambient air quality data presented in the EIS, as one element for the modelling study, have been derived from EPA monitoring sites in Brisbane or from monitoring carried out for this and previous road tunnel projects by EPA under contract. The DERM website explains the instrumentation and methodology employed in achieving these air quality data.

Carbon monoxide concentrations are measured by a technique known as non-dispersive infra-red spectroscopy. The vast majority of the covalently-bonded molecules absorb infra-red (IR) radiation somewhere in the wavelength range of 3-15µm (micrometres, i.e. one millionth of a metre). This represents the amount of energy required to start atoms vibrating with respect to each other. Carbon monoxide is a very simple molecule that has only one mode of vibration, a sort of concertina-like stretching, analogous to that of a coil spring. Carbon monoxide absorbs infra-red radiation at wavelengths around 4.7µm. The atoms take up the light energy to move slightly further apart than normal and then re-liberate that energy in the form of heat when they recompress.



Carbon monoxide analysers pass an infra-red light beam alternatively through a reference cell (containing a non-absorbing gas (N_2)), and a sample cell (containing air with the carbon monoxide to be measured). The infra-red light of 4.7µm wavelength is absorbed from the sample to the extent that corresponds to the carbon monoxide concentration. The next step is to receive the infra-red beam through the carbon monoxide filled reference cell and sample cell which now have different intensities due to light absorption by carbon monoxide in the sample cell and the nitrogen filled reference cell. The difference in the measured intensity is converted to a carbon monoxide concentration.

Nitrogen oxides are measured using a technique that is based on a "chemilumiscent" reaction, which is a chemical reaction that emits energy in the form of light. Essentially the reaction is the oxidation of nitric oxide (NO) to nitrogen dioxide (NO_2) by ozone (O_3).

$NO + O_3 > NO_2 + O_2$

It is an exothermic reaction which produces NO_2 in an activated state. When the NO_2 molecules return to normal from the activated state some energy is emitted in the form of a small amount of light. Since one NO molecule is required to form one NO_2 molecule, the intensity of the chemiluminescent reaction is directly proportional to the NO concentration in the sample. The analyser measures the amount of light emitted by the reaction and converts this to a concentration.

The chemiluminescent reaction only occurs between O_3 and NO, therefore the measurement of NO_2 is performed by diverting the ambient air stream through a converter which reduces any NO_2 present to NO before entering the reaction cell. The difference between NO levels in the undiverted and diverted gas streams is the amount of NO_2.

Total suspended particulate matter (TSP) is measured using a high-volume air sampler that draws a large known volume of air through a pre-weighed filter for 24 hours. After sampling, the filter is re-weighed and the difference in filter weight is the particulate mass.

The concentration of TSP in the air is calculated as the particulate mass divided by the volume of air sampled. The particulate matter retained on the filter can be analysed to determine the concentration of other pollutants, such as lead or other metals.

The design of the air inlet means that airborne particles with diameters greater than 50µm are unlikely to be drawn into the sampler. TSP sampling takes place at six-day intervals.

The health effects of particles smaller than 10µm are of particular concern as these particles can enter the human respiratory system and penetrate deeply into the lungs, causing adverse effects.

PM_{10} is generated by diesel and petrol motor vehicles and other combustion processes that burn fossil fuels, such as power generation, industrial processes and domestic solid fuel heaters. Smoke particles from bushfires are another sporadic source of PM_{10} emissions.

PM_{10} is measured using either a high-volume air sampler or a tapered element oscillating microbalance (TEOM) sampler.

The PM_{10} high-volume air sampler is similar to that described above for TSP, except that the air sample is drawn through a size-selective inlet which removes particles larger than 10µm by impaction, while particles less than 10µm in aerodynamic diameter pass through the instrument onto the pre-weighed filter.

High-volume air samplers are programmed to take a 24-hour sample at six-day intervals. The filter is weighed before and after the sample is taken to determine the concentration of PM_{10} particles in the air.

The second technique uses a tapered element oscillating microbalance (TEOM) sampler fitted with a size-selective inlet to monitor PM_{10} concentrations.

These samplers draw air through a filter mounted on a vibrating glass tube. As PM_{10} particles get trapped on the filter the additional weight changes the oscillating frequency of the tube. This frequency change is converted into a particulate mass that can be divided by the volume of air being drawn into the instrument to produce a PM_{10} concentration. TEOM samplers operate on a continuous basis and do not need filter changes as frequently as high-volume air samplers. An advantage of continuous monitoring is that it can provide additional information, such as the time of day that peak concentrations occurred. Such information may be used in conjunction with meteorological data to help identify the source of an emission.

At some stations in south-east Queensland high-volume air samplers and TEOM samplers are located together for quality assurance purposes to ensure that data obtained from the two instruments is comparable.

PM_{10} TEOM samplers are also operated in conjunction with $PM_{2.5}$ TEOM samplers to investigate particle size distribution.

Of the total PM_{10} fraction those particles with aerodynamic diameters below 2.5 micron, or $PM_{2.5}$, are now considered to be the major contributor to human health effects, as these particles can penetrate and block the very small passages of the lungs.

$PM_{2.5}$ comes from the same sources as PM_{10}, mainly fuel combustion processes. As the particles are so small and fine they can remain suspended in the atmosphere for very long periods. These fine particles are capable of scattering sunlight, resulting in reduced visibility over long distances.

In Queensland, $PM_{2.5}$ is measured using TEOM samplers similar to the instruments that measure PM_{10}.

B.8.3 Issue 2 – Ventilation Outlet – Placement (Western)

The western ventilation outlet is too close to residential areas and the botanic gardens. The concentration of pollutants from the entire tunnels at the two outlet points will produce ground level concentrations of pollutants above those reported from the dispersion modelling in the EIS. Particulate pollution from the

stack may contaminate rainwater collected from roofs or entering Toowong Creek with pollutants such as lead and other toxic chemicals.

At least one submission suggests the proposed stack is too high another suggests it is not high enough quoting stack heights at various power stations.

Response

The criteria for locating the ventilation outlets have been outlined in the EIS (Chapter 3, Section 3.5). The location options considered in selecting the proposed site for each of the ventilation stations and outlets, together with a summary of the evaluation against the criteria, were consulted at the community information sessions, as well being discussed in the EIS.

The key criterion to be achieved with selecting sites for the two ventilation outlets was that the ambient air quality goals could be achieved in the immediate vicinity of the outlets. The detailed study of the effect of the outlets in the proposed locations has shown that the changes to ground level concentrations of pollutants due to the ventilation outlets would be very small so that the predicted levels, with the outlets, would remain well below half the goals under worst case conditions.

The EIS (Volume 1, Chapter 8, Section 8.3.5 Assessment of Operational Air Quality and Volume 3, Technical Report No 7, Section 8.2) demonstrates that the effect of the ventilation outlets on ground level concentrations of pollutants derived from motor vehicles would be very small to negligible, in comparison with existing background pollutant levels in those areas and in comparison to the air quality goals. The goals for ambient air quality are stringent and have been acknowledged in the DERM submission to the EIS Reference Project EIS and other similar projects.

The findings of the EIS with regards changes in ambient air quality in the vicinity of the ventilation outlets have been accepted by the Queensland Government, in particular the then EPA.

The separation distances between each of the ventilation outlets and residential areas were carefully considered and balanced against the other criteria to ensure that potential impacts on ground level concentrations of pollutants from motor vehicles would be minimised. Compared with other road tunnel projects in Brisbane, the separation distances to residential premises for Northern Link exceed those for both Clem7 and Airport Link. Both of those projects were approved following a rigorous assessment of air quality and health risk impacts. Road tunnel ventilation outlets in other places, such as Sydney and Melbourne, are mostly much less distant from residential areas than those for Brisbane ventilation outlets.

Set out in **Table B-40** is a comparison of the locations of ventilation stations in Brisbane and other places in relation to residential premises.

Table B-40 Distances to Residential, Other Road Tunnel Ventilation Outlets

Northern Link - Brisbane	270m - Toowong	200m – Kelvin Grove
Clem7 (NSBT) – Brisbane	183m – Woolloongabba	145m – Bowen Hills
Airport Link – Brisbane	90m – Windsor	65m – Clayfield
M5 East - Sydney	153m – Turrella	
Lane Cove - Sydney	510m – Lane Cove West	110m – Artamon
Eastern Distributor - Sydney	25m – City	
City Link - Melbourne	33m – South Yarra	20m – Barkly Gardens
East Link - Melbourne	161m – Ringwood	

Source: Google Maps 2009

Over the life of the Northern Link project, and the operation of the ventilation system, the fuels and engines in the Brisbane vehicle fleet are expected to change for the better through the removal of a range of pollutants, including lead. This trend is already well-established with the reducing demand for leaded fuels as the vehicle fleet transitions to unleaded petrol, LPG or diesel. The development of cleaner fuels and engines is on-going.

At the same time, the ventilation system for Northern Link would be designed and operated to capture motor vehicle emissions that would otherwise be emitted on surface roads, and disperse and dilute them through high-level outlets. Ground-level concentrations of motor vehicle emissions have been modelled in preparation of the EIS and have been found to be marginally different to a 'no project' scenario.

The height proposed for each of the ventilation outlets, in combination with its location in the topography, reflect a careful combination of achieving optimum dispersion and minimising visual impact for nearby communities. While optimising dispersion, and therefore achieving a good outcome in terms of ambient air quality, was the primary consideration in determining the minimum stack height, community input received during the preliminary consultation process indicated that minimising visual impact was also important for many people. The height and location for each outlet is considered to achieve good outcome against both criteria.

The heights of other stacks, such as power stations, are determined by much lower emission velocities than those intended for the Northern Link ventilation outlets. Air would be driven from the ventilation outlets at velocities ranging from 25kph to 70kph, depending on traffic conditions, in-tunnel air quality and meteorological conditions, to ensure that the goals for ambient air quality at ground level is met. Emissions from industrial stacks generally are not expelled at such velocities, requiring much higher stack heights as a consequence[11]. Furthermore, some industrial emissions have a more hazardous chemical composition, requiring such high-level release.

B.8.3 Issue 3 – Operational Air Quality

Assurance is sought that air quality, particularly around schools, after the tunnels begin operation would:

- meet set standards;
- not adversely affect the health of the school community; and
- be monitored regularly with the results available publicly on a regular basis.

Response

The dispersion modelling study of the effects of the Project on the ambient air quality in the study area shows that pollutant concentrations in the study area in future years arising from motor vehicles would be expected to be similar to existing concentrations. This is the case both with and without Northern Link. These results are considered conservative because they do not include any allowance for improved technology in motor vehicle engines to reduce pollutant emissions. Regionally across the study area the ambient air quality is expected to be similar whether the project is constructed or not.

[11] Refer to EIS, Volume 1, Chapter 4, section 4.4.2 – Tunnel Ventilation, p53)

The draft outline Operation EMP requires monitoring of in-tunnel and ambient air quality around the portals and ventilation stacks. The Operation EMP proposes a suite of stringent goals for ambient air quality, being the same goals against which the potential impacts of operating the road tunnel ventilation system were assessed.

Air quality objectives are set by the EPP(Air) 2008 and would be required to be met by the operating road tunnel ventilation system. The air quality objectives established in EPP(Air) 2008 are substantially the same as the goals adopted for the impact assessment of Northern Link. A monitoring regime for the ventilation system for both in-tunnel and ambient air quality was proposed in the EIS to gauge the performance of the system and the impacts on the receiving environment. Monitoring results would be reported in regular environmental reports. If the monitoring detected either the air quality goals or the air quality objectives were exceeded, an incident report followed by corrective action would be required.

The health risk assessment presented in the EIS indicated the level of risk and the probability of a range of health outcomes occurring as a consequence of the operation of the Northern Link ventilation system. The risks generally were found to minimal to negligible.

B.8.3 Issue 4 – Ventilation Outlet – Placement (Eastern)

The portals on the ICB should be moved 400 m further east away from the Victoria Park Road/Normanby Terrace intersection to reduce the direct effects from the combined emissions from the ICB and the tunnel on residents living nearby.

Response

The proposed ventilation system for Northern Link is intended to maintain negative air pressure within the tunnels and at each of the exit portals. This would draw fresh air back into the tunnel, against the flow of traffic, with the aim or avoiding or minimising the risk of motor vehicle emissions being released at ground level from the portals, including the ICB portal. This approach of avoiding or minimising portal emissions is not adopted for many other road tunnel projects – for example, many road tunnel projects in Europe, Asia and the United States of America allow either portal emissions or vent vitiated air at or close to ground level.

The approach taken with Northern Link demonstrates the high-level commitment to maintaining environmental values of air quality adopted during concept development.

There is no warrant to relocate the ICB portals on air quality grounds.

The project is not able to control emissions from surface traffic. The most effective method for reducing the impact of emissions from surface traffic is to equip motor vehicles with emission controls, in addition to those already fitted to modern vehicles.

The EIS (Volume 3, Technical Report No 7, Figures 25 and 53) shows the predicted roadside concentrations near the Inner City Bypass. The levels of major pollutants from motor vehicles are predicted at the kerbside, 10m, 30m and 50m from the kerb with the highest levels at the kerbside. Findings presented in the EIS demonstrate that the predicted levels would be less than half of the stated goals. It is concluded that with the forecast increase in traffic on the ICB with the implementation of Northern Link, the pollutant levels near the ICB are not expected to have any significant adverse effects on ambient air quality.

Updated air quality modelling provided in Chapter 4 of this Supplementary Report shows expected differences in pollutant levels between the Project and No NL options decrease with distance from the ICB and at greater than 50 m the differences will be barely discernible. The assessment has therefore focussed on the impacts at 10 m from the road. In reality no-one is living this close to the ICB; however this distance was used in the EIS HRA to provide an extreme worst-case. In summary, while there will be differences in the traffic distributions with the Project, the "worst-case" health impacts would be no greater than those identified in the EIS for the Reference Project.

As noted in the EIS (Volume 1, Chapter 8, Section 8.3.5 Assessment of Operational Air Quality – surface roads, on page 8-32) the predicted concentrations for motor vehicle emissions from the ventilation outlet would be well below the goals for ambient air quality. These predicted concentrations also include the effects of surface traffic on the ambient environment.

B.8.3 Issue 5 – Air Quality Monitoring

Monitoring of air quality before and after commencement of operation of the ventilation outlets should be undertaken in the vicinity of the ventilation outlets and especially at representative sensitive places.

Response

Air quality monitoring was undertaken for the preparation of the EIS. A monitoring station was established and maintained at Toowong for a 13 month period, while a project-specific monitoring station was established adjacent to the Victoria Park golf course for 3 months to calibrate the impact assessment model which was based on 13 months of data collected in 2005 at Bowen Hills.

Baseline monitoring in the vicinity of each ventilation outlet would be conducted prior to commencement of operations of the ventilation system. The location of monitoring stations will be determined taking into account the proximity of sensitive places, topography and seasonal meteorological conditions.

The EIS (Volume 1, Chapter 8, Section 8.3.6 on page 8-33) proposes extra monitoring sites to be established during the operational phase of the Project, at specified locations in the vicinity of each of the ventilation outlets. These monitoring stations would complement the DERM network of monitoring sites. The air quality monitoring program is outlined in the Draft Outline EMP in Appendix D of this Supplementary Report.

B.8.4 Assessment of In-Tunnel Air Quality

B.8.4 Issue 1 – Portal Emissions

The transition structure for the exit ramp at the Western Freeway portal should be lengthened and roofed with a mesh to allow the used air from the tunnel to be expelled to the atmosphere through the portal but over a considerable distance. Careful design and testing of such a system may remove the need for a ventilation station on the westbound tunnel.

Response

The proposed ventilation system would operate with and maintain negative air pressure in the portals and transition structures to avoid or minimise the risk of portal emissions. In this approach, fresh air would be drawn into the tunnel system at each portal, including those where air would be drawn in against the flow of traffic. Vitiated air would be extracted each road tunnel at a point generally about 100 – 200m from the portal and expelled from the system via the high-level ventilation outlets.

B.8.4 Issue 2 – In-Tunnel Air Quality Control System

For the in-tunnel air quality, automated control systems will regulate the overall airflow to maintain the in-tunnel air quality within limits. Traffic management options are also proposed to ensure motorists within the tunnel are not subjected to extended periods of exposure, however no details are given.

Response

The technology required for linking of the in-tunnel air quality monitoring system to the traffic management system is standard for road tunnels around the world. In-tunnel monitoring of air quality is the key element in a strategy that integrates the management of the ventilation system with the in-flow of traffic. In-tunnel monitoring would be maintained on a '24/7' basis, with low averaging times (e.g. 15mins) to reflect PIARC requirements for pollutants such as carbon monoxide (CO) and nitrogen dioxide (NO_2). Monitoring of visibility in each tunnel would also be maintained for traffic safety.

In concept, traffic flows into each tunnel would be restricted or blocked in the event that the in-tunnel air quality standards would be approached or possibly exceeded. In response to in-tunnel monitoring, the ventilation system first would have been operating at maximum capacity to avoid the risk of exceedance.

The modelling for impact assessment of ambient air quality assumes a worst case scenario in which each tunnel would be congested with traffic flows at less than 10kph.

The EIS (Volume 1, Chapter 4, Section 4.4.2) has described the performance requirements for integrated traffic management and air quality management. These requirements will be incorporated into the performance specifications for design, construction and operation of the project.

B.8.4 Issue 3 – In-Tunnel Air Quality Assessment

The analysis of in-tunnel air quality seems very brief and without supporting information. No estimates are given for the time of day, at various distances into the tunnel or at different expected congestion levels. Some discussion of the recommendations made in Air Quality In and Around Traffic Tunnels (National Health and Medical Research Council, 2008) and their relevance to the project would seem appropriate in a supplementary document.

Response

The Northern Link ventilation system is designed to control the air quality within the tunnels by diluting the concentration of pollutants arising from vehicle emissions to acceptable concentrations.

The key requirement for tunnel ventilation systems is to provide sufficient air for dilution so that pollutant concentrations are kept within design limits. Other issues include the control of air speed within the tunnels, the control of portal air flows and the discharge of air into the atmosphere.

With a typical longitudinal ventilation system, air is drawn into the tunnel from the portals and moves along the full length of the roadway in the direction of traffic. Vehicle emissions progressively increase pollutant concentrations so that at the point of discharge the air is fully vitiated (or "used"). Longitudinal ventilation systems move air along the tunnel by a combination of vehicle induced airflow and mechanical ventilation comprising of jet fans and axial extraction fans. Within the tunnel, jet fans are used to impart longitudinal air movement, particularly in the congested traffic case where the traffic-induced airflow is minimal.

Air quality within tunnels is predominantly influenced by the pollutant load arising from vehicle emissions which are factors of:

- traffic speed and traffic density – as traffic speed increases, the overall pollutant load within the tunnel tends to diminish. Generally, peak pollutant loads are associated with congested conditions;
- traffic mix – the vehicle fleet that will use the tunnel is a mix of vehicle types (passenger vehicles, light commercial vehicles, light rigid trucks and heavy trucks) using different fuels (petrol, diesel and LPG) and designed to comply with emission criteria appropriate at the time of manufacture; and
- road gradient – for a given speed, the road gradient alters the load on the engine and hence the level of vehicle emissions. The tunnel alignment has been developed to minimise the up-hill gradients which can affect the road speed of some commercial vehicles.

Other factors influencing the design of a ventilation system include:

- quality of air entering the tunnel through the portals;
- external wind conditions at the portals; and
- on and off-ramps that provide additional connections to the atmosphere.

The pollutants generally considered during the design of tunnel ventilation systems are:

- carbon monoxide (CO) which is associated with all fuel types;
- particulate emissions (visibility) which is primarily influenced by diesel fuelled vehicles; and
- oxides of nitrogen (NOX), predominantly nitrogen monoxide (NO) and nitrogen dioxide (NO2) which are also associated with all fuel types.

All three pollutants would be monitored within each tunnel, and any one of these can be the trigger for control of the ventilation system.

With the introduction of newer vehicles into the fleet that comply with more stringent emission standards, pollution levels within the enclosed space of a tunnel are expected to decrease over time. Although as vehicles become more efficient the production of NO_X increases due to the higher compression ratios required. It has now been found that NO_X needs to be carefully considered as part of the tunnel ventilation design process.

- **Table B-41 Design Criteria – Tunnel Ventilation System**

Design Criteria	Measure
Carbon Monoxide	
CO peak at any point in tunnel under all free flowing and congested conditions (traffic management implemented)	70 ppm
CO peak at any point in tunnel under a condition of extreme congestion (traffic management failed to control traffic))	90 ppm
Oxides of Nitrogen	
NO2	1 ppm average in tunnel
NO2 / NOX	10 % by volume for calculations
Visibility	

Visibility free flowing traffic	0.005 m-1
Visibility congested traffic	0.007 m-1
Design Speed for ventilation	
Design speed for ventilation	Posted speed limit of 80 km/hr 10km/hr congested case with traffic management systems implemented to control traffic below this speed
In-tunnel Air Velocity	
Air velocity maximum	10 m/s
Portal Discharge	
Portal discharge	No net portal discharge (to be averaged over a 15 minute period)
Design Fire	
Design fire	50 MW (placarded vehicles are excluded from the tunnel)
Acoustic Design	
Tunnel acoustic criterion	85dBA 1.5 m above road level

The modelling for in-tunnel air quality indicates that in the 'worst case' scenario of a fully-congested tunnel with traffic moving at less than 10 kph, the ventilation system for each tunnel would be capable of satisfying the standards. The forecast traffic flows in peak hour for each of the tunnels would be significantly lower than those assumed for the 'worst case' scenario. Furthermore, the ventilation system design allows for one axial fan on standby in the 'worst case' scenario, providing confidence that the system would accommodate that scenario with some spare capacity.

- **Table B-42 Design Criteria – Tunnel Ventilation System**

	East-bound Tunnel	West-bound Tunnel
Worst case in-tunnel conditions (fully congested, traffic flow <10 kph)		
Min. outside air volume	600 m3/s	
Extract volume	600 m3/s (say 4 off-duty axial fans and 1 off-standby axial fan @ 150 m3/s each)	
CO	97 % design	95 % design
NO2	86 %	57 %
Visibility	60 % design	39 % design
In-tunnel air velocity	8.4 m/s	7.4 m/s

The recommendations of the *Air Quality In and Around Traffic Tunnels* (National Health and Medical Research Council, 2008) report with respect to in-tunnel air quality are generally directed towards developing a better research base for setting health-based goals. The proposed research is outside the scope of this individual project. All of the case histories and other issues discussed in that report have informed and in some cases influenced the proposed ventilation design and air quality discussions in the EIS. None of the proposals in the EIS conflict with findings of the NHMRC Report.

B.8.4 Issue 4 – Traffic Mix in Northern Link Vicinity

There is potential for an increase in heavy vehicles carrying freight through the Northern Link route, resulting in higher levels of particulates and pollution.

Response

The modelling of motor vehicle emissions included a forecast increase in use of Northern Link by heavy commercial vehicles in peak periods from 4 – 8% range to 5 – 11% range over the modelling period 2014 – 2026. The average daily use was forecast to increase from 1 – 8% range to 2 – 11% range over the same period. The emissions from diesel-powered heavy commercial vehicles were factored in to both the in-tunnel and ambient air quality modelling.

Visibility in the tunnels is the key criterion relating to particulates, and was found to be well within the design criterion. The goal for ambient air quality (PM_{10}) was readily achieved in all circumstances.

With the forecast increased patronage of Northern Link by heavy commercial vehicles over the period 2014 - 2026, there would be a corresponding reduction on the surface road network through the inner western and inner northern suburbs. The anticipated changes in air quality for the surface road network have been described both in the EIS (Chapter 8, Section 8.3.5) and in this Supplementary Report (Section 4.8.1, Table 1).

B.8.5 Air Filtration Technologies

B.8.5 Issue 1 – Ventilation Outlets – Filtration

The air extracted from the tunnels should be filtered before release to the atmosphere through elevated outlets.

Response

The existing ambient air quality across the study corridor is generally good in comparison with the stringent goals adopted in the EIS for ambient air quality, as well as the recently-released air quality objectives in EPP (Air) 2008. Regardless of whether the Northern Link Project proceeds or not, there is expected to be an improvement in air quality in the Brisbane air-shed due to the future use of cleaner fuels and improved engine technologies in motor vehicles generally. This improvement is off-set somewhat by the predicted increase in travel demand deriving from forecast population growth.

The health risk assessment has concluded that there will be no appreciable change in community health as a consequence of the Northern Link Project, either in relation to the operations of the ventilation outlets or the changes in roadside concentrations of vehicle emissions.

The effects of filtration at the ventilation stations were assessed in the EIS (Volume 3, Technical Report 7, Sections 4.3 and 9.3). The bases for the assessment were very conservative (i.e. seeking to exploit the potential benefits of filtration). The modelling of ambient air quality with Northern Link, with and without filtration, indicates there would be little to negligible change in ground-level concentrations for the pollutants of interest in the assessment. Consequently, there would be little benefit to ambient air quality and community health, if any, from installing and operating filtration systems.

B.8.6 Greenhouse Gas Assessment

B.8.6 Issue 1 – Greenhouse Gases

It is submitted that maintaining air quality and limiting greenhouse gas emissions should be high priorities for the Project at this important time for the world's environment. One submission is that the EIS does not investigate or address the impacts of energy consumption leading to carbon dioxide emissions of the construction process and operation of the tunnel.

Response

The EIS (Volume 1, Chapter 8, Section 8.6 and Volume 3, Technical Report Nos. 7, 7A, & B and 8) addresses the issues of air quality and greenhouse gas emission. The assessment provides the strategic context for the assessment of the greenhouse implications of Northern Link. The material includes estimates of greenhouse gas production during the construction and operational phases of Northern Link, as well as presenting a range of mitigation measures for both phases. The estimates are expressed in standard reporting units (i.e. tonnes of CO^2).

With removal of the local connections the Project requires less electricity and will require less diesel fuel combustion so the estimates of tonnes of CO_2 emitted during construction of the Project will be less than the estimate provided for the EIS Reference Project. Since the estimate of CO_2 emissions for the EIS Reference Project was below the threshold for reporting under the *National Greenhouse Emissions Reporting Act (2007)* the Project is predicted to be further below the reporting threshold.

B.8.6 Issue 2 – Carbon Reduction Scheme

The EIS should demonstrate why the implications of the Commonwealth Government's Carbon Reduction Scheme have not been included within the Project Rationale Alternative options assessment.

Response

At the time of preparing the EIS, the Commonwealth Government's position to greenhouse gas was contained in the *National Greenhouse Strategy 2008*. On 15 December 2008, one week prior to the close of submissions for the Northern Link EIS, the Commonwealth Government released a 'white paper' entitled *Carbon Pollution Reduction Scheme – Australia's Low Pollution Future*[12]. Based on the 'white paper' and public reaction to it, the Commonwealth Government released the draft Carbon Pollution Reduction Scheme legislation on 10 March 2009. However, the Bill was subsequently rejected in the Senate and the Commonwealth Government redrafted it to include a number of modifications including a starting date postponed by 1 year. The amended Bill was introduced into Parliament on 14 May, 2009.

The Commonwealth Government's proposed Carbon Pollution Reduction Scheme (CPRS) aims to achieve greenhouse gas emissions reductions by imposing costs on businesses and individuals based on their greenhouse gas emissions. This economic incentive is expected to drive businesses and individuals to reduce their greenhouse gas emissions through behavioural change (e.g. less frequent car travel) or adoption of new technologies (e.g. hybrid vehicles).

The Project alternative of continuing development of the public transport infrastructure was considered in Section 2.5 of the EIS. It is recognised that enhanced public transport can lead to lower energy demand for transport and also greenhouse gas emissions. However, the public transport option did not satisfy the project needs or the strategic objectives, demonstrating the need for a multi-layered response to transport planning at the regional and metropolitan levels.

In parallel to this project, Brisbane City Council and the Queensland Government are managing greenhouse emissions across the community through the provision of better public transport alternatives, travel demand management measures and promoting cycling and walking as important transport modes.

[12] Commonwealth of Australia 2008, Carbon Pollution Reduction Scheme – Australia's Low Pollution Future, Attorney-General's Department, Canberra

B.8.6 Issue 3 – Greenhouse Gas Emissions Assessment

The EIS does not account for the emissions associated with construction material inputs required, particularly concrete, steel and bitumen. Emissions generated in producing those construction material inputs should be counted as being generated as a direct consequence of the project. An emissions management plan to address embodied energy and greenhouse gas emissions (for instance from the inputs of products such as concrete and steel which have a high greenhouse impact in their manufacture) should be provided.

Response

The impacts of the project on greenhouse gas emission levels are assessed as required by the Terms of Reference. The Terms of Reference specify the activities to be assessed at Section 5.3.4 on page 29. These activities were addressed in the EIS (Volume 1, Chapter 8, Sections 8.6.1 and 8.6.2. The emissions generated in manufacture of the concrete etc. are to be accounted for at the concrete and other manufacturing plants and not as part of the Project.

B.9 Noise and Vibration

B.9.1 Description of Existing Environment

B.9.1 Issue 1 – Western Freeway – Existing Noise Levels

Western freeway noise levels are already excessive impacting negatively on residential housing and the botanical gardens. This is particularly so in the area of Kent Street and Sussex Street where monitoring was not carried out. Will monitoring be undertaken in the Kent Street/Sussex Street area to identify potential future impacts?

More comprehensive noise monitoring should be undertaken in the Toowong area to enable a realistic assessment of existing noise levels. In particular the junctions of Milton Road, Croydon Street and Jephson Street have not been monitored. Modelling presented in the EIS, based on a limited number of monitoring sites, may be inaccurate.

Baseline noise monitoring for the EIS study occurred between 14th and 27th November, 2007. During this period there was a significant increase in truck traffic along the Western Freeway and Milton Road for the Gateway Upgrade Project with 600-740 truck movements per night from 6pm to 5am Sunday to Thursday. If baseline levels are abnormally elevated due to abnormal events then construction and operation noise impacts will appear falsely reduced.

Response

The EIS (Volume 1, Chapter 9, Section 9.5 Operational Impacts and Mitigation Measures and Volume 3, Technical Report No 9B, Operational Noise & Vibration, Section 5 Traffic Noise Predictions and Impact Assessment) explains the modelling methodology and demonstrates its consistency with the Main Roads Code of Practice.

The submission states that 600 – 700 truck movements occurred between 6.00pm and 5.00am Sunday to Thursday during the period of monitoring for the Northern Link EIS. The Western Freeway – Milton Road – Hale Street – Inner City Bypass route provides a key link for freight movements between the western corridor, the ports and eastern suburbs. While this route is open to use for all metropolitan activities, inquiries made in response to community inquiries during preparation of the EIS indicated that a notable activity was the hauling of fill material from Dinmore in the west to the Gateway Upgrade Project (GUP) in the east.

Personal communications with the Leighton Abigroup Joint Venture indicate that for the EIS noise monitoring periods in November 2007 and April 2008, an average of 40 trips per night were initiated by GUP, with such trips occurring usually between midnight and 6.00am. Observations made during attended noise monitoring sessions in the Toowong area detected a number of heavy vehicles passing along Milton Road, but that the numbers of such vehicles were likely to be substantially less than 600 – 740 vehicles over an 11 hours period (ie approximately 1 vehicle pass-by per minute for 11 hours was not observed).

To address the concern raised in the submission, a ‘heavy vehicle’ scenario was tested to determine the effect on background noise levels. In this scenario, it was assumed 1000 heavy vehicles would pass along Milton Road between Sylvan Road and the Toowong Roundabout, and that of these movements, 600 would occur between 6.00pm and 12 midnight. CORTN modelling predicted that a 0.4 dB increase in the LA10 (18 hour) noise level would occur. The calculated increase is considered to be negligible in

the context of monitored background noise levels, in which increases less than 2dB are not detected by the human ear.

The SoundPLAN modelling presented in the EIS generally over-predicted noise levels compared with monitored noise levels at the verification receivers in the Toowong area (EIS, Volume 1, Chapter 9, Table 9-40 on page 9-54). For example, the modelling predicted a +2dB increase at Valentine Street, compared with the monitoring results. Generally, the modelled noise levels were the same as or higher (up to +2dBA) than the levels monitored in November 2007 at each specific monitoring site in Toowong (EIS, volume 1, Chapter 9, Table 9-40) for the LA10(18 hour) parameter.

The modelling undertaken for the EIS study concluded that existing noise levels emanating from the Western Freeway, at all nearby residences monitored, are below the planning level of 68 dBA for the LA_{10} (18 hour) measure established in the *Main Roads Road Traffic Noise Management - Code of Practice* for State controlled roads such as the Western Freeway. This includes the area of Kent Street and Sussex Street which has been accurately modelled based on the parameters noted above, including topography. The relative elevation of the Crag Road and Elizabeth Street monitoring stations compared to the Kent Street-Sussex Street precinct has been accounted for in the model. Noise levels at the Kent Street-Sussex Street precinct have been found to be below the 68 dBA LA_{10} (18 hour) guideline.

The modelling of potential noise levels in the Milton Road, Croydon Street and Jephson Street areas are accurately presented in the EIS through the modelling technique referenced above, and are presented in the EIS (Volume 1, Chapter 9, Section 9.5.1 and graphically in Technical Report No 9, Appendix H). Removal of the Toowong local connection resolves the issue of noise levels in the Milton Road/Croydon Street/Jephson Street precinct as the Project would not impact in this area.

In response to the Coordinator-General's request for further information, additional noise monitoring was conducted in the Toowong area at the locations relied upon for the preparation of the EIS, to enable a comparison of current background noise levels, with those presented in the EIS. The results are shown on **Table B-43.** The resulting marginal reduction in road traffic noise level at some locations in the Toowong precinct may have resulted from a reduction in the number of heavy vehicle movements through the area during the 6 am and 12 midnight time period relevant to the $LA10(18hour)$ parameter.

Table B-43 Analysis of Baseline $L_{A10(18hour)}$ Noise Levels

2009 Monitoring Locations	Assessment of Average Day Evening Traffic Noise $L_{A10(18hour)}$[1] (dBA)			
	EIS Result	Repeated 2009 Result	Calculated (EIS Table 9-40)	Difference
22 Crag Road, Taringa	59	58	59	+1
9 Horrocks Street, Toowong	58	58	61	+3
9 Victoria Crescent, Toowong	55	54	55	+1
31 Valentine Street, Toowong (EIS 29 Valentine St)	59	58	N/A[2]	N/A[2]
128 Sylvan Road, Toowong	66	66	67	+1
4 Wool Street, Toowong (EIS 6 Wool Street)	55	54	55	+1
115 Elizabeth Street, Toowong	52	50	54	+4

Note 1 – LA_{10}(18hour) refers to the time period between 6am and 12 midnight.

Note 2 – Model verification carried out at a different location (i.e. 29 Valentine Street).

In situations where the CoRTN model calculates higher $L_{A10(18hour)}$ road traffic noise levels than measured noise levels, it may be necessary to apply correction factors to the CoRTN predicted levels to account specifically for Australian road traffic conditions. According to data published by the Australian Road Research Board (ARRB), the values presented by CoRTN should be corrected by -1.7 dB for a façade calculation and 0.7 dB for a free-field calculation to account for Australian road traffic conditions. ARRB corrections were not applied to the EIS calculated road traffic levels as they were within +2 dB of the measured noise levels which is considered acceptable for the purpose of model verification.

The CoRTN calculated road traffic noise levels in **Table B-44** are based on the EIS calculated noise levels from **Table B-43** with the recommended ARRB corrections to account for Australian road traffic conditions. The results of the analysis show that the ARRB corrected calculated noise levels are equal to or 2 dB higher than the 2009 (repeated) measured road traffic noise levels at all Northern Link monitoring locations at the western end of the Project. Therefore, the calculations are within the acceptable tolerance of ±2 dBA.

Regardless of whether the ARRB correction is applied or not, the Northern Link model calculated road traffic noise levels that were either equal to or higher than what was measured which means that the future road traffic noise levels which are contained in the EIS are conservative. As the conservative future predictions do not result in any exceedances of Main Roads' Code of Practice 68 $L_{A10(18hour)}$ planning noise level, these additional measurements give further comfort that actual levels will also be below this planning level.

- **Table B-44 Analysis of ARRB Corrected $L_{A10(18hour)}$ Road Traffic Noise Levels**

2009 Monitoring Locations	Assessment of Average Day Evening Traffic Noise LA10(18hour) (dBA)			
	EIS Result	Repeated 2009 Result	Predicted (EIS Table 9-40) with ARRB Correction	Difference
22 Crag Road, Taringa	59	58	58[1]	0
9 Horrocks Street, Toowong	58	58	60[1]	+2
9 Victoria Crescent, Toowong	55	54	54[1]	0
31 Valentine Street, Toowong (EIS 29 Valentine Street)	59	58	N/A	N/A
128 Sylvan Road, Toowong	66	66	66[1]	0
4 Wool Street, Toowong (EIS 6 Wool Street)	55	54	54[1]	0
115 Elizabeth Street, Toowong	52	50	52[2]	+2

Note 1 – CoRTN façade prediction correction of 1.7 dB.
Note 2 – CoRTN free-field prediction correction of 0.7 dB.

B.9.1 Issue 2 – Noise Levels – Inversions

It is not clear whether assessments of construction and operational noise levels have taken into account the meteorological inversions that often occur in Toowong during winter months.

Response

Temperature inversions have not been assessed as part of the EIS assessment due to the close proximity of all noise sources (eg, roads, construction works, and ventilation stations) to the nearest "worst case" noise sensitive locations. Modelling of temperature inversions is only undertaken for industrial/mining type activities (eg construction works or ventilation stations for this project) as they are often at considerable distances (eg 300m or more away) from noise sensitive locations. Within 300m the effects of temperature inversions on noise levels are negligible.

B.9.2 Assessment Criteria

B.9.2 Issue 1 – Improve Noise Levels

This type of project should aim to improve noise levels and diminish air pollution etc to make Brisbane a better city not just to maintain its existing environment.

Response

The Living in Brisbane 2026 corporate vision of Council strives to achieve a range of outcomes which, separately and collectively, would make Brisbane a desirable and pleasant place to live, while at the same time recognising and managing the effects of sustained rapid population growth. A safe, efficient and integrated transport system is a core element in Council's strategy to achieve its corporate vision and to meet the travel demands of a growing population.

The EIS identifies, in numerous places, where expected benefits and impacts upon community and environmental values would occur as a consequence of implementation of Northern Link.

The implementation of published goals and standards for environmental values such as air quality, noise and water, together with conditions of approval for the Project, is intended to achieve an acceptable level of environmental amenity in the urban area. As explained in the EIS (Volume 1, Chapters 8, 9 and others) such goals and standards have been adopted for Northern Link. Furthermore the impact assessment conducted for this EIS indicates that, with appropriate mitigation measures, these standards or goals will be met.

B.9.2 Issue 2 – Spoil Handling Noise

Spoil loading and haulage should only be allowed during normal building working hours or between 6.30am and 6.30pm Monday to Saturday, because the noise levels from reversing buzzers, accelerations and decelerations will be unreasonable over a construction period of such length. Some houses nearest spoil loading areas are only 50m away.

Response

The EIS indicates that spoil transferred to the western worksite (WS1) would be taken via a conveyor to the Mt Coot-tha Quarry. Predictive noise modelling for the EIS (Chapter 9, section 9.3.2, p9-23) indicates that noise from the conveyor system would be attenuated by a combination of acoustic enclosures and the topography, to the extent that further mitigation would not be required to achieve the noise goals at sensitive places.

Spoil from the construction of the transitions and the cut and cover tunnels at the Western Freeway would be trucked to Swanbank. These truck movements would occur during daytime hours only (6.30am to 6.30pm on Monday to Saturday).

The Project without the Toowong connection removes the Toowong worksite and the transport of spoil from Toowong to the western worksite. The impact of concern would no longer arise.

Similarly, spoil from the Kelvin Grove Road connections would have been removed by trucks loaded within the acoustic enclosure and workshed. The Project without the Kelvin Grove Road connection would have no impact from spoil handling or haulage at Kelvin Grove Road.

Spoil to be removed from the Inner City Bypass transition structures and section of cut and cover tunnel would continue to be controlled by the measures set out in the Environmental Management Plan (Construction), to be prepared prior to the commencement of such works. Mitigation measures will also be included in the Environmental Management Plan (Construction). The Draft Outline Environmental Management Plan is presented in Appendix D of the Supplementary Report and proposes environmental (acoustic) objective and performance criteria for spoil handling.

B.9.2 Issue 3 – Australian Standards

The EIS makes reference to Australian Standards. These standards are based on the typical Australian house which is generally made of brick that provides considerable insulation from noise and vibration. The typical house in the Toowong area is high-set, with timber walls offering minimal noise protection.

Response

The Australian Standards specify in most cases the location where the standard noise level needs to be met. So it may be an external standard or an internal standard. AS2107 specifies internal living area for daytime and internal sleeping area for night-time. Most noise monitoring, including that for Northern Link, is undertaken with the noise logger external to the building as explained in the EIS. Through numerous experiments monitoring noise sources in different locations inside and outside buildings made from different building materials, standard façade reductions have been established for different types of buildings. Accordingly it may be seen that the Australian Standards have been designed to account for different building materials having different noise insulation properties.

The EIS (Volume 1, Chapter 9, Section 9.3.1 Reference Noise and Vibration Data – Indicative Effectiveness of Upgrading Building Facades) indicates that for a modern brick or insulated house the façade may lower external noise levels by as much as 20dBA when windows are shut whereas older houses relying principally on natural ventilation through open windows may have a façade reduction of only 10dBA. These differences have been identified and taken into account in the noise modelling for the EIS.

B.9.2 Issue 4 – Vibration

Because Queenslander houses are at elevated risk of vibration damage to tiles and plasterboard the trigger level for building condition surveys should be reduced to 5mm/sec. A commitment should be made to repair damage and provide a guarantee for work undertaken, with minimal inconvenience to the property owner.

Response

The Draft Environmental Management Plan (Appendix D of this Supplementary Report, Section B.6, Element 7) establishes vibration levels to be met to have minimal risk of cosmetic property damage, preserve human comfort and sensitive working conditions.

The vibration levels for minimal risk of damage to residential premises from transient vibration (eg blasting) is 10mm/sec peak particle velocity and from continuous vibration (eg tunnelling with TBM or roadheader) is 5mm/sec peak particle velocity. The vibration levels for heritage places for both transient and continuous vibration is 2 mm/sec peak particle velocity. Mitigation measures are required, as necessary, to achieve the vibration levels for minimising building damage as a consequence of construction. The expectations of the submission would be met for levels arising from continuous vibration (ie 5mm/sec).

The range of vibration levels for heritage places and residential premises is considered appropriate to the building stock in the Northern Link study corridor.

While the BCC Local Law 5 requires pre-and post-construction building condition surveys where the anticipated ground vibration level will be 10mm/sec peak particle velocity or greater, the Draft Outline EMP, requires such consideration to residential properties where potential vibration levels of 5 mm/sec are predicted.

B.9.2 Issue 5 – Electromagnetic Radiation

The EIS only addresses the acoustic environment (i.e. sound and vibration) which is related to the human sense of hearing. It does not address electromagnetic radiation, electrostatic, magnetic, optical, quantum etc types of noise.

Response

The EIS has addressed the acoustic environment because it is the effect of the Project on the human senses and its potential to disturb normal living conditions that are of concern. The urban environment of the city is continuously affected by a wide range of physical phenomena, including those mentioned in this submission, at levels that would not be altered by Northern Link.

B.9.2 Issue 6 – EPP(Noise) 2008

The Environmental Protection (Noise) Policy 2008 will come into effect on 1 January 2009 replacing the 1997 policy. The Proponent should be required to identify its ability to meet the goals of the new policy (particularly with respect to goals for sleep preservation) or additional mitigation measures that would be necessary to meet these goals.

Response

The Project construction and operation will need to comply with the EPP (Noise) 2008.

Noise and vibration impact assessment criteria adopted for the Project were derived from a variety of sources and presented in the EIS (Volume 3, Technical Report 9A, Chapter 2 and Technical Report 9B, Chapter 2). The Environmental Protection Act (Schedule 1, Part 1, Section 1) provides that the EPP (Noise) 2008 acoustic quality objectives are not applicable to the use or maintenance of public roads. However, the planning levels adopted for the EIS study are:

- for State Controlled Roads - the Department of Main Roads *Traffic Noise Management: Code of Practice*; and
- for Non-State Controlled Roads – levels derived from the DTMR Code of Practice (63 dBA LA_{10}(18hour) for "new" roads) and the previous EPP(Noise) 1997.

The requirements for 'background creep' in EPP (Noise) 2008 are substantially the same as the BCC Noise Impact Assessment Planning Scheme Policy (NIAPSP) (refer to EIS, Volume 1, Chapter 9, Section 9.4.1 Traffic Noise, pp9-50, 51). Ahead of the release of EPP (Noise) 2008, the EIS adopted the BCC policy provisions.

The acoustic quality objectives established in Schedule 1 of the EPP(Noise) 2008 are intended to be achieved over the long term and would be used to guide operational noise assessment rather than temporary construction activities such as those proposed for Northern Link.

B.9.2 Issue 7 – Missing Data

In Table 9-7 in Chapter 9 of Volume 1 of the EIS the right-hand column is not from AS/NZS2107:2000 as suggested, the source should be correctly specified.

In the EIS (Volume 1, Chapter 9), values given for Workshops in Table 9-9 appear incorrect and the text should indicate that a crest factor of 1.4 has been applied to the values in this Table.

In the EIS (Volume 1, Chapter 9) Table 9-15 and Table 9-16 each have data missing.

Response

Table 9-7 quotes L_{Aeq} (60secs) directly from AS2107:2000 in the left-hand column but because an average over 60 seconds is not indicative of the variability of noise levels, the right-hand column provides the L_{A10} (15min) equivalent as a more meaningful measure. The L_{A10} (15min) measure is derived mathematically. From experience, there are few comparators for L_{Aeq} recordings over longer periods.

Table 9-9 of the EIS (Volume 1) is reproduced here with the corrected figures highlighted for continuous vibration in Workplaces. The crest factors applied to values in this table are as stated in the EIS as varying from 1.4 for construction activities such as continuous vibratory rolling and rotating plant, and up to 4 or more for intermittent activities such as rock breaking and ripping.

- **Table B-45 Typical Vibration Levels for Human Comfort– 8 Hz to 80 Hz —AS 2670.2**

Type of Space Occupancy	Time of Day	Vibration Velocities (mm/s) corresponding to a 'Low Probability of Adverse Comment'			
		Continuous Vibration (16 h Day, 8 h Night)		Transient Vibration Excitation with several Occurrences per Day	
		Vertical	Horizontal	Vertical	Horizontal
Critical working areas (e.g. hospital operating theatres, some precision laboratories, etc.)	Day Night	0.1 0.1	0.3 0.3	0.1 0.1	0.3 0.3
Residential	Day Night	0.2 to 0.4 0.14	0.6 to 1.1 0.40	3 to 9 0.14 to 2	9 to 26 0.4 to 6
Offices	Day Night	0.4 0.4	1.2 1.2	6 to 13 6 to 13	17 to 37 17 to 37
Workshops	Day Night	0.8 0.8	2.3 2.3	9 to 13 9 to 13	26 to 37 26 to 37

Table 9-15 of the EIS is provided here with the missing reference to the air compressor type of plant highlighted.

- **Table B-46 Effective Noise Reductions Achieved by Enclosure**

Plant Type	Effective Noise Reduction (dBA)		
	1 - Low Performance enclosure	2 - Medium Performance enclosure	3 - High Performance enclosure
Air compressor	0	7	18
Diesel powered mobile plant	4	12	24
Electric conveyor drive	7	16	28
Rock drill	4	12	23

Table 9-16 of the EIS is reproduced here with missing data highlighted.

- **Table B-47 Indicative Maximum Ground Vibration Levels for Mechanical Tunnel Excavation Methods**

TBM, roadheader and rockbreaking operation	Peak Vibration Levels (mm/s) Versus Distance					
	5 m	10 m	20 m	30 m	40 m	50 m
12m hard rock TBM	35	10	3	1.5	0.8	0.5
Heavy rockbreaking	4.5	1.3	0.4	0.2	0.14	0.1
Heavy roadheading	0.5	0.13	0.04	0.02	0.01	0.01
Blasting - ICI tunnelling formula						
5 kg Maximum Instantaneous Charge	168	55	18	10	6	4
1 kg Maximum Instantaneous Charge	46	15	5	2.6	1.7	1.2
0.2kg Maximum Instantaneous Charge	13	4.2	1.4	0.7	0.5	0.3

B.9.2 Issue 8 – Sleep Disturbance Goal

In some cases 40 dBA LA_{eq} is used for internal sleeping areas in residential buildings situated near major roads and in other cases 45 dBA. The EIS needs to be consistent in this regard.

Response

Although the submission is not specific about where this perceived discrepancy occurs it is possible that reference is being made to the apparent discrepancy between the stated "(intermittent) maximum" (L_{max}) noise level disturbance which is based on residential categories contained in AS1055.1 (EIS, Volume 1, Chapter 9, Table 9-6) and the "(continuous) average" (L_{eq}) noise level goals from AS2107 (EIS, Volume 1, Chapter 9, Table 9-7, 9-16, 9-23 and others). The different noise goals employed in these standards are explained in the EIS (EIS, Volume 1, Chapter 9, Section 9.2.2).

B.9.3 Construction Impacts and Mitigation Measures

B.9.3 Issue 1 – Construction Noise

There will be construction noise and vibration from works above and below ground throughout the construction period of three and a half years at each worksite. Increased noise levels from removal of spoil and other construction traffic on the Western Freeway, Kelvin Grove Road and Milton Road have been ignored in the EIS. Given the extended construction time and the 24 hour per day basis of certain noise sources, construction noise goals should be the same as the noise goals set for the operational phase.

Response

Noise and vibration from construction will occur as the underground works progress from the west along the Project alignment towards the east. The underground works for the Project will be supported by activities conducted from within the Western Freeway worksite and the acoustic enclosures and sheds within the worksite. There will be some construction activities conducted above ground, such as the construction of the surface connections at the Western Freeway and the Inner City Bypass. Otherwise, the source of noise and vibration would be mobile and the impact of shorter duration than suggested in the submission.

The Project without local connections will not require the Toowong or Kelvin Grove worksites and therefore will not involve spoil haulage from these previously identified worksites.

The EIS (Volume 1, Chapter 9 and Volume 3, Technical Report No 9A Construction Noise & Vibration) provides a detailed assessment of the potential impacts from construction noise. This assessment identifies certain areas as potentially impacted by excessive noise during the use of certain construction equipment. However, those areas identified as impacted by activities at the Toowong and Kelvin Grove worksites in the EIS would not be impacted by the Project without connections. The EIS goes on to identify a variety of possible mitigation measures to avoid exceedances of noise goals for both above-ground and below-ground works.

The proposed spoil haulage routes rely on arterial roads and higher-order roads such as motorways. Residential areas along the proposed spoil routes have been assessed for expected noise impacts, with the assessment reported in the EIS (Volume 1, Chapter 9, Section 9.3.6 and Volume 3, Technical Report No 9A Construction Noise & Vibration, Section 11.2). The findings are that construction traffic including spoil haulage trucks on the proposed spoil haulage routes would not increase "average maximum" (L_{A10}) traffic noise levels at any residential sites by more than 0.2 dBA which is well below the 2dBA considered the threshold of detection by the human ear.

The Project without the local connections has significantly reduced spoil haulage requirements compared to the EIS Reference Project as outlined in Chapter 3, Table 3-3 of this Supplementary Report. The potential noise impact of Project spoil haulage trucks would be less than the 0.2dBA change predicted from the EIS Reference Project. This change is considered not discernible by the human ear.

B.9.3 Issue 2 – Construction Noise – Mitigation Measures

Homes located within 20m of the Toowong worksite will have noise from trucks reversing buzzers, exhaust braking, acceleration/deceleration, wheel wash facilities and tunnel ventilation plant. The proposed mitigation measures of changing windows and doors are not compatible with the open lifestyle enjoyed in typical Queenslander houses. Wheel wash facilities should be within the acoustic lined shed.

Possibility of scheduling noisy works in holiday periods/non-school hours/weekends could be included.

Response

This issue would be resolved by the removal of the Toowong connections at Milton Road, and the worksite at Valentine Street. Similarly, the potential issue at Kelvin Grove Road would be mitigated with the removal of the connections to Kelvin Grove Road and the worksite along the western side of Kelvin Grove Road.

For the Western Freeway worksite, potential noise impacts require special attention in terms of minimisation and mitigation. The EIS (Volume 1, Chapter 9, Section 9.3.2) outlines a range of effective mitigation measures, in addition to possible building façade treatments, for worksite activities including:

- a "high performance" acoustic shed;
- the erection of temporary noise barriers;
- minimising truck movements on the worksites;
- where "traditional" reversing alarms could impact, other "variable loudness" or "buzzer" type reversing alarms are advocated; and
- designing continuously operating ventilation plant and any other plant operating at night to meet reasonable night time noise objectives.

Within the EIS (Volume 1, Chapter 9 and Volume 3, Technical Reports 9A and 9B) the noise impacts from each potential source during construction and operation are quantified as accurately as possible and related to the environmental objective and performance criteria, with subsequent reference to appropriate standards or criteria. Where the environmental objective would not be met and exceedances of applicable standards predicted, a range of possible mitigation measures are outlined. The arrangements for dealing with predicted exceedances adjacent to work areas would be negotiated between the contractor and residents/businesses individually as the works progress.

Wheel wash facilities are generally designed as part of the exit from the worksite and usually do not impart noise impacts. Inclusion within the acoustic-lined shed is not considered a mandatory requirement but if the layout of the worksite permits such a location it may be considered.

The Draft Outline EMP (Appendix D of this Supplementary Report, Section D.6, Element 7) requires that where surface construction noise impacts are predicted due to specific construction activities, reasonable and practicable mitigation and management measures must be adopted and notified in advance to potentially affected owners and occupants of adjacent properties. If such activities are to occur often during the construction works, a program for a regular scheduled occurrence should be devised and implemented in consultation with the owners and occupiers of nearby properties

B.9.3 Issue 3 – Vibration & Monitoring – Toowong Cemetery

Appropriate specialists should be engaged to audit every monument in the Toowong Cemetery that may be potentially affected by tunnel construction below ground and to monitor vibration levels daily. The meaning of "cosmetic damage", as used in the draft outline EMP, needs clarification. Will Toowong Cemetery staff be involved in deciding on mitigation measures to be employed in the Cemetery during construction?

Proposed vibration monitoring points as listed in the EIS are not sufficient and need to be increased to take into account the variety of geology and topography within the Toowong Cemetery.

Response

The geology beneath the Toowong Cemetery, and the remainder of the tunnel alignment, is illustrated in diagrammatic form in the EIS (refer to Chapter 6, Figure 6-3). Calculations of the anticipated ground vibration during construction have been made based on depth (ie including surface topography) and grade of each tunnel, type of machinery being used and nature of the rock. The EIS (Volume 1, Chapter 9, Section 9.3.5) identifies the potential vibration impacts from the tunnel construction works for both TBM and roadheader operations and recommends steps necessary in the detailed design phase to

mitigate these. The predicted impacts of construction of the EIS Reference Project on the Toowong Cemetery are provided in the EIS (Volume 1, Chapter 12 Cultural Heritage, Section 12.2.3 Driven Tunnels – Toowong Cemetery on page 12-20).

The Toowong Cemetery is included in the Queensland Heritage Register. Consequently strict management of construction works beneath the cemetery, in accordance with an approved cultural heritage management plan, would be required to maintain the values of the place. A preliminary survey of all graves and monuments, including photographs of each, above the proposed alignment throughout the cemetery has been carried out. This survey would be updated, prior to construction, at which time appropriate protective measures would be undertaken to protect those graves or monuments considered in danger of damage from vibration.

Also, the community values of recreation, landscape and connections with the past, would need to be recognised and protected during the construction works.

Cosmetic damage refers to visible cracks in plaster, rendering, mortar or other unyielding building material and may occur in a structure without any structural damage occurring. It is often used as a level of vibratory impact on buildings because it is generally discernible and can be a threshold to requirements for more effective mitigation.

Owing to the fragile nature of some of the headstones and monuments, the Draft Outline EMP has recommended mitigation measures to protect the Toowong Cemetery from the effects of tunnel vibration during construction be devised, on the basis of predictive modelling and then monitoring, so as to avoid or limit damage to graves and monuments to cosmetic levels, and that any such damage would be repaired upon completion of tunnel construction in this location. The mitigation measures proposed would need to be part of the cultural heritage management plan prepared for and accepted by the Department of Environment and Resource Management. The responsible cemetery staff would be consulted in developing the level of protection necessary for structures on the surface.

The Draft Outline EMP recommends further that continuous vibration monitoring devices be located at numerous points within the cemetery, to validate or re-calibrate the modelling predictions and to provide accurate data on which to revise mitigation strategies, while tunnel construction is under way.

B.9.3 Issue 4 – Spoil Conveyor – Noise

The EIS indicates that the spoil conveyor could be producing noise levels during the night equal to the daytime background levels for residential areas north of Mt Coot-tha Road.

Response

Mitigation measures, such as enclosures and dampers on the conveyor system would be required to ensure noise levels comply with the environmental objectives, the performance criteria and the goals presented in the EIS and the requirements of any conditions imposed by the Coordinator-General. The draft Outline EMP (Appendix D of this Supplementary Report, Section D.6, Element 7) recommends a regime of predictive modelling, monitoring and management to ensure the environmental objectives are achieved, particularly for night-time operation of the spoil conveyor.

Noise modelling for the spoil conveyor in operation at the western worksite (refer EIS Table 9-19, Volume 1, Chapter 9), indicates that at the nearest residences on Wool Street and north of Mt Coot-tha Road noise levels are predicted to marginally exceed the L_{Aeq} noise goal by up to 2dBA. This assessment has not included such mitigating factors as the local topography and vegetation which would

be expected to have ameliorating effects. The combination of these natural factors and the implementation of effective mitigations such as acoustic-lining enclosures of the conveyor system, give rise to a very low risk of significant acoustical impacts.

B.9.3 Issue 5 – Noise Mitigation – Trigger Levels

The EIS fails to provide trigger levels or time frames for initiation of mitigation measures to reduce noise and vibration impacts on households.

Response

The thresholds for initiation of noise mitigation measures are the noise goals established in the EIS for the different noise sources and locations throughout the work areas. The Draft Outline EMP (Appendix D of this Supplementary Report, Section D.6, Element 7) identifies the requirement for the Proponent to provide advanced notice of construction to landowners and occupants as well as notifying them of predictive modelling results where the noise goals are expected to be exceeded. The Proponent is also required to advise owners and occupants before beginning the noise generating activity, with information on the duration and mitigation measures proposed. Consistent with the conditions imposed on both the North South Bypass Tunnel and Airport Link, this requirement would likely be imposed by the Coordinator-General on Northern Link, should the Project be recommended to proceed.

B.9.3 Issue 6 – Kelvin Grove Worksite – Noise

The Kelvin Grove worksite is situated in a valley so that dust, fumes and noise will accumulate. Noise from the acoustic workshop will be projected from its open doors against the QUT building façade and up the hill towards Upper Clifton Terrace aided commonly in the afternoons in summer by the north-easterly sea breezes.

Response

Potential impacts from the Kelvin Grove worksite are now avoided with the decision of Council to proceed with the Kelvin Grove local connection.

The Kelvin Grove worksite was proposed to be situated on a ridge and not in a valley as suggested in the submission (refer EIS, Volume 1, Chapter 6, Figure 6-2). The EIS recognised the proximity of this worksite to residential properties and the consequential need for effective mitigation measures to avoid or manage the risk of adverse impacts from noise, dust and fumes. The acoustically-lined workshed proposed for the Kelvin Grove worksite was to be designed and operated with closed doors, to be opened only for ingress and egress of vehicles.

B.9.3 Issue 7 – Low Frequency Noise

Given the close proximity of residences to the worksites, any work generating low frequency noise with the potential to impact on residences must be undertaken during the hours 6.30am to 6.30pm Monday to Saturday. The health effects of low frequency noise also need to be assessed. Suggests monitoring of low frequency noise levels at sensitive receptors. A commitment should be made in the supplementary EIS to offer relocation when a pre-defined trigger level is exceeded, such as the Australian standards.

Response

The EIS (Volume 3, Technical Report 9A, Section 10.4.4) provides an assessment of potential low frequency noise impacts from both infrasound and low frequency sources. The assessment identifies that particular activities at certain locations may cause impacts in excess of the Ecoacess guidelines[13] that have been adopted as the standards for low frequency noise during construction of Northern Link. A monitoring program for low frequency noise is recommended in accordance with the Ecoaccess guidelines. Several possible mitigation measures are listed in the guidelines and would be employed where appropriate. The decision on which mitigation measures would be employed and where would depend on predictive modelling and a number of circumstances (e.g. proximity, likely duration, type of activity impacted etc). The approach would be negotiated with the owner or occupant as part of the detailed design phase prior to works commencing in that locality.

It should be recognised that the previously proposed local worksites in proximity to local residences at Toowong and Kelvin Grove have now been removed from the Project.

B.9.3 Issue 8 – Plant Noise

The assessment of noise levels from construction plant and equipment (EIS, Volume 1, Chapter 9, p. 9-23) should indicate that it is for individual items as assessment is not for cumulative effects. Suggest a cumulative assessment be included.

In the EIS (Volume 1, Chapter 9, Table 9-19) why is the sound power level corrected by 4dBA and what does the superscript 1 refer to?

Response

Construction plant and equipment operating at night mostly would be involved in spoil removal within the acoustic lined shed. For some surface works on major roads such as the Western Freeway and the Inner City Bypass, night works would be required to achieve other construction objectives, such as minimising the disruption to peak, daytime traffic flows. While these locations are well-removed from sensitive places, care would still be required to avoid, or mitigate and manage the effects of night-time construction works. In such circumstances, mitigation measures fitted directly to construction plant and equipment may be necessary to achieve the environmental objectives.

With regards the concern about cumulative effects of multiple machines operating, it should be noted that the addition of noise levels from more than one source is a logarithmic addition such that the cumulative noise from two machines each operating at 50dBA, would produce a combined noise level of 53 dBA. Cumulative noise levels are slightly above the highest source level, rarely more than 3dBA above the highest source level.

The sound power level of 4 dBA is explained in the EIS (Volume 3, Technical Report 9A, Table 32) as referring to the adjustment for the type of acoustic-lined shed proposed for a worksite.

B.9.3 Issue 9 – Mitigation measures

In several sections of the EIS it is stated that decisions will be made after certain actions have been completed or monitoring is carried out. It is suggested that appropriate information on these actions be inserted in the Supplementary Report.

[13] Ecoaccess guidelines administered by the Environmental Protection Agency, Department of Environment and Resource Management

Examples:

- Chapter 9. Noise and Vibration 9.3.2 Work Sites: on pp. 9-25 to 9-31and 9-33 to 9-41, predicted noise levels during construction are shown to exceed external noise goals by considerable amounts.
- Technical Report No. 9B, Section 7. Ventilation Noise from Ventilation Stations: on p. 59, it is stated that the noise predictions should be reviewed and refined once the fan and system design has progressed.
- Section 9. Noise and Vibration 9.3.5 Tunnelling between Portals: on pp. 9-42 to 9-47, predicted vibration levels exceed acceptable values to protect against annoyance. It is noted (p. 9-46) that recommended low-frequency noise limits will be exceeded during tunnelling in close proximity to all receiver types.

Response

The studies for the EIS have addressed potential impacts from the design, construction and operation of the Project. The aim of these studies has been to identify if the Project is feasible and provides a basis for approval that would enable the Proponent to seek tenders to implement Northern Link. The tendering process may bring forward improved design or construction methods that would remove certain impacts identified for the Project. While such changes would be addressed in a Request for Project Change to the Coordinator-General, the detailed mitigation measures would be formulated during the detailed design phase, prior to construction, or in parallel but in advance of some aspects of construction (eg noise and vibration modelling, monitoring and mitigation).

The development of detailed designs and operating procedures, in combination with predictive modelling and monitoring, ought to determine the mitigation measures necessary to achieve the environmental objectives for Northern Link.

B.9.3 Issue 10 – Construction Noise Conditions

Regular noise complaints have been received in relation to the CLEM7 (formerly NSBT) road tunnel project. The Northern Link EIS needs to contain an assessment of the lessons learnt from CLEM7 and how these will be applied to Northern Link.

Response

The EIS for Northern Link has sought to observe the 'lessons learned' from the construction of the CLEM7 project. Further, the lessons learned from implementation of the Draft Outline EMP and the Coordinator-General's conditions of approval for CLEM7 ought to be incorporated in the possible conditions that would be imposed on Northern Link, should the Coordinator-General determine that the Project ought to proceed.

The Clem7 project reports on environmental performance on a monthly basis[14]. Complaints regarding construction noise have been received in relation to each of the worksites, and in particular, surface works on the Pacific Motorway while the permanent noise barriers were being erected. While the environmental objectives for Clem7 remain relevant, these construction experiences will inform the development of more effective mitigation measures for Northern Link.

[14] www.clem7.com.au

All of this information has been incorporated into the development of the Northern Link EIS and would be included, where appropriate, in the request for tenders and subsequent environmental requirements.

B.9.3 Issue 11 – Construction Traffic Noise Measure

The EIS presents construction traffic noise levels in the L_{A10}(12 hour) parameter. However, because the construction working hours recommended in the Draft Outline EMP in the EIS are 6.30am Monday to 6.30pm Saturday the noise levels should be presented in the L_{A10} (18 hour) parameter.

Response

The construction traffic noise impacts were presented in the L_{A10}(12 hour) parameter because this is a more conservative measure ie the level indicates the daily truck numbers over a 12 hour period rather than an 18 hour period. Since the daily truck numbers are not changed, the L_{A10} (18hour) parameter would always be a lower sound level than the L_{A10}(12 hour) level. The statement, in the EIS, that spoil haulage traffic would not alter the noise level at any residential receiver by more than 0.2dBA remains valid.

B.9.4 Operational Phase Noise Assessment Criteria

B.9.4 Issue 1 – Toowong Cemetery

The Toowong Cemetery should be elevated to the status of a place of worship/education and have appropriate noise goals applied.

Response

The Toowong Cemetery is a registered heritage place, requiring specific construction measures to avoid damage to heritage attributes due to vibration. There are no specific measures for noise, except for the internal noise goals proposed in the EIS (refer Chp 9, section 9.2.2, Table 9-7) for a place of worship L_{Aeq}(60sec) of 40dBA and L_A(15min) of 50dBA. Imposition of these goals on an open setting, such as the cemetery, would be both unreasonable and likely to be unachievable considering that the planning noise levels for Frederick Street, as a State-controlled road, is 68dBA.

Post-construction, the effect of the Project on the noise environment of the Cemetery is likely to be more beneficial than adverse because the traffic volumes on Mt Coot-tha Road west of the Toowong roundabout and on Frederick Street are predicted to decrease when the Project commences operation. As noted in the EIS noise levels at residences on Frederick Street, and thus the Cemetery, are already above the 68dBA planning level for State Roads.

B.9.5 Operational Impacts and Mitigation Measures

B.9.5 Issue 1 – Noise Barrier – Croydon Street

Along Croydon Street the EIS proposes noise barriers on one side only. Noise barriers should be erected on both sides of Croydon Street because noise will reflect off the noise barrier and increase noise levels for residents on the eastern side of Croydon Street. Suggested mitigations are ineffective for older Queenslander houses. Concave noise barriers are more effective than vertical ones such as those along the ICB adjacent to Normanby Terrace.

If required during detailed design, the traffic side of the Croydon Street barrier could be made "absorptive" thus effectively removing all reflected noise.

Response

The requirement for noise barriers, associated with the Project, along Croydon Street would fall away with the removal of the proposed connections in Milton Road.

Noise barriers were proposed along the western side of Croydon Street where, owing to property acquisitions required for Northern Link, it would have been possible to erect a continuous barrier isolating the green space from the roadway. This would not have been the case on the eastern side of Croydon Street residences where there would have remained a need for access to individual properties. Such gaps in a noise barrier would render it completely ineffective for its intended purpose and so it is not proposed.

B.9.5 Issue 2 – Western Freeway – Noise Levels

There will be a significant increase in traffic on the Western Freeway but the study corridor for the EIS does not include most of the corridor of the Western Freeway. Particularly the section between Waverley Road and Russell Terrace needs to be assessed because existing fences in this area are not effective noise barriers. A reduction in speed limit to 80km/hr for the sections of the Western Freeway that run adjacent to residences would also be beneficial in reducing noise.

Response

Noise modelling in accordance with the Main Roads Code of Practice was carried out in the EIS (Volume 3, Technical Report 9B, Section 6 on page 47). Such modelling indicates that the increased traffic on the Western Freeway adjacent to works associated with Northern Link would contribute increases in road traffic noise below the DTMR 68dBA L_{A10}(18 hr) planning level noise level. Traffic modelling of the Project without local connections (refer Chapter 4, Table 4-5 of this Supplementary Report) predicts a very small decrease in traffic volumes on the Western Freeway compared to that for the EIS Reference Project so the DTMR planning level may confidently be expected to be maintained.

It is standard practice to only assess those areas adjacent to upgrade works, unless part of a Network Noise Management Plan where roads not being upgraded can be assessed for compliance with the DTMR Code of Practice. Such an assessment is not required for Northern Link and has not been undertaken between Waverley Road and Russell Terrace.

B.9.5 Issue 3 – Surface Road Noise

Little regard appears to have been paid to the long term noise levels created by the Toowong Connection especially around Toowong State School. Widening of Milton Road between Sylvan Road and Croydon Street will have noise impacts on residences that become closer to the roadway. Traffic on Milton Road, between Penrose Street and Morley Street, will increase enormously and no sound barriers have been proposed.

The potential increase in traffic on Gregory Terrace will cause higher noise levels with potential to adversely affect BGGS. Concern has been expressed that noise levels could be elevated by increased traffic on ICB and advice is sought on whether noise barriers will be erected along the southern side of the ICB.

Response

Potential noise impacts at the Toowong State School as a result of the previously proposed local connections are resolved by the removal of the Milton Road connections from the Project.

The EIS (Volume 1, Chapter 9 and Volume 3, Technical Report 9B) contains detailed modelling of long term noise levels for the EIS Reference Project in the vicinity of the Toowong connection (Technical Report 9B, Appendix H). Where noise goals were predicted to be exceeded in some areas (eg Valentine Street, Milton Road between Frederick Street and Croydon Street and Croydon Street), mitigation measures were suggested, such as the erection of noise barriers. Noise impacts from the EIS Reference Project were predicted to be negligible at the Toowong State School.

In areas, such as the Inner City Bypass adjacent to the Brisbane Grammar School, the EIS indicates that 'status quo' noise levels would be maintained for the Grammar Schools without implementation of noise barriers along the ICB.(refer EIS, Technical Report 9B, Appendix I). The results of noise modelling for the Project without local connections (Chapter 5 of this Supplementary Report) show that the expected changes in the traffic noise along the ICB as a result of the the Project are considered to be minor and would not be noticeably different from those documented in the EIS for the Reference Project.

B.9.5 Issue 4 – Vent Station Noise

Nearby residents will hear the noise from ventilation stations as stack height is level with some houses in Wool Street and the maximum exit velocity of 70kph would be clearly audible.

Response

An assessment of the potential noise impacts from the ventilation stations and outlets is provided in the EIS (Volume 3, Technical report 9B, Section 7 Ventilation Noise from Ventilation Stations).

Preliminary modelling conducted for the EIS indicates that ventilation station and ventilation outlet noise comply with Council's Noise Impact Assessment Planning Scheme Policy. This policy also deals with background creep in noise, as does EPP(Air) 2008. The assessment related to a site at Elizabeth Street and Cross Street, Toowong, 43 Normanby Terrace Kelvin Grove and QUT (Kelvin Grove). The assessment is presented in Technical Paper 9b, Chapter 7, Section 7.5, p.58.

In summary, the assessment found that for the western ventilation station, no further noise mitigation would be required to achieve background noise of 34dBA, other than to incorporate some additional attenuation in the low and high frequencies (i.e. 63 Hz and 2 kHz). In between frequencies do not exhibit any exceedances. For the eastern ventilation station, the assessment found that no further noise mitigation would be required to achieve background noise of 38dBA, other than to incorporate some additional attenuation in the low and high frequencies (i.e. 63 Hz and 4 kHz). In between frequencies do not exhibit any exceedances. The predicted noise level at QUT was assessed at 40 dBA. While no additional attenuation would be required, it would be desirable to incorporate some additional attenuation in the low and high frequencies (i.e. 63 Hz and 4 kHz).

Mitigation measures would need to be designed into the ventilation outlet and the ventilation station such that they do not exceed existing background noise level in each area.

B.9.5 Issue 5 – Regenerated Noise

Regenerated noise from heavy vehicles using the tunnel during the operation phase is likely to impact on some houses. Vibration monitoring should be permanent after the tunnels' commissioning not just during construction and the results of this monitoring should be made available on line.

Response

The EIS (Technical Paper 9b, Section 5.12) reported that vibration generated by heavy vehicles on a poorly maintained roadway can sometimes be heard in nearby buildings as a low frequency "rumbling" sound. The potential for this to occur may be enhanced where the tunnel is situated directly beneath a building. However, for well maintained roadways, regenerated noise is not an issue.

The EIS (Volume 1, Chapter 9, Section 9.5.4 Vibration and Regenerated Noise, on page 9-69) notes the investigation of Sydney tunnels for this specific Northern Link issue found all vibration and regenerated noise levels to be below the threshold of human perception. If the roads are well maintained without discontinuities, vibration, and therefore regenerated noise, from truck movements in the Northern Link tunnels would not be discernible at the surface at any point along the alignment.

B.9.5 Issue 6 – Portal Noise Emissions

The analytical software, Concawe, presumably predicts portal noise as a planar source in terms of L_{Aeq} and not L_{A10}. CoRTN predicts road traffic noise from a line source in L_{A10}. What method is used to combine the two contributory noise sources to establish noise level at a noise sensitive receptor?

Response

As explained in the EIS (Volume 3, Technical Report 9B, Section 5.1 Modelling Methodology) the noise predictions from the tunnel portal noise model utilising Olafson's "Noise from Road Traffic Tunnel Openings – An Engineering Approach" have been added logarithmically to the noise predictions from the standard CoRTN traffic noise predictions to generate overall noise levels for the combination of portals and roadways.

B.9.5 Issue 7 – Road Noise

The reduction of 3 dBA claimed for Open Graded Asphaltic (OGA) concrete should be clarified. Reduction varies over the life of the treatment. The DTMR Noise Code recommends average value of 2 dBA.

Response

The EIS has adopted a dense-graded asphaltic surface for all modelling in the reference design. The only reference to open-graded asphalt is for alternative mitigation measures. It would be part of the detailed acoustic design to use the appropriate road surface correction if such measures were to be implemented.

Although the current DTMR Code of Practice does recommend the use of a 2 dBA correction for open-graded asphalt, the figure has varied from 2 to 4dBA over many years. At present it is recommended that the detailed design adopt the latest correction from Main Roads, being a -2dBA correction compared to dense-graded asphalt.

B.9.5 Issue 8 – Concave Noise Barriers

Several types of vertical structure are illustrated in the EIS, in an endeavour to mitigate noise while providing for some visual amenity; these structures allow considerable levels of noise to lift over and then down to the recipients. It was submitted that a 'concave' barrier should be used instead. Also suggests the use of totally-enclosed noise and emission barriers, effectively half tunnels, made of a clear/tinted plastic.

Response

The conventional approach to noise barrier design around the world retains the vertical wall because the defining parameters for noise wall efficiency are its vertical height and the absorptive characteristics of the material used to construct the barrier. For example, a 3m vertical wall and a concave wall with the vertical height of 3m would have the same noise attenuation properties for receivers behind the barrier. In some cases where receiver sites are significantly higher above the source a concave barrier with extension out over the source may protect the elevated receiver more effectively. Examples of this approach can be found in Flemington, Melbourne where the Tullamarine Freeway passes close to several residential high-rise towers. In that situation the concave-sided noise tube has been constructed based on design principles to deal with noise impacts in the elevated towers.

Design considerations of the Northern Link noise sources have been carefully evaluated. No situations were found where concave walls or fully enclosed roadways would have significant noise attenuation benefits and so the reference design includes provision of vertical noise walls in the locations and at the heights indicated in the EIS. While detailed design may suggest alteration of these specifics it is not anticipated that justification for concave or tubular noise walls would be developed.

B.10 Ecology

B.10.1 Description of Existing Environment

B.10.2 Potential Impacts and Mitigation Measures

B.10.2 Issue 1 – Air Quality – Cockatoos

The impact of emissions from the ventilation outlet should be assessed on a flock of 50 or more cockatoos that live and feed in the area of Anzac Park to Toowong Creek and other adjacent parklands.

Response

The EIS (Volume 1, Chapter 8, Section 8.3.5 Assessment of Operational Air Quality – Ventilation Outlets on page 8-31) indicates that the maximum increase in any of the pollutants associated with motor vehicles in the vicinity of the ventilation outlets is expected to be negligible compared to the existing background. These very small increases are assessed (EIS, Volume 1, Chapter 18, Section 18.3 on page 18-4) as having negligible effect on human health and on that basis they are assessed as having no or negligible effect on the health of wildlife in general, including cockatoos.

B.10.2 Issue 2 – Wildlife Corridors

Two wildlife corridors have been identified to the west of the study corridor. Has it been considered that fauna mortality may be reduced by inclusion of fauna exclusion fencing or underpasses on the Western Freeway within the area of Northern Link construction work.

Response

As noted in the EIS (Volume 1, Chapter 10, Section 10.2.8) the Project is unlikely to have a significant impact on identified corridors in the vicinity of the Project. The Project works are so peripheral to the major corridor of the D'Aguilar Range to Mount Coot-tha areas that no impact is expected. The Western Freeway already traverses the second, arboreal and avian corridor as a significant barrier between Mt Coot-tha and Toowong. The Project would widen this corridor but this would not change the environment of the corridor for the tree dwelling and bird species that may use it. Moreover, the increasing level of human intrusion into vegetated areas on the Toowong side of the Western Freeway already make it an unattractive destination for native wildlife. Inclusion of fauna exclusion fencing or underpass is not considered suitable for a wildlife corridor identified as being used by tree-dwelling and bird fauna.

B.10.2 Issue 3 – Koala Conservation

Mitigation measures to protect habitat for fauna species (EIS, Volume 1, Section 10.2.5, page 10-28) do not include a reference to Clearing Requirements under the Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016 (the Koala Plan).

Response

There are no approvals required under the Nature Conservation (Koala) Conservation Plan 2006 as there are no known populations of Koalas within the affected area and there are no mapped Koala habitat areas affected by the Project.

The draft South East Queensland Koala State Planning Regulatory Provisions and regulatory maps came in to effect on 12 December 2008. The draft regulatory provisions are an interim measure to provide additional protection for koala habitat located within the South East Queensland Regional Plan urban

footprint. They replace the Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006 – 2016 (Koala Plan) for development located within that area. The Department of Infrastructure and Planning is now a Referral (Concurrence) Agency under the *Integrated Planning Act 1997* for development occurring in an interim koala habitat area within the urban footprint.

The statement in Chapter 11 of the EIS that the western end of the study corridor is within a gazetted Koala Sustainability Area has been clarified as identified in Table B1 of Appendix B to this Supplementary Report.

B.10.2 Issue 4 – Aquatic Species

Aquatic fauna such as turtles, fish and aquatic invertebrates have been identified as part of the field survey and the mitigation measures need to reflect this. Include mitigation measures during construction for identified aquatic species within Anzac Park.

Response

Mitigation measures to protect the aquatic environment in the Anzac Park gully are presented in the EIS (Volume 1, Chapter 10, Section 10.2.9). These address the potential impact of erosion of the work site or construction areas along the Western Freeway contributing sediment to stormwater runoff entering Anzac Park. The mitigation measures to control erosion and sediment loading of stormwater runoff are outlined in the EIS and specified in the Draft EMP (Appendix D of the Supplementary Report, Section B.6, Elements 3 and 5).

B.10.2 Issue 5 – Vegetation Clearing

The destruction of "floristically interesting" vegetation generated by site clearing activities is significant and areas of similar vegetation types are not well represented in the area.

Response

The EIS (Volume 1, Chapter 10, Sections 10.2.1 and 10.2.2) acknowledges the relatively minor extent of vegetation loss for a project of this size and outlines a range of mitigation measures that would more than compensate in the longer term rehabilitation program. The mitigation measures include the requirement to plan worksite layouts to minimise the clearing of mature trees.

B.11 Planning and Land Use

B.11.1 Existing Environment Planning Framework

B.11.1 Issue 1 – City West Task Force (CWTF)

The EIS mentions that the CWTF had proposals for the Normanby area but does not outline those proposals, even though they are relevant to its proper assessment of impact. The EIS acknowledges that the Kelvin Grove connection would widen Kelvin Grove Road and increase traffic in the area so placing the project at odds with the CWTF proposals. Although the EIS asserts that the base case would not prevent the implementation of CWTF proposals it does not amplify. On the grounds of geometry and the knowledge-corridor intentions of CWTF, the EIS statement is inadequate and open to significant question.

Response

With the removal of the local connection at Kelvin Grove, there is no longer a requirement for widening of Kelvin Grove Road. The physical elements of the Project do not impact on the CWTF.

B.11.1 Issue 2 – SEQ Regional Plan (SEQRP) and Infrastructure Plan (SEQIPP)

The SEQIPP was most recently amended in June 2008 not May 2007 as stated in EIS. The IRTP has not been superseded by the SEQRP, it is a 25 year strategic plan that acts as a supporting document to the SEQRP. The statement that the Project is identified in the SEQRP as a project under construction is misleading, it identifies the Northern Link Tunnel project under "further TransApex investigations".

Northern Link is referred to and supported by the SEQRP, but this does not foresee local connections.

Response

A draft SEQRP 2009-2031 was made public in December 2008. The draft SEQRP includes the statement that “Quality orbital road networks are needed in Brisbane to allow freight and longer distance trips to move around the city and access key industrial hubs without passing through centres and the inner city.” Northern Link is referred to in the SEQIPP of June 2008 as follows: “Brisbane City Council has commenced a detailed feasibility study of the Northern Link proposal as part of its TransApex plan. Northern Link is a proposed tunnel and toll road project, …….”

Local connections to the Northern Link tunnels were indicated in the TransApex Prefeasibility Report which preceded either the SEQRP or SEQIPP quoted above. The Project continues to figure prominently in all significant State Government planning documents on regional and sub-regional transport systems. Council has now decided to remove the local connections from the Project.

B.11.1 Issue 3 – Toowong – Major Activity Centre

The EIS discusses the role of major regional activity centres such as Toowong as employment and trip generators, but fails to acknowledge other important activity centre principles outlined in the SEQRP, including walking, cycling and public transport. The large forecast traffic increase on Jephson Street appears to indicate traffic congestion that would compromise the SEQRP objective of Toowong developing as a major regional activity centre.

Response

The removal of the local connections at Toowong removes the impact of the local connections on the Toowong major regional activity centre. The updated traffic modelling for the Project indicates that Jephson Street would experience a 4% decrease in traffic compared to the scenario without construction of the Project.

B.11.1 Issue 4 – Access and Mobility Desirable Environmental Outcome (DEO)

The Brisbane City Plan 2000 DEO addressing 'Access and Mobility' promotes a "compact urban structure and less reliance on private motor vehicles…" which needs a response given the nature of the Project.

Response

As noted in the submission the response is provided in the EIS (Volume 1, Chapter 11, page 11-25, 3rd paragraph from bottom). The EIS acknowledges that the Reference Project could be seen to be in conflict with some elements of this DEO but further consideration of the Project's effects suggests that it could promote the DEO through improved road network conditions in inner western suburbs between the CBD and Indooroopilly. Removal of tens of thousands of through trips from the surface roads in the Toowong area to the tunnels must improve mobility and access in the area.

At the same time the submission seems unaware that the strategy quoted is only one of two identified in CityPlan to address this DEO. The other strategy "Integrate the Movement System with land use pattern to maximise efficient use and enhance accessibility of the Movement System" is directly promoted by Northern Link because it "integrates the Movement System with that of the Southeast Queensland region", because it "discourages the use of local roads by through traffic and allows interconnectivity between neighbourhoods for locally generated trips" and because it "helps reduce trip times to major employment centres".

In discussing "Elements of the City" City Plan acknowledges the continued preference for private motor vehicle usage, particularly between the outer 'dormitory' suburbs and the main employment centres. The Brisbane Integrated Transport Plan and subsequent Transport Plans, noted in the EIS as addressing this 'element', are directly supported by Northern Link in several ways, namely:

- removing through traffic from local streets;
- providing alternative route for freight vehicles so relieving pressure on arterial roads;
- providing a bypass route to avoid the CBD; and
- servicing major activity and employment centres like the Brisbane Airport, Australia Trade Coast, Royal Brisbane Hospital and the Western Corridor.

B.11.1 Issue 5 – Brisbane City Plan 2000 – Strategic Plan

It was submitted that the EIS statement – "Of particular reference to Northern Link, the Movement System reference in the Strategic Plan acknowledges that Brisbane's transport infrastructure has become outdated due to changes in travel patterns and the continued dispersal of activity" does not make any sense. What is meant by "outdated" – surely you mean that demand is beyond the capacity of existing infrastructure? What is meant by "continued dispersal of activity"? The EIS should state that travel distances are increasing as the metropolitan area expands. Clarification is required of comments in the 2nd paragraph under 'Strategic Plan'.

It was submitted that the EIS statement that "The absence of a northern connecting motorway from the Ipswich Motorway to the Gateway Motorway is readily apparent" is subjective, not based on the findings of any publicly released transport planning study and suggest that it be deleted or reflect the role of the Inner Orbital as the planned primary motorway from the west to the north.

Response

The sentence quoted in the submission is an overview statement of the City Plan description of the challenge regarding the Movement System – 5th Element of the City. City Plan is making the point that the CBD is no longer the sole activity and employment centre that it was 20 and more years ago when an arterial road network was adequate. Accordingly, the challenge, as defined in the City Plan strategic plan is to redevelop the movement system to cater to the new employment centres such as Australia Trade Coast and the Western Corridor among others. In providing a brief overview of this point the description of the arterial movement system as outdated is entirely appropriate.

The EIS statement is entirely objective because there is patently no connecting motorway from the Ipswich Motorway to the Gateway Motorway north of the river. There is agreement that the statement is not based on the findings of any publicly released transport planning study but it does not claim to have such a basis and any number of studies would not affect the veracity of the statement as it stands – there is 'no northern connecting motorway from the Ipswich Motorway to the Gateway Motorway'. The role of the Inner Orbital as the planned primary motorway from west to north is not impugned by Northern Link but the Inner Orbital is planned to meet the Bruce Highway at the northern extremity of the Gateway Motorway whereas Northern Link (with ICB and Airport Link) meets the Gateway Motorway near its midpoint, servicing a quite different sector of the transport task, to a fast developing employment centre.

B.11.1 Issue 6 – Brisbane Long Term Infrastructure Plan, 2007

The EIS Reference Project is not consistent with the Brisbane Long Term Infrastructure Plan, 2007 (BLTIP) because:

- It is acknowledged that the 'straight through' option addresses the BLTIP, but believes the Toowong Connection portion of the reference design is in conflict with BLTIP because Toowong will be significantly impacted in terms of identity, sense of place and local environment.
- If Northern Link facilitates the creation of a secondary freight route from the western corridor to the city and ATC, it would run through significant residential areas particularly along the Centenary Highway apparently contrary to BLTIP's goal of protecting residential amenity. Furthermore, the untolled Milton Road is forecast to continue to carry a high proportion of the freight movements to and from the motorway (when compared to Northern Link).
- The Toowong connection conflicts with plans for a Transit Oriented Development node in Toowong hindering development of pedestrian and cyclist facilities. Jephson Street has high potential for TOD developments and widening Jephson Street would conflict with this aim by creating a significant barrier to pedestrians wanting to access the transport and business centre.
- The proposed Toowong local access destroys a unique and historic "tin and timber" suburb that cannot be justified as being required for the greater public good, since the proclaimed benefits in terms of reduction in travel time are based on outdated methods that do not fully capture induced demand, because it fails to take into account changes in land use.

Response

Section 11.1.5 of the EIS discusses the BLTIP, which is Council's over-arching strategy document in terms of the city's long-term infrastructure needs. The BLTIP recognises the *TransApex* projects, including Northern Link, as a strategy for reducing cross-city traffic congestion within the CBD and inner and middle suburbs. A priority for *TransApex* projects has also been to address freight implications within suburban Brisbane. The BLTIP's freight strategy has a number of goals that could be potentially achieved for the study area as a result of the Project, including:

- protecting residential areas from impacts of inappropriate intrusion of freight; and
- providing more efficient road freight movement through better inter-modal and distribution facilities, and an appropriate network of arterial roads.

With removal of the Toowong local connection from the Project the issue of whether the Toowong connection may be in conflict with the BLTIP is resolved.

With regard to freight movement from the Western Corridor, the Centenary Highway is already a designated freight route (although heavy freight is directed to the north via the Brisbane Urban Corridor and the Gateway Motorway), and with the exception of B-Doubles and certain vehicles carrying dangerous goods, freight vehicles will not be excluded from using Northern Link. As referred to in Chapter 5 of the EIS (Section 5.2.8) there are no B-Double routes within the study corridor, so these are not an issue for Northern Link. As reported in the traffic modelling for the Project in Chapter 4 of this Report, traffic volumes on Milton Road are forecast to be reduced by up to 6% compared to the scenario without construction of the Project. Further, the argument that "a high proportion of freight movements" will continue to use Milton Road is not supported. For those freight movements with origins or destinations in the north or west, it is considered that the benefits in travel time savings of using Northern Link will outweigh the cost of the toll.

The EIS acknowledges that the proposed Toowong connection would have had an impact on the urban and residential environment in the immediate vicinity of the connection. While most freight vehicles coming from the Western Corridor would access Northern Link via the Western Freeway, some would likely have used Jephson Street – Croydon Street to access the tunnel, which would contribute to noise and loss of amenity as perceived by nearby residents. However, it is considered that any increase in heavy traffic using the Toowong Connection to access the tunnel would have been more than offset by the predicted reduction in heavy traffic volumes along Milton Road.

B.11.1 Issue 7 – BCC Urban Renewal Strategy – Milton Local Area Plan

The EIS acknowledges that the Reference Project would not only require road widening of Milton Road and Croydon Street, but also of Jephson Street, which is largely outside the Study Corridor. However, the EIS fails to comprehensively assess the impacts in this area outside the Study Corridor. This is problematic because such an assessment would have revealed incompatibility with BCC"'s own Urban Renewal strategy.

Response

As a consequence of the removal of the local connections, no road widening in Milton Road, Croydon Street or Jephson Street is required.

B.11.2 Planning Impact Assessment

B.11.2 Issue 1 – City West Impacts

The EIS refers to reduction of traffic on Milton Road, Countess Street, Petrie Terrace and some other local roads due to the Project. This seems improbable - the Kelvin Grove Northern Link portal is likely to increase traffic to the CBD through Countess Street and Petrie Terrace.

Strongly supportive land uses between the Kelvin Grove Urban Village and Normanby (as proposed by the City West Task Force) are important to encourage pleasant and safe pedestrian and cyclist movement to and from the city centre and to support the Normanby Bus Station. The EIS does not appear to consider the impact of its Kelvin Grove connection upon this transit node. That node becomes even more important with the likely decision that any new underground "metro" system would not come through Normanby (a recent and relevant study that does not appear to be mentioned).

In the proposed mitigation of impacts on the Kelvin Grove area, the base case appears to deal only in planting trees and other vegetation. While in some particular places that might be reasonable, there is a fundamental difference between that "cover it with planting" response and the "creating a new urban neighbourhood of pedestrian friendly streets and buildings with active frontages" proposal by the City West Task Force.

Some of the EIS drawings of the base case appear at odds with basic CPTED Principles as defined by the Government's own Guidelines document. It is not immediately clear that the EIS Report has considered this important community safety (and therefore social and economic sustainability) issue.

Response

Council has now decided to remove the local connections, including the Kelvin Grove connection, from the Project.

As a consequence, the Project will not directly impact land use in the Kelvin Grove / Normanby / Red Hill precincts. No changes would be required to the existing road layout, and no properties would need to be acquired.

The statement regarding CPTED principles is not related to any specific issues within the submission so the detailed reference is not clear. However, as mentioned in the EIS all designs have been developed in line with CPTED principles.

B.11.2 Issue 2 – SEQ Principal Cycle Network Plan

The affected sections of Milton Road and Kelvin Grove Road are future principal cycle routes according to the SEQ Principal Cycle Network Plan. Meandering footpaths are not a substitute for principal cycling routes. The EIS claims that road space in some parts of the study corridor, will be "freed up" to provide cycling facilities. However, as the EIS shows that traffic will increase regardless of the Project proceeding, it is unlikely that these facilities should be provided in the future. Restore bus lanes on Coronation Drive and introduce cycle lanes on Milton Road.

Response

The Project with the local connections removed, includes no works at all on Milton Road or Kelvin Grove Road so that the issue of the principal cycle ways on those main roads is no longer relevant to Northern Link.

B.11.2 Issue 3 – South East Queensland Regional Plan (SEQRP)

The EIS Reference Project is considered inconsistent with the SEQRP as the EIS does not recognise the Desired Regional Outcome for 'Community, Place and Identity' (DRO 6). By only presenting positive impacts and not negative impacts, the EIS presents a biased picture. When negative impacts are taken into account the proposed local access design is contrary to maintaining local connectivity and may lead to further deterioration of local connectivity. There are also numerous adverse impacts in relation to the 'sustainability' and 'strong communities' policy items.

Response

Under the SEQRP 2005-2026, the DRO for Strong Communities is "Cohesive, inclusive and healthy communities with a strong sense of identity and place, and access to a full range of services and facilities that meet diverse community needs." Within this DRO is the objective for Community, Place and Identity, with the guiding principle of managing "…urban growth and development to create, maintain and enhance a sense of community, place and local identity throughout the region."

With the removal of the local connections, the Project would largely maintain the status quo in Toowong, with a reduction of 6% by 2026 in the volumes of through traffic in the section of Milton Road between Frederick Street and Croydon Street compared to the scenario without construction of the Project.

B.11.2 Issue 4 – Sustainability

The Statements in Table 11.5 on the sustainability regional policy are considered to be fairly subjective and some belong against other policies, for example, "The Project would contribute to sustainability through improving accessibility to activities and services at both local and regional level". How would the project contribute to achieving less private vehicle trips? This is more a measure of sustainability. Dot points 2, 3 & 4 belong against the Integrated Transport Policy.

Response

The Project would contribute to Public Transport opportunities, improving surface congestion, etc. The tunnel would also allow vehicles to operate more efficiently, with less stopping and starting, and hence contribute to improved fuel efficiency and per-vehicle reductions in emissions.

B.11.2 Issue 5 – Planning Impact Assessment

Despite claims of reduced traffic as a result of the Reference Project, the EIS' own data indicate that traffic will still increase. Statements in the EIS do not provide adequate detail of specific, practical and measurable strategies to manage impacts. The Toowong connection option is clearly inconsistent with a range of statutory planning instruments and these inconsistencies have not been satisfactorily addressed within the EIS.

The EIS Reference Project with local access roads and ramps is not consistent with the Desired Environmental Outcomes of the Brisbane City Plan. The Project needs:

- to commit to improving public and active transport along Milton Road and Coronation Drive;
- to make it less difficult and more inviting to walk or cycle around Toowong;
- to commit to no net loss of community open space as a result of the Project; and
- to present greater detail in the specific development options for residual land following completion of construction.

When using the Brisbane Plan 2000's DEO assessment criteria to evaluate the costs and benefits of the Toowong local entry, it is clear the costs (natural environment, liveability, and health and safety) far outweigh the benefits (access). Such an assessment also reveals that there is a serious equity issue associated with this portion of the EIS Reference project in that the local community will be expected to carry the costs whilst communities further afield can expect some modest benefits.

Response

On balance, and having considered the submissions and other issues, Council has decided to proceed with the Project without local connections. This addresses the issues raised in the submission.

B.11.2 Issue 6 – Living in Brisbane 2026 – "Green and Active Transport"

The Brisbane City Council vision of "green and active transport" for the future local transport network in Toowong will be compromised for the movement of cyclists, wheel chairs, prams, micro electric vehicles and pedestrians wishing to travel from north Toowong across Milton Road by the building of the Toowong connection.

The EIS states that road works are exempt from the Demolition Code. While this may be true, it is inappropriate to imply that this is a justification for roadworks which should not be carried out at all.

A secondary access point at Toowong would lead to resumption and demolition of more than 100 properties, some pre-1900, that are considered worthy of preservation as Character Homes in the Brisbane City Plan 2000. Council is disregarding its own regulations in removing these character houses. The existing owners are not permitted to take such action on their own property.

The change to the Croydon Street area will be enormous. An 1880s house will have to be removed or demolished along with several other pre-1946 homes. There are no images of Croydon Street in the EIS showing what it will look like, similar to the examples of vantage point TC3 and TC4 on Milton Road.

Response

On balance, and having considered the submissions and other issues, Council has decided to proceed with the Project without local connections. This addresses the issues raised in the submission.

B.11.3 Existing Environment Land Use

No issues were raised in any submissions related to existing land use.

B.11.4 Land Use Impact Assessment

B.11.4 Issue 1 – Quinn Park, Local Service Station, Toowong

The EIS understates the adverse impacts on the amenity of Quinn Park. It neglects to identify the following impacts that may occur due to construction:

- loss of remaining park area temporarily given over to construction activities, including the building of a retaining wall separating Quinn Park from Milton Road;
- loss of trees and landscaping affecting the visual amenity of park users;
- loss of visual amenity in the surrounding area due to the construction activities;
- use of construction vehicles, heavy equipment use and construction personnel movement further inhibiting access to the park;

- loss of the use of the playground area;
- reduction in pedestrian and park safety due to construction vehicle activity in Quinn Park; and
- loss of available parking for park users due to potential use of Quinn Street for parking for construction workers.

Construction of the Toowong Connection would lead to the loss of half of Quinn Park and no conceivable landscaping or design action could mitigate the loss. A widened Milton Road will cause the loss of a green space barrier between local residents and Milton Road. While it is noted in the EIS that the park will be extended to Croydon Street with improvement to park amenities, it will not compensate for the impacts from the additional traffic noise from Milton Road.

The service station near the corner of Milton Road and Frederick Street will be removed and no alternate site for a service station in Toowong has been included. Loss of the service station will result in increased travel time to a service station and increased inconvenience, including to cemetery staff, FOTC and visitors, as it is the only convenience store within walking distance of the cemetery. The loss of local services, namely the service station, liquor store and part of the Baptist Church represents a major loss of amenity for local residents.

When local adverse impacts of changed traffic flows are considered, key objectives of the Draft Transport Plan 2006 - 2026 are not met. The EIS traffic modelling does not consider in any detail adverse impacts at the local level. Issues such as the removal of the Caltex service station are only considered in terms of loss of convenience, not impact on traffic.

Response

The Project without local connections requires no encroachment into Quinn Park. The park would remain in its existing condition and there would be no change to local access, or to the facilities situated within the park. The local Caltex service station on Milton Road will not be directly impacted by the Project.

B.11.4 Issue 2 – Resumption of Character Housing

The strategic need to create an efficient link between the Western Freeway at Toowong and the Inner City Bypass at Kelvin Grove that takes traffic off surface streets is supported. However, the Toowong Connection and the associated property resumptions in the Valentine Street, Milton Road and Croydon Street precincts, would lead to significant disruption of the local community. An alternative design or the "straight through" option should be adopted.

The resumption of a large number of properties undervalues homes and lives. Residents affected are unsure of whether their house will be resumed and can no longer sell for a reasonable price. There is also uncertainty for residents from whom only part of the property may be required.

The Toowong Connection would lead to the resumption of more than 100 properties and permanent disruption to the lives of potentially hundreds of people, in many cases elderly people with longstanding and significant local community connections, whose lives could not be re-established elsewhere in the same way.

Technical Report 11 Planning and Land Use on page 47 describes some of the properties to be resumed as in "various states of repair, with some appearing to have undergone recent renovations or are well maintained and are generally in a good state of repair, while some appear to be in bad repair." By saying some properties are in a good state and some properties are in "bad repair", it infers that

approximately half of the houses in the area are in each of these states. In reality, only one of two houses on Milton Road next to the Service Station could be called of lesser street appeal and none of the houses appear to be in "bad repair."

Response

With the removal of the local connections, the property requirements for the Project are greatly reduced as shown in **Table B-48**. The number of properties for which volumetric title would now be required for the Project is 374 (compared to 614 in EIS).

- **Table B-48 Surface Resumption Impacts**

	State Owned		BCC Owned		Privately Owned		Total	
Location	**EIS**	**Project**	**EIS**	**Project**	**EIS**	**Project**	**EIS**	**Project**
Kelvin Grove/Herston	4	4	8	4	30	-	42	8
Mt Coot-tha/Toowong	1	1	7	4	66	-	74	5
Total	5	5	15	8	96	-	116	13

B.11.4 Issue 3 – Redevelopment of Residual Land Areas

The proposed redevelopment of land, acquired for the EIS Reference Project but left vacant at end of construction, into townhouses or three-storey multi-unit developments, as suggested in 11.8, conflicts with other sections of the EIS that proposed such land as public space. A new park on the corner of Milton Road and Croydon Street opposite the shops can link into existing playing fields and open space but has poor urban interfaces and is hidden behind a high acoustic wall.

The parks provided by the roadworks are in residual spaces left over after the road construction in undesirable locations next to the road infrastructure.

Response

There is minimal residual land as a result of the Project. The balance of the Western Freeway worksite not required for operation of the Project will be returned to open space.

B.11.4 Issue 4 – Milton Road – South Side Residences, East of Croydon Street

The only reference to properties between 512 Milton Road and the shopping centre at Croydon Street is in the fourth paragraph on page 11-40, “East of Croydon Street, access to properties on the south side of Milton Road would be temporarily relocated to permit the widening of the roadway. This includes the commercial properties on the corner of Croydon Street, the Toowong Private Hospital, and a small number of residential properties”. However, there is no mention of land acquisition, only temporary relocation of access to Milton Road although 512 Milton Road isn't even in this category since it has back access to Cadell Street via a right of way easement. Are any or all of these properties to be resumed wholly or partially for the Project? The land use plan shows that these people outside of the study corridor will lose part of their land.

Response

The Project without local connections, as now proposed, will not directly impact on Milton Road east of Croydon Street, so resolving this issue.

B.11.4 Issue 5 – Kelvin Grove Urban Village

The importance of the Urban Village as an activity centre is mentioned in the EIS but not when the EIS Reference Project's negative impacts are discussed. The negative impacts in the Kelvin Grove area seem to be considered only in terms of the amenity of immediate residential communities. The EIS fails to mention the substantial tertiary and secondary educational and office uses which give the Urban Village its significance.

The Urban Village will derive no benefit from the greater car access to its front door because its urban planning has sought to manage private car access and to pursue pedestrian, cyclist and public transit accessibility. The theoretical advantage of greater accessibility by the tunnels is at best of no consequence and at worst a significant problem if it generates not only lost amenity but also both greater congestion on Kelvin Grove Road and demands for more parking in the Village.

Response

With the removal of the Kelvin Grove local connection, the Project will have minimal effect on the Kelvin Grove Urban Village.

Traffic modelling of the Project reported in Chapter 4 of this Supplementary Report show reductions in average weekday traffic in 2026 compared to the scenario without Northern Link on Kelvin Grove Road (-3 to -7%), Musgrave Road (-9%), College Road (-1%), Petrie Terrace (-10%) and Countess Street (-7%). By comparison, these roads were forecast to experience increases in traffic with the EIS Reference Project.

B.12 Cultural Heritage

B.12.1 Description of Existing Environment

B.12.1 Issue 1 – Milton Brewery

The Milton Brewery is identified as having heritage significance, and is the subject of the *Planning (Urban Encroachment – Milton Brewery) Bill 2008* which, if enacted, will seek to "protect the existing use of the Milton Brewery from encroachment by, and the intensification of, other development". The submission notes that the EIS identifies the Milton Brewery as being significant in the development of this part of the Study Corridor, but has not been addressed in the context of this Bill.

Response

The comment in regard to the *Planning (Urban Encroachment – Milton Brewery) Bill 2008* (now the Planning (Urban Encroachment - Milton Brewery) Act 2009) is noted. However, the Brewery is not situated directly within the Study Corridor, and subsequently the Project is not located in close proximity to the brewery. The Project is not likely to impact on the cultural heritage significance of the place, or have implications for the *Planning Bill*.

B.12.1 Issue 2 – Aboriginal Cultural Heritage

It was submitted that under Section 23 of the *Aboriginal Cultural Heritage Act 2003*, an assessment of the proposed activity against the duty of care guidelines will help determine whether or to what extent Aboriginal cultural heritage may be harmed by the proposed development. A person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage (the "cultural heritage duty of care").

Response

The EIS in Chapter 12, Section 12.1.6 identifies locations and places having known or potential Aboriginal cultural heritage significance. This section of the EIS also identifies the mitigation measures that would be required to be implemented to manage Aboriginal cultural heritage during the construction of the Project. The mitigation measures include the proponents' obligation to negotiate a Cultural Heritage Management Plan (CHMP) or Indigenous Land Use Agreement (ILUA) with both the respective Aboriginal parties having an interest in the Project.

The process of engaging the relevant Aboriginal Party (including both the Turrbal People and the Jagera People) commenced during the preparation of the EIS. Both parties were engaged to prepare a Cultural Heritage Report in respect of the Project and its potential impacts in the areas for which each of the parties has an interest. Responses were received and the recommendations of both parties have been documented in the EIS.

B.12.2 Impact Assessment

B.12.2 Issue 1 – Impacts on Local Character and Character Housing, Toowong

The secondary connection to Milton Road would lead to demolition of properties in Croydon Street, Milton Road, Morley Street, St Osyth Street, Sylvan Road and Valentine Street identified in the Brisbane City Plan 2000 as Character Places. A number of submissions have raised concerns regarding the potential loss of individual character houses, or the potential loss of character in Toowong. This includes the issue of the loss of half of Quinn Park, which is seen as being integral to local history and

contributing to the character of the locality. Community submissions have suggested that through the loss of character homes, the EIS Reference Project would reduce the attractiveness and liveability of the area; that the area "should be a tourist destination, not a concrete jungle"; and that the only mitigation measure available is "to not proceed with this development option."

A number of these submissions pointed out that the proposed resumption and demolition of character housing is in direct contradiction of Council's demolition control policies and procedures for character areas under City Plan 2000. It is suggested by some community members that the only feasible option to mitigate the potential impacts on the character of Toowong is to remove the Toowong connection from the EIS Reference Project.

Response

This issue is resolved by the removal from the Project of the local connections at Toowong and Kelvin Grove which will mean that no residential or commercial properties in Toowong need to be resumed for the Project.

B.12.2 Issue 2 – Driven Tunnels – Impact on Toowong Cemetery

Concerns were raised regarding the potential impact on Toowong Cemetery of vibration from tunnel construction, and the potential for settlement post-construction. Concerns were raised that there is potential for damage to graves and monuments resulting from vibration and/or settlement, particularly where the depth to tunnel is shallowest. As many of the monuments are not well founded, a condition survey should identify where physical support may be required prior to the tunnelling operations - the type of support proposed should be discussed with DERM. A further survey at the completion of the works will determine remedial works required. The necessity for remedial works in the cemetery will provide an opportunity for consideration of long term conservation and interpretation needs of the cemetery.

It was noted that settlement is a major cause of monument damage in cemeteries, and that settlement from tunnel construction will exacerbate a known issue.

Submissions have requested that continuous monitoring of vibration be carried out during construction of tunnels beneath the cemetery, and that settlement be monitored throughout the cemetery after construction is complete. Further, it has been requested in some submissions that many graves and monuments are already in delicate structural condition therefore necessitating a pre-emptive protection strategy such as underpinning. Adequate financial provision for reparation needs to be made from the outset.

The EIS states that: "the duration of maximum vibration levels [that would occur in Toowong Cemetery] would be less than one day". This is a gross misrepresentation as the duration to construct the launch chamber under the cemetery is likely to be some weeks, certainly not one day.

A submission raises a concern regarding "apparent encroachment upon the cemetery."

Response

The issue of potential construction impacts on Toowong Cemetery is addressed in EIS Section 12.2.3. The EIS acknowledges the fragile condition of many of the graves and monuments in the cemetery, and the risk of further damage being caused by vibration. Vibration mitigations are therefore described at length, including actions to be taken prior to and during construction. As discussed in the EIS, there is a range of possible measures that could be implemented to prevent further damage to vulnerable items,

and the actual strategy adopted will depend on the tunnel construction method and the actual levels of vibration generated.

Settlement is also discussed in this section of the EIS, and predicted settlement contours are illustrated (for Toowong Cemetery) on the drawing EIS-SC-01 in EIS Volume 2: EIS Reference Design. As shown on the drawing EIS-SC-01, very small areas of the cemetery are likely to experience settlement in excess of 10 mm. In all other areas of the cemetery along the proposed tunnel alignment, settlement would be less than 10 mm. In relation to individual graves and monuments the nature, extent and rate of settlement is considered unlikely to result in any structural damage to items within the cemetery.

The TBM launch chambers at the western connection (i.e. adjacent to the Western Freeway) would be constructed outside the boundaries of the cemetery, and it is most likely that the TBMs would be assembled within the Western Freeway worksite, and then 'walked' to the TBM portal which would be located at the property boundary of the cemetery. Therefore, construction of TBM launch chambers is highly unlikely to result in any vibration that might cause damage to graves or monuments in the cemetery.

Aside from volumetric acquisition below ground, the Project would not encroach upon the cemetery. All surface works would take place outside the cadastral boundary of the cemetery.

B.12.2 Issue 3 – Access to Toowong Cemetery

The Toowong connection will reduce access to the cemetery, divide one of the oldest communities in Brisbane and further isolate the Toowong Cemetery from its original town centre. The 'straight through' option would create the maximum benefit to the cemetery, with a reduction in traffic in front of the main gate thus providing safer entrance for slow moving vehicles.

Vehicle access to the cemetery will be disrupted during construction due to the multiple changes at the Mount Coot-tha roundabout. Suggested that formal pedestrian crossings be added across Milton Road and Frederick Street near the Milton Road roundabout, and that adequate signposting direct traffic to the Cemetery's main entrance, or alternate entrance on Richer Street.

Response

The removal of the Toowong Connection from the Project avoids the issue of the perceived reduction in access to the cemetery expressed in this submission and will provide the perceived access improvements ascribed to the straight through option in the submission.

Public access to the cemetery would not be impeded during construction. Appropriate signage would be erected to inform visitors of alterations to the cemetery's ingress or egress particularly relating to interruption of traffic flows along Mt Coot-tha Road during the construction of the cut and cover section of the western tunnel portal. Toowong Cemetery would not be used as a means of access to construction sites, nor would it be used for any storage of construction materials.

B.12.2 Issue 4 – Crows Ash Memorial, Toowong

Submissions have noted the likely loss of the memorial tree at the corner of Milton Road and Sylvan Road, Toowong, which commemorates the 100th anniversary of the landing of John Oxley on the Brisbane River nearby. It is suggested that the tree is a significant landmark which should not be cut down, and that placing a plaque on a cement barrier would be disrespectful.

Response

The issue of the Crows Ash memorial tree in Toowong is resolved by the removal of the Toowong local connection from the Project.

B.12.2 Issue 5 – Vibration Impacts, St Brigid's Church and Convent

Some sections of St Brigid's Church are currently being re-pointed and this will mask pre-existing cracks in the brickwork. The condition survey should take note of earlier condition reports that may have recorded defects, which may indicate weak points in the brickwork that should be monitored.

Response

As discussed in EIS Section 12.2.3, predicted surface vibration levels from tunnelling at St Brigid's Church would be in the range of 0.7 to 2.4mm/sec (Chapter 9, Noise and Vibration), while the Guide Value for cosmetic damage for heritage listed buildings is 2mm/sec. Vibration is likely to be perceptible, and although the predicted vibration level exceeds the Guide Value, the risk of cosmetic or structural damage remains low. As a mitigation strategy, the EIS recommends that the Church's custodians be notified prior to the 'arrival' of the TBM beneath the property, and that vibration monitoring be carried out during the period when vibration levels are likely to be highest. It is also recommended in this section of the EIS that a building condition survey be carried out prior to construction commencing.

B.12.2 Issue 6 – Toowong Cemetery – Impacts of Dust Fallout

No mitigation measures are detailed for memorials in Toowong Cemetery affected by increased dust fall from activities at Mount Coot-tha Quarry.

Response

Monitoring of dust levels in the vicinity of construction worksites and the quarry, including at the cemetery, would occur throughout the construction phase and appropriate dust control measures would be implemented at the quarry site. Dust itself is not considered likely to cause any long-term damage to graves or monuments. Any tunnel spoil handled through the Mount Coot-tha Quarry would be managed by the quarry under the terms of the quarry's existing operating conditions and licensing. The Quarry operates as a licensed 'environmentally relevant activity' (ERA) and would continue to do so. The conditions on the Quarry's licence include controls on dust emissions, and continuous monitoring of dust in surrounding localities, which requirements would continue for handling the spoil from the Project.

B.12.2 Issue 7 – Communication with Friends of Toowong Cemetery during EIS

The EIS states that "no written submissions or correspondence has been received from the Friends of Toowong Cemetery, in relation to vibration or any other issue of relevance." However, a representative of Friends of Toowong Cemetery has attended a number of CRG meetings and has expressed concerns. It is not apparent that these concerns have been acknowledged or addressed in the EIS. Such attendance at CRG meetings does not indicate indifference.

Response

Friends of Toowong Cemetery's concerns regarding the Project's potential impacts on Toowong Cemetery through vibration and settlement have been considered, in EIS Chapter 12 and also in EIS Chapter 9 (Noise and Vibration). In Chapter 12 these concerns are addressed in Section 12.2.3 as

referred to under Issue 2 above. Chapter 9 makes numerous references to the cemetery and discusses the potential vibration impacts and issues in some detail. Mitigation measures as recommended in Chapter 9 and Chapter 12 reflect these concerns and in large measure reflect the wishes of the Friends of Toowong Cemetery as communicated through CRG meetings and the written submission received during the EIS exhibition period.

B.12.2 Issue 8 – Tunnel Construction – Grout

Grout may emerge on the surface of Toowong Cemetery in areas where the cover is minimal during the very early stages of excavation. Such grout fills voids. In the case of the cemetery, this may include cavities in some graves and some grout may find its way to the surface.

Response

Grouting within the mainline tunnel in the vicinity of the Toowong cemetery will be undertaken behind the installed permanent support (segmental lining or cast in-situ concrete lining). The purpose of the grout is purely to fill the annulus (void) between the excavation and the permanent support and as such, grouting for this purpose is only installed under low pressures. These low pressures will be lower than the overburden pressure from the weight of soil/rock above the tunnel, and therefore grout will not emerge on the surface of the Toowong Cemetery, nor within graves.

B.12.2 Issue 9 – Positive Outcomes

The EIS states [p12-23] that “On completion of the project, the expected traffic volumes along Frederick Street…. would provide visitors with a more tranquil environment." This is a misrepresentation. Traffic volumes and exhaust emissions will be greatly increased at the southern end of Frederick Street due to traffic on the adjacent ramps providing access to the tunnel. Only some parts of the Cemetery adjacent to Frederick Street may benefit from reduced traffic volumes (if in fact the traffic modelling is accurate).

Response

The full statement from the EIS was – “On completion of the Project, the expected reduced traffic volumes along Frederick Street and Mt Coot-tha Road would provide visitors to Toowong Cemetery with a more tranquil environment due to the reduction in noise and vibration from passing traffic. Additionally, the effect of exhaust emissions on the monumental masonry would be reduced. Pedestrian access to the main entrance of the cemetery would also be enhanced due to changed traffic volumes on Frederick Street and Milton Road”. When taken in context we do not believe that this is a misrepresentation and we stand by the traffic modelling as provided in the EIS and as further addressed within this Supplementary Report.

Removal of the Toowong local connection including the bridge structures adjacent to Frederick Street from the Project will significantly mitigate this issue as a reduction of 9% in 2026 traffic volume compared to the scenario without the Project constructed is forecast on Frederick Street from traffic modelling for the Project reported in Chapter 4 of this Supplementary Report.

B.13 Social Environment

B.13.1 Introduction

B.13.2 Description of Existing Environment

B.13.2 Issue 1 – Social Impact Assessment (SIA) Methodology

A submission suggested that the EIS does not provide the methodology it used to identify and evaluate the benefits and impacts of the social environment and that the Supplementary Report should rectify this so that proper scrutiny of the procedure can be undertaken. A submission also suggested that a full assessment of the current social networks and pathways should be undertaken.

Response

The method for assessing social impacts is outlined in the EIS (Volume 3, Technical Report No. 13, Section 1.3). Key stages of the SIA included scoping of issues, documentation of the existing environment, identification of potential benefits and impacts for particular communities, including an assessment of their magnitude, duration and likelihood, and identification of mitigation strategies to enhance benefits of the EIS Reference Project and avoid or minimise impacts.

The SIA provided a detailed assessment of the existing social conditions of the study corridor, including existing community networks, and social and community impacts of the EIS Reference Project. These are presented in Chapter 13 of the EIS and Technical Report No. 13.

B.13.2 Issue 2 – Barriers to Pedestrian Movement

The EIS (Volume 3, Technical Report No 13 Social Environment, Section 2.4.1 Accessibility and Connectivity, page 2-31) misrepresents the impact and extent of the rail line, of Coronation Drive and of Milton Road in impeding connectivity in Toowong, Milton and Auchenflower, and that it is an easy walk from all directions of Toowong and surrounding suburbs to access the Bicentennial Bikeway, Regatta Ferry Stop, Toowong railway station and Toowong village. That Milton Road and Coronation Drive are barriers to pedestrian and cycle connectivity overstates the impact on access and connectivity in and around Milton and is used as a justification for the inclusion of the Toowong connection.

Response

The EIS does not misrepresent or overstate existing barriers to pedestrian and cycle connectivity of the railway line and major roads in the study corridor. The railway line restricts east-west movement within the study corridor by allowing crossing in particular locations only.

As outlined in the Technical Report No 13, issues were identified about existing traffic levels and local movement between residential areas and Toowong Cemetery across Frederick Street and across Milton Road to Toowong State School, local shops and public transport facilities.

B.13.2 Issue 3 – Demographics

A number of submissions raised the issue that some statements in the Technical Report No. 13 (p 2-16) make it sound like Toowong is occupied by a transient population of renters and that there are low numbers of families and children in the study area. The submissions suggest that in reality, the area of Toowong with apartments is in the vicinity of Toowong Village and between Coronation Drive and the railway line and that the parts of Toowong to be impacted by the project consist mainly of retirees, families and couples in free standing Queenslander houses, with a higher proportion of owner occupiers and a lower property turnover rate than Toowong in general.

Some submissions also suggested that the exclusion of West Toowong from the study corridor and the fact that the EIS states that there is a lower proportion of family households and high population mobility, demonstrates a significant lack of understanding (within the EIS) of the true community nature in the West Toowong area.

A submission identified an inconsistency between the study area's estimated resident population (57,291 people) in 2006 reported in the EIS with the figure given in Technical Report No. 13 (59,897 people).

Response

The demographics presented in the EIS were based on Australian Bureau of Statistics (ABS) defined State Suburbs, which included that part of Toowong adjacent to the Western Freeway. The data presented in the EIS is principally based on the ABS Census of Population and Housing 2006. The ABS data indicates that overall, Toowong has:

- lower proportions of children and higher proportions of older people compared to the study corridor as a whole;
- slightly lower proportions of family households with children compared to the study corridor as a whole;
- higher proportions of people who speak a language at home other than English; and
- higher proportions of attached housing.

It is recognised that Toowong is a large and diverse suburb, and that population and housing characteristics vary across the suburb. For example, the EIS states that Toowong has a mix of low density character housing and medium-high density housing, with higher densities generally adjacent to the transport corridors and Toowong Centre (Technical Report No. 13, Section 2.5).

In relation to the Study Corridor population, the figure reported in the Technical Report No. 13 is correct. The discrepancy does not change the findings of the social impact assessment.

B.13.2 Issue 4 – Existing Community Cohesion

A submission raised the issue that the EIS did not appear to provide any data to support the (subjective) statement that 'levels of community cohesion in the study corridor are generally likely to be healthy, but are expected to vary across the study corridor' (p13-19).

Response

Community cohesion refers to connections and relationships between individuals, groups, and neighbourhoods[15]. It includes values such as trust between local people, networks that support community development (i.e. school communities and church congregations), and practices (i.e. volunteering) related to those values and networks. Cohesion is encouraged by the existence of local community facilities, a sense of local identity and belonging, population stability, and opportunities for community participation.

[15] McCracken, M. 1998 Social cohesion and macroeconomic performance, Centre for the Study of Living Standards Conference, Ottawa, Ontario

The statement about levels of community cohesion in the study corridor is supported by quantitative and qualitative data presented in the EIS (Chapter 13 and Technical Report No. 13) including information on:

- access to community facilities and services and meeting places which support local social cohesion;
- community networks that foster relationships, trust and joint effort;
- proportions of people who volunteer for an organisation or group compared to Brisbane; and
- levels of residential mobility.

In addition, information gathered from community feedback during the consultation process also indicated a strong sense of community cohesion and shared social networks, particularly amongst longer term residents and around hubs such as schools, sporting clubs, neighbourhood centres, churches and other community-based organisations.

B.13.2 Issue 5 – Existing Community Values

A submission suggested that the comment in Section 13.2.3 of the EIS about existing community values relating to accessibility and connectivity *'in particular, increased traffic congestion on Milton Road and Coronation Drive has resulted in delays to peak period bus travel and commuter traffic…*' requires expansion to highlight that removal of bus priority lanes in Coronation Drive has also contributed to bus delays and the overall congestion problem in this corridor. In addition, the existing community values should also discuss impact on bus travel and commuter traffic of the removal by Brisbane City Council of the tidal flow system.

Response

A detailed assessment of existing traffic and transport conditions in the study corridor, including on Coronation Drive, is provided in Chapter 5 of the EIS (Traffic and Transport) and further discussed in this Supplementary Report (Chapter 4).

B.13.3 Social Impacts

B.13.3 Issue 1 – Local Benefits for Toowong Community

A number of submissions suggested that the Toowong connection would not provide any benefit to the Toowong community, but instead will fracture access and impact on amenity for residents. A submission also identified concerns that the EIS does not address the impact on the social needs of the residents and questions where the EIS Reference Project's benefits are outlined.

A submission identified an issue that the Toowong community, including its valued character, heritage, sense of place and sense of community, would be profoundly impacted upon for what is an absolutely marginal benefit (i.e. -3%) to future traffic conditions on Milton Road and Coronation Drive combined. This benefit is within the typical range of modelling error so is questionable. The submission concludes that the primary proponent (i.e. Brisbane City Council) is keen to pursue the local connectors to attract more traffic through the tunnel, making the project more attractive to the private sector to enter a Public Private Partnership arrangement.

Response

Chapter 13 and Technical Report No. 13 of the EIS outlines a range of social benefits of the EIS Reference Project, including amongst other things, the potential for the EIS Reference Project to improve:

- the amenity of some local streets and neighbourhoods through by reducing traffic and rat running in the study corridor;
- access to community facilities including local and regional health and medical services and education facilities;
- improving local amenity through local road closures and turn bans; and
- improve travel times and access for residents and businesses in Toowong, Auchenflower and St Lucia to Brisbane Airport and Brisbane's northern suburbs, and key employment centres such as the ATC and CBD.

However, the chapter and technical report also recognises that the EIS Reference Project would have a number of impacts both during the construction and operation phases for local residents and that the EIS Reference Project would have introduced significant and long term changes to the local community in the vicinity of the Toowong connection that would be perceived by the local community as detrimental impacts on their quality of life and amenity.

With the decision to remove the Toowong connection, some of the benefits for local residents, such as improved travel times and access to Brisbane Airport and Brisbane's northern suburbs are reduced. However, the removal of the Toowong connection would also reduce a number of the construction and operation impacts identified in the EIS for residents in those neighbourhoods that were to be near worksites and surface works.

B.13.3 Issue 2 – Noise Barriers

While it was raised in a number of submissions that noise barriers provide acoustic benefit, issues were raised in submissions about the impact of noise barriers, particularly in relation to the Toowong connection. This included concerns that noise barriers:

- will impose significant social dislocation and disruption to community life and divide the community, inhibiting access including to schools and local amenities (i.e. Cat and Fiddle, Morley Street businesses) and making it more difficult to cross the road;
- will create security issues by removing visibility; and
- are visually unattractive and will be a visual 'scar' on Milton Road and Croydon Street.

Concerns were also raised that residents near Croydon Street will feel like being 'corralled' by sound barriers and those residences on the other side of Croydon Street to the noise barriers would need to cope with the extra reflected noise. A submission also questioned whether noise barriers would be required on both sides of Croydon Street, creating an artificial canyon.

The need to find alternatives to the unsightly noise barriers to preserve the interconnection of community members locally was also identified.

Response

With the removal of the Toowong connection, noise barriers would no longer be required at Croydon Street, avoiding the potential impacts identified in submissions.

As identified in Section 13.4.1 of the EIS, the design and positioning of noise barriers will need to consider access and connectivity for local communities and visual amenity of neighbouring properties. As part of this, consideration will be given in to Crime Prevention through Environmental Design principles, particularly in relation to visual surveillance and legibility.

Section 14.7.2 of the EIS identifies the need for vegetative screening to be provided to sound barriers and/ or provide access to views and vistas of the surrounding area using transparent materials. The use of transparent materials will help to reduce security risks and also ensure that residents do not feel 'corralled' by the noise barriers. Section 9.5.3 provides an overview of alternative mitigation strategies to reduce road traffic noise impacts, including road surface treatments, architectural acoustic treatment of existing dwellings, resumptions, urban renewal measures, vehicular speeds and reductions in vehicle noise emissions.

B.13.3 Issue 3 – Access to Community Facilities at Toowong

A number of submissions suggested that the project will greatly impede or inhibit local access, particularly for pedestrians and cyclists, to important local community services and facilities at Toowong, such as the Cat and Fiddle shopping centre, petrol station, Toowong Village, Toowong Cemetery, Quinn Park, Anzac Park, Toowong State School, Botanic Gardens, Mt Coot-tha, churches, public transport facilities (rail stations, bus stops and ferry terminal).

In addition, some submissions identified issues that the EIS Reference Project will:

- increase the amount of time it takes to travel to the Toowong Village;
- isolate the Toowong State School and shops from the community;
- cause a loss of amenity to the Toowong shopping and business area as it will become a tiny island surrounded by busy crowded roads, resulting in no one wanting to walk to the shops; and
- cause major disruption to the neighbourhood, creating accessibility problems with important community services.

Response

With the removal of the Toowong connection, existing access arrangements to local community services, facilities and amenities are unaffected by the Project.

B.13.3 Issue 4 – Access and Connectivity at Toowong Connection

Potential impacts on local access and connectivity in the vicinity of the Toowong connection were identified in a number of submissions. In particular, concerns were raised that the connection will fracture and divide the community and act as a barrier to connectivity, resulting in a significant loss of connectivity for local residents, and that not providing the local access would be the solution to these issues. Specific issues relating to local access and connectivity at Toowong included:

- the Toowong connection would make the crossing of Milton Road and Croydon Street more difficult and that there is a lack of pedestrian and cycle crossing points in Milton Road and Croydon Street;
- it is important that safe crossing opportunities of Milton Road and Croydon Street is maintained or enhanced, particularly given local pedestrian and cycle traffic generators such as the Toowong Primary School;
- the project would cause an increase in accidents and a higher risk to children crossing roads, particularly as there are many schools where the project is located;
- the project fails to address connectivity in the provision of crossing roads and that the connection does not provide an overpass or underpass or pedestrian crossing across either Milton Road or Croydon Street, requiring people to walk 200 m and wait for six changes of lights in order to make a crossing of Milton Road;

- the two-lane left turn from Croydon Street into Milton Road would pose a significant safety risk for cyclists seeking to get across into Morley Street on the northern side of Milton Road;
- absolutely no improvement is provided to safe pedestrian crossings at the Toowong roundabout;
- access to and from St Lucia could be achieved by current routes or entering the tunnel via the freeway at other sites; and
- the closure of Valentine Street limits permeability.

A number of submissions also identified that the part of Toowong north of Milton Road is cut off from the original town core by Milton Road and the Frederick Street roundabout. Submissions suggest that the Northern Link provides an opportunity to address this problem, however, the Toowong connection would increase this separation.

A submission also suggested that given the existing Milton Road outbound bus stop will be removed, pedestrians will avoid walking back to Milton Road, to the only (albeit cumbersome) designated crossing, and will instead make unsafe crossings.

Some submissions identify issues that the Toowong connection will result in much less safe and convenient access to the Morley Street/ Gregory Street area from the Bicentennial Bikeway, Western Freeway Bikeway and the new Toowong pedestrian/ cycle overpass. Concerns were also identified that the connection would restrict access to Sylvan Road and that walking to different locations in the area will no longer be a viable or pleasant way to get around.

A raised an issue that the EIS does not include any reference to the removal of access to the cycle overbridge and how the level of service would be maintained during construction. In particular, the submitter is concerned that any impacts to the bikeway be minimal and that alternative routing arrangements be put in place to minimise disruption to cyclists and pedestrians. The submission also requested that the period of 'temporary disruption' of the Western Freeway bikeway in Anzac Park be defined.

Response

With the removal of the Toowong connection, the impacts identified in submissions with respect to pedestrian and cycle access and connectivity in the vicinity of Milton Road, Sylvan Road and Croydon Street as a result of the Project are avoided.

The EIS (Volume 1, Chapter 5, Section 5.7.7) indicates that the Western Freeway pedestrian/cycle overbridge would be maintained during construction. However, some temporary closures may become unavoidable given the proximity of the structure to the construction works and complexity of the works in that area. The EIS further indicates that wherever possible such closures would be restricted to night time works when the overbridge would be least in use and that sufficient public notification of any such closure would be given. The exact duration of any such temporary closure would be determined during the detailed design phase.

B.13.3 Issue 5 – Pedestrian and Cycle Access at Kelvin Grove

A concern was raised that elderly residents of Aldersgate Court in Upper Clifton Terrace and many other locals walk down to the end of Upper Clifton Terrace and cross at the lights to the new shopping complex in Kelvin Grove. It was suggested that the proposed worksite will treble the distance elderly residents will need to walk to get to shops as many do not have cars.

The project severely reduces local connectivity and severs communities. In particular, the submission identifies the following issues:

- the EIS has not addressed connectivity between Kelvin Grove and Normanby Bus Station;
- the north bound bus stop on Kelvin Grove Road near Kelvin Grove Urban Village would be unsafe;
- the intersection of Kelvin Grove Road and Northern Link is complicated for pedestrians and cyclists to negotiate and lengthens pedestrian and cyclist routes;
- connections are closed to Upper Clifton Terrace and Lower Clifton Terrace, reducing permeability and that cul-de-sac are not desirable;
- the combined effect of changed traffic arrangements on Victoria Street and closures of other streets mean that local trips will be forced to circumnavigate the mega-block between Prospect Terrace and the Normanby intersection, increasing the length of local trips;
- it is essential that the pedestrian overpass to Brisbane Grammar playing fields is not compromised and remains open at all times; and
- the land bridge (near Brisbane Grammar School) over the Inner City Bypass and the rail corridor would need to be extended to accommodate the project.

Response

With the decision by Council to remove the local connections, the issues of pedestrian and cycle access and connectivity west of and along Kelvin Grove Road as affected by the EIS Reference Project are no longer existent. The pedestrian overpass to Brisbane Grammar playing fields will not be compromised and access will be maintained. There would likely be some temporary changes to the alignment of the pedestrian and cycle access to the playing fields beneath the INB overbridge however access would be maintained during construction. The Project is not anticipated to affect the land bridge over the Inner City Bypass and the rail corridor.

B.13.3 Issue 6 – Impact on Character Housing at Toowong

Some submissions suggest that while the EIS states that Toowong has 'a mix of low density character housing and medium-high density housing, with higher densities generally adjacent to transport corridors and the Toowong Centre' (Technical Report No. 13, Section 2.5), the greatest impact of the project will be along Croydon Street, Milton Road and Frederick Street. These corridors do not contain high density housing, but are mainly low density, detached dwellings with many 'tin and timber' and character homes.

Other submissions also identified that many historic and heritage homes will be demolished or impacted by the project, including many pre-war homes, and that Toowong is a close knit, vibrant community that enjoys the history of its past. As such, the project is contrary to the urban community. Some community members also identified concerns that the suburb would gradually become run-down and that character housing will deteriorate and lose value.

Response

With the removal of the Toowong connection, the issues relating to the local character at Toowong are resolved, including issues regarding loss of open space and impact on the Crow's Ash monument.

B.13.3 Issue 7 – Impact on Local Character at Toowong

The potential for the Toowong connection to divide Toowong, which was identified as one of Brisbane's oldest and most character-rich suburbs, was also raised in a number of submissions. In

particular, issues included the loss of open space and significant landmarks such as the Crow's Ash monument and memorial tree, further isolation of the Toowong Cemetery from its original town core, and disruption to the social fabric and historic character of Toowong by having the suburb dissected by major road infrastructure. Some submissions suggest that putting an access tunnel through Toowong is not in keeping with Council's desire to protect character suburbs.

A submission also raised concerns that the EIS acknowledges that a Toowong tunnel connection would bring about irremediable losses in trees and green space, and architectural character and communities which need to be preserved in the inner city.

Response

With the removal of the Toowong connection, the issues relating to the local character at Toowong are resolved, including issues regarding loss of open space and impact on the Crow's Ash monument.

B.13.3 Issue 8 – Impacts on Local Amenity and Liveability at Toowong

Some submissions raised issues that the tunnel and Toowong connection will impact on the aesthetics and attractiveness of Toowong, decrease the liveability of the suburb due to impacts on air quality, noise levels and increased traffic, and impact on the quality of life for Toowong's residents. In particular, concerns were raised that:

- Croydon Street, Jephson Street and Sylvan Road would become uninhabitable and the Regatta Hotel Precinct would be ruined;
- the EIS Reference Project's resulting increase in traffic on Croydon Street in 2026 of 60%, would destroy the very liveable community;
- Croydon Street should remain four lanes;
- the residential amenity of Valentine Street will be destroyed;
- the connection would result in a high level of intrusion into what is a quiet residential character area, and turn a leafy inner suburb permanently into a concrete structure;
- the visual impact and loss of visual amenity, including through the loss of trees, parkland (i.e. reduction of Quinn Park) and character housing, and from the noise barriers and overall width, scale and extent of flyovers;
- the construction work will be extensive and disruptive to residential areas and that there is no way to construct the Toowong connection without an extensive loss of amenity to the community;
- the Toowong community should not be put through the loss of quality of lifestyle of inner city living for an inefficient and poorly conceived EIS Reference Project;
- fewer formal pedestrian crossings of Milton Road and Croydon Street would be a significant reduction in amenity for Toowong; and
- the project will introduce commercial areas into a predominantly suburban environment.

A submission also suggested that the EIS does not identify all the impacts on local amenity during construction, and that those impacts omitted include:

- construction noise beyond 1km of the worksite, particularly at night time when ambient noise is lower and construction noise travels further;
- night time construction works resulting in sleep disturbance;

- impacts of construction dust for residents beyond 1km from the worksite, particularly when affected by differing weather patterns such as wind and storm activity;
- resumption and removal of over 40 character homes;
- negative changes to local character and visual amenity due to the worksites being 'visual eyesores' and their locations;
- changes to local character due to loss of trees, greenery and parks;
- noise and congestion associated with construction traffic, including workers' vehicles and construction vehicles, in and around the worksites;
- loss of connectivity and access for residents within construction areas; and
- greater congestion on surface roads, particularly [close] to construction activity.

The submission suggests that construction impacts need to be clearly described to enable a comprehensive review of the project.

Some submissions suggested that the straight through option should be undertaken or else re-planning of the feeder road systems be undertaken to reduce impacts or ensure these are more sensitive to local community needs.

A submission suggested that the Toowong connection will actually provide for increased liveability in the local area, with only a couple of streets affected. The submission also suggests that the overall benefits for the community will outweigh the negatives.

Response

With Council's decision to remove the Toowong connection from the Project, these impacts on local amenity and liveability resulting from this connection are avoided.

B.13.3 Issue 9 – Impact on Amenity at Kelvin Grove

A resident close to the Kelvin Grove connection suggested that residents who did not own or drive a motor vehicle would not benefit from any increase in amenity and that their amenity would be compromised by the residents living in outer suburbs, who are not given adequate alternative transport choices.

A concern was also raised in a submission that the removal of houses at Kelvin Grove would result in a house being exposed to patrons leaving the Normanby Hotel, potential increasing vandalism, crime and safety for the property owner.

Response

With the removal of the local connection at Kelvin Grove, the Project will not impact on Kelvin Grove Road or local streets west of Kelvin Grove Road so resolving these issues.

B.13.3 Issue 10 – Impacts of Property Acquisition

A number of submissions raised issues in relation to property acquisition and impacts on residents. In particular, concerns were raised that:

- the management and mitigation did not disclose the likely fate of the occupants of those buildings to be permanently destroyed;
- the resumption of properties had not been appropriately addressed in the EIS, and that this undervalues people's homes and lives;

- homes are being resumed and people's lives are being fundamentally disturbed, particularly those who have to relocate, including many elderly people with longstanding and significant local community connections, whose lives could not be easily re-established elsewhere; and
- the number of homes to be demolished to allow for the Toowong access is horrifying and is causing significant disruption to peoples' lives and the community. In particular, affect residents are unsure of whether their house will be resumed and can no longer sell it for a reasonable price, causing enormous stress on residents. It was suggested that the ongoing effect of this should be considered.

Concerns that residents who are 'evicted from their homes' may experience mental health issues, including stress and other health problems was also identified in submissions. A suggestion was made that residents should be allowed to relocate within the same suburb if they desire, that the amount of compensation should be increased and that payment should be provided for the costs of counselling and other treatments for health and psychological problems.

Response

With the removal of the local connections at Toowong and Kelvin Grove, the Project will not require any residential land in Toowong or in Kelvin Grove so resolving this issue.

B.13.3 Issue 11 – Impact on Property Values

The loss of property value for those properties near the Toowong connection that will not be resumed and the inability for property owners to sell their properties because of the proximity of the Toowong connection to a residential area was raised in some submissions.

Some submissions suggested that compensation should be paid to property owners, including for the loss of property value, visual impact of noise barriers and connection ramps, and loss of breezes from noise barriers. It was also considered that the payment of financial compensation to local residents and businesses owners so that the costs are spread to the people who will benefit from the project.

A submission also considered that statements in the EIS that the proposed Toowong connection would support property values was entirely speculation, based on premature information form uncompleted tunnel projects in completely different location of Brisbane. The submission suggested that the Supplementary EIS should include updated data on property values in Brisbane, in general, and that it should 'undertake independent research to obtain unbiased information on the impacts of tunnel project on property values in Australia, including potential impacts of property values as a result of the entire suite of TransApex projects'.

It was also suggested that a study be undertaken on the construction and long term impacts on property values of properties within 100 m of major road infrastructure projects such as Northern Link.

A submission raised an issue that the access points to these streets [bounded by Musgrave Road and Kelvin Grove Road] will now only be Windsor Road and Musgrave Road which are both major incident areas due to blind spots and/or large traffic flows. It was considered that this would result in a large reduction in the value of properties in this area.

Response

The removal of local connections at Toowong and Kelvin Grove would significantly mitigate perceived impacts on property values identified in submissions in relation to the EIS Reference Project.

B.13.3 Issue 12 – Specific Property Issues

Some issues were raised about specific properties, including:

- access to a property on Milton Road, and the need for changes to the driveway to allow entrance via the eastbound lane or from Morley Street at the rear;
- that a property on Milton Road is not within the investigation area and that the EIS does not imply that a home on Milton Road will be resumed, although they have been told that it is to be resumed;
- other properties on the southern side of Milton Road, east of the Croydon Street will have part of their land resumed; and
- road widening should comply with the easement 'Notice of Realignment of Milton Road (No. 6012101115 (1967)).

Response

With removal of the Toowong connection, the Project does not require any land along Milton Road.

B.13.3 Issue 13 – Impact on Quinn Park

Quinn Park at Toowong was identified by some submitters as having important amenity and historical values (i.e. being the site of the Toowong City Pound). The park was also identified as being an important location for social gatherings. A number of submissions raised issues about impacts of the EIS Reference Project on Quinn Park, including the loss of approximately one third of the park and the impact of the retaining wall adjacent to Milton Road. It was further suggested that the park would lose its open feel, lined by trees due to the tall ramps at Milton Road and the cul-de-sac at Quinn Street potentially resulting in the park not being a safe place.

Some submitters also consider that the proposed bikeway through Quinn Park will further reduce the usability of the park (i.e. it would essentially become a bike path). Issues were also raised that the location of the bikeway through the park will lead to the reduced use of this basic amenity as people will need to walk or cycle further, that it will not feel safe to walk down at the bottom of the structure and that it was unclear where the entry and exit points of the bikeway are and how it would connect to pedestrian and cycle activity in the area.

A submission also suggested that the EIS understates the adverse impacts on the amenity of Quinn Park and neglects to identify the following construction impacts:

- loss of remaining park area temporarily given over to construction activities, including the building of a retaining wall separating Quinn Park from Milton Road;
- loss of trees and landscaping affecting the visual amenity of park users;
- loss of visual amenity in the surrounding area due to the construction activities;
- use of construction vehicles, heavy equipment use and construction personnel movement further inhibiting access to the park;
- loss of the use of the playground area;
- reduction in pedestrian and park safety due to construction vehicle activity in Quinn Park;
- loss of available parking for park users due to potential use of Quinn Street for parking for construction workers.

One submission suggested that Quinn Park is a wasteland and that the use of the park for the EIS Reference Project makes sense.

Response

With the removal of the Toowong local connection, Project impacts on the use and amenity Quinn Park are avoided.

B.13.3 Issue 14 – Impact on Community Cohesion

A number of submissions raised issues that the Toowong connection would divide the suburb and impact on community cohesion. In particular, issues included:

- the Toowong connection will cause a high degree of social dislocation from the loss of social contacts;
- radical widening of Milton Road to ten lanes and Croydon Street to seven lanes will have a devastating impact on the social milieu of Toowong;
- demolition of homes will cause significant disruption to peoples' lives and the community;
- EIS talks about redressing impacts on community cohesion through 'provision of attractive and usable public space', although there is no conceivable action of this type that could be taken that would mitigate the loss of half of Quinn Park and the widening of roads up to ten lanes; and
- support that may be provided to people will never be enough to compensate for dislocating them from the communities of which they are a part.

One submission suggested that there is already a loss of community in Toowong and that this will be exacerbated with the tunnel. Another submission suggested that while tunnels may be of interest to citizens through improvements to traffic flow, wrecking neighbourhoods to create unnecessary tolling point was not.

Response

With removal of the Toowong connection, impacts on community cohesion for neighbourhoods in the vicinity of Milton Road and Croydon Street identified in submissions are avoided.

B.13.3 Issue 15 – Impact on Social Infrastructure

Issues relating to impacts on social infrastructure due to the Toowong connection were raised in a number of submissions. This included impacts such as the loss of or changed access to community services, facilities and local amenities resulting in inconvenience to local residents and disruption to local businesses. Specific facilities identified in submissions included:

- open space and park areas such as Quinn Park and Anzac Park;
- Toowong State School;
- Toowong Cemetery; and
- local shops, restaurants and retail outlets, including the Cat and Fiddle shopping centre, Caltex service station, and the Toowong Centre.

Response

With the removal of the Toowong connection, these impacts on social infrastructure for neighbourhoods in the vicinity of Milton Road and Croydon Street are avoided.

The connection to the Western Freeway would continue to impact on Anzac Park as described in Section 13.3.3 of the EIS. This amounts to construction works along the edge of the Western Freeway for the westbound tunnels exit to the surface network and realignment of the bikeway to accommodate

this new structure. Any adjacent areas of Anzac Park affected by the Project would be landscaped upon completion of construction works.

B.13.3 Issue 16 – Impact on Toowong State School

A number of submissions raised issues in relation to Toowong State School, including impacts on access to the school, safety for students and potential effects on the school catchment.

Issues raised in submissions relating to access to the school included:

- access to Toowong State School will be more hazardous and difficult, reducing safety for school children who walk or ride to school from the Morley Street precinct and across Croydon Street;
- the school has been chosen for the Active Schools program in 2009 and it seems hypocritical of Council to put a huge motorway-type construction in the way;
- the EIS does not propose mitigation strategies to ensure local children have safe pedestrian access to the school and if the project proceeds, enhanced pedestrian and cycle access should be provided from Morley Street to Quinn Street via an underpass or bridge;
- a sizeable portion of students at Toowong State School are driven to work from the Western Freeway, who will now have great difficulty accessing the school;
- safety for students at Toowong State School will be affected through increased rat-running by motorists accessing Coronation Drive via Jephson Street and Sylvan Road, using Quinn Street adjacent to the school;
- proposed changes to Milton Road will mean that attending Toowong State School and various Toowong sporting clubs will require crossing a major highway.

Some submissions noted that the catchment for Toowong State School is drawn from across Milton Road and that children regularly socialise and play across the area. This will be made infinitely more difficult with the division, both physical and mental, created by ten lanes of traffic.

The catchment area for Toowong State School will not be viable as residents north of Milton Road will not be able to access it by foot or car.

Response

With the removal of the Toowong connection, the perceived impacts on Toowong State School identified in submissions to the EIS are avoided.

B.13.3 Issue 17 – Impact on Other Schools

A submission raised an issue that the EIS Reference Project encroaches into Brisbane Grammar School playing fields which are understood to be of critical dimensions. A submission also suggested that it was unlikely the school would have surplus area to relocate the fields or accommodate a loss of functionality of the affected fields.

A submission indicated that the Department of Education, Training and the Arts (DETA) has a major presence in Kelvin Grove; the Academy, Kelvin Grove State High and Kelvin Grove State School. Its facilities are grouped near the proposed exit and entry portals for the EIS Reference Project. It appears that the local containment of the Kelvin Grove suburb is to be adversely affected by the EIS Reference Project and that the size of the portals seems to be out of scale with the local area, causing significant destruction of the urban fabric. Parents will need to negotiate extra lanes to access the State School.

One submission also raised issues relating to traffic increases along Gregory Terrace and potential safety risks for students, particularly during school pick-up and drop-off times.

Response

As outlined in Section 13.3.6, the EIS Reference Project would encroach on the southwest corner of the Brisbane Grammar School playing fields, to the extent that one of the existing tennis courts would be lost. This is a result of the realignment of the access road to the playing fields. Ongoing consultation with the school is recommended to identify ways to minimise potential impacts from the potential loss of the tennis court.

With the removal of the local connection to Kelvin Grove Road potential impacts of the Project for the identified DETA facilities are avoided.

The impact of the Project on traffic volumes along College Road east of the Normanby Fiveways is shown on Table 4-8 in this Supplementary Report where a small reduction is predicted with construction of the Project compared to the scenario without construction of the Project. This predicted impact on College Road traffic volume means that traffic volumes specifically for Gregory Terrace in front of Brisbane Girls Grammar School would not increase with the Project and may marginally decrease.

B.13.3 Issue 18 – Overall Social Benefits

A submission suggested that statements in Section 13.3.2 of the EIS about traffic congestion, local amenity, travel times and rat-running in local streets, pre-suppose that the solution to the problems is Northern Link to construct a new road, not a public transport solution, or a combination of other measures and questioned where the data was to support the stated conclusions.

Response

The rationale and strategic context for Northern Link is outlined in Chapter 2 of the EIS. This includes detailed information on the strategic context and traffic and transport need for Northern Link.

Chapter 13 of the EIS does not pre-suppose that Northern Link is the solution to the problems of traffic congestion, local amenity, travel times and rat-running. Rather, as identified in Chapter 2 of the EIS, the Northern Link Project is one part of an integrated transport and land use planning approach to responding to the anticipated growth in travel demand driven by a combination of population growth and economic activity. In particular, Northern Link would complete a missing link in the motorway network and provide opportunities for improvement in local public transport services for particular centres, including the Brisbane CBD, Toowong and the University of Queensland.

B.13.3 Issue 19 – Rat Running in Local Streets

A number of submissions identified issues relating to increases in rat-running in local streets that would occur as a result of the project. In particular, an issue was raised that the EIS does not address increases in rat running likely to occur in specific areas of Toowong. In particular, concerns were identified that rat running in local neighbourhoods would increase in order to access the Wesley Hospital and Toowong Private Hospital and that the loss of the right hand turn from Jephson Street to Sylvan Road would increase rat running in Lissner Street and Bennett Street. The submission also suggested that the EIS largely ignores rat running through north Toowong of vehicles coming from Bardon, which currently occurs and is expected to worsen with the Toowong connection.

A number of other streets were also identified in submissions that were considered to experience an increase in traffic, reducing access for residents to their homes. It was suggested that the EIS should assess the impact of rat-running on all local streets that will be impacted and not just a select few.

Response

As the Project does not have local connections there would be no effect on local access in the Toowong or Kelvin Grove precincts and as addressed for the Project in Chapter 4 of this Supplementary Report, Section 4.1.8 – Local Access Effects.

B.13.3 Issue 20 – Impact on Community Health

A number of submissions identified issues about potential health effects for residents located close to the project (i.e. within 3 km) as a result of changes in air quality and potential pollutants.

In particular, concerns were raised about potential effects on children's health as a result of changes in air quality. This included:

- that poor air quality endangers children's health and the link between high acute and chronic respiratory disease morbidity rates and proximity to diesel exhaust; and
- that there are currently 328 children in Toowong, not including children attending local schools, who will be affected by the worsening air quality from the ventilation outlets.

A concern was also raised that existing climatic (heat) conditions will be exacerbated by the ventilation stacks and heavy traffic.

Some submissions also suggested that the tunnel will impact on people through stress, loss of sleep, hopelessness and despair and that the uncertainty of the final design is having a detrimental effect on people's health.

Response

Removal of the Toowong local connection from the EIS Reference Project resolves several of these issues relating to anxiety over knowing exactly which residential land may have been required. The other issues in these submissions relate in various ways to potential community health impacts of the ventilation outlets. These issues were assessed in the EIS (Volume 1, Chapter 18 and Volume 3, Technical Report No. 8 Health) and in the Supplementary Report Section 4.4.

B.13.4 Mitigations and Monitoring

B.13.4 Issue 1 – Social Impact Mitigation Measures

A number of submissions raised issues relating to mitigation measures identified for the social environment. These included:

- A recommendation, for the preparation of an Equitable Access Statement prior to construction, in consultation with Disability Service Queensland.
- That Section 13.4 of the EIS does not provide a detailed outline of the mitigation measures, their practical application, auditing, monitoring and management, and instead refers readers to the technical reports;
- A suggestion that a design development objective should include 'ensuring the design of the road network (major road and connections) is of a high standard, safe and efficient'.

- That consideration be given to maximising the park areas on Milton Road and Croydon Street and that public facilities should be provided in the parks (i.e. BBQ facilities, shelters, play equipment) to ensure that they are used and do not attract crime.
- The suggestion that residual land at Toowong be used for free space and parkland to provide a buffer for residents closest to the surface connection and to retain, as much as possible, the visual amenity of the suburb.
- The mitigation measures outlined in Technical Report No. 13 are non-specific and 'softly' worded objectives with little practical detail. They are not presented as requirements for mitigation and appear to be designed to enable the project to deliver minimal mitigation to the community.
- Allowance should be made for further social impacts to be included as and when identified and a requirement to design appropriate, specific strategies to mitigate against these impacts.

A submission also identified the need for communities impacted by the construction of the tunnel and other complementary infrastructure projects around the city to be kept fully informed about the project's development as well as the cumulative impacts of the many infrastructure projects. The submission also identified the need for appropriate measures to be taken to ensure that community concerns are monitored and responded to in a timely manner.

Response

Mitigation and monitoring measures relevant to the social environment are outlined in Section 13.4 of the EIS and Section 5 of Technical Report No. 13. This includes a detailed outline of recommended mitigation measures relating to the design development, public and active transport, urban renewal strategies and environmental management, as required by the Terms of Reference for Northern Link, to ensure that community benefits are optimised and social impacts are avoided or minimised. Removal of the Toowong and Kelvin Grove local connections means that the Project no longer requires mitigation measures identified as specific to the areas of those local connections (e.g. reference to Quinn Park, noise barriers, public transport facilities on Milton Road or Kelvin Grove Road etc.). Other mitigation measures generic to the social environment would continue to apply to the Project. Monitoring, management and reporting measures are also outlined in Section 13.4.4 of the EIS and Section 5 of the Technical Report No. 13. Should the Coordinator-General recommend that the Project proceed, the applicable mitigation measures outlined in the EIS would be required to be implemented by the Proponent in accordance with the Coordinator-General's evaluation.

As outlined in Section 13.4.1, a design objective includes ensuring that access to public places near the project works is maintained during construction and operation for people with disability, as required by the Disability Discrimination Act 1992. In addition, consultation with Disability Services Queensland is also recommended to ensure that equitable access requirements are considered in the design and construction of the Project.

The recommendation that the design objectives outlined in Section 13.4.1 should include an additional objective of *'ensuring the design of the road network (major road and connections) is of a high standard, safe and efficient'* is noted. The design objectives outlined in Section 13.4.1 of the EIS relate specifically to those matters identified during the assessment of social impacts. In addition, the Project would be required to achieve relevant design standards and criteria as identified in Chapter 4 of the EIS.

With removal of the Toowong connection, the issue of future use of residual land at Toowong is resolved.

Section 13.4.4 of the EIS includes a requirement for ongoing monitoring and evaluation of the effectiveness of mitigation outcomes using qualitative and quantitative standards to measure achievement of social objectives and mitigation criteria. Ongoing consultation and communication is also recommended to ensure that local and regional residents are informed about Project activities, including timing, duration and potential impacts. This includes the establishment of an effective system for receiving, handling, responding to and monitoring community complaints.

B.13.4 Issue 2 – Pedestrian and Cycle Mitigation

A number of submissions identified issues relating to pedestrian and cycle mitigation, including issues with mitigation measures proposed in the EIS as well as need for additional mitigation measures. Particular issues identified included:

- The need for specific enhancements and practical measures for mitigating loss of cycle and pedestrian access to be outlined.
- The EIS notes that 'pedestrian and cycle experiences' would be [further] diminished by the EIS Reference Project and that the 'barrier effect' [of widened roads] has been raised as a community concern, but does not suitably mitigate these impacts.
- A suggestion that the project be required, as a minimum, to maintain the current level of pedestrian and cycle access between the areas of Toowong north and south of Milton Road and that a new crossing is required between Croydon Street and Miskin Street as informal crossing along this stretch of road would not be possible once the project is constructed.
- The suggestion that a dedicated bike path along Croydon Street and that a pedestrian/cycle access tunnels/bridges across Croydon Street should be provided.
- The suggestion that more park-and-rides be developed along with better cycling options and reliable public transport.

In addition, a submission identified the need for impacts on the Western Freeway bikeway to be mitigated by ensuring that the level of service is maintained for cyclists, including consideration of safety, accessibility and journey times.

Response

Section 13.4 of the EIS outlines a number of mitigation measures to address potential impacts on pedestrian and cycle access in the vicinity of the EIS Reference Project's connections. This includes recommended mitigation measures to ensure that the impacts on the Western Freeway bikeway are managed and that the level of service for cyclists is maintained.

With the removal of the Toowong connection, the specific impacts on pedestrian and cycle access for neighbourhoods in the vicinity of Milton Road and Croydon Street, identified in submissions, are avoided. Consequently, mitigation measures to reduce potential impacts of the Project on pedestrian and cycle movement in the area of the Toowong local connection would not be required.

B.13.4 Issue 3 – Toowong Cemetery

Issues were raised about reduced access to the Toowong Cemetery, including for pedestrians and motorists. This included suggestions that formal pedestrian crossings are added across Milton Road and Frederick Street near the Milton Road roundabout to improve access and that adequate signage be provided directing traffic to the Cemetery's main entrance or alternate entrance on Richer Street, for the convenience of funeral corteges and visitors.

Response

With the removal of the Toowong local connection the Project will not include any works on Frederick Street or the Toowong roundabout so removing any impacts on access to the Toowong Cemetery.

The EIS recommends ongoing consultation and communication with community facilities closest to the construction works about Project activities, including timing and duration, and potential impacts.

B.14 Urban Design and Visual Environment

B.14.1 Description of Existing Environment

B.14.1 Issue 1 – View Sheds – Toowong Connection

This section fails to identify the view sheds which will be impacted on most by the Toowong local connection. These view sheds not only provide views to areas of local and regional significance, they are important in the development of a legible city.

Response

The urban context of the Study Corridor is described in some detail in Section 14.1.1 of the EIS including the overall urban character and the distribution of open space. Significant views are identified and mapped on Figure 14.1. Impacts on views and view sheds are discussed in Section 14.5 of the EIS (see 4.14.5 below).

The issue of identifying view sheds that would be most impacted by the Toowong local connection is avoided by removal of the Toowong local connection from the Reference Project so that no view sheds will be impacted by the Toowong local connection.

B.14.2 Identification of Key Locations

This section of the EIS was not raised in any of the submissions.

B.14.3 Goals and Objectives for the Study Corridor as a Whole

A number of submissions and comments made reference to planning, landscape and urban design strategies and policies set out in the Queensland Government and Brisbane City Council's planning policy documents, and the need for the Project to be seen to be consistent with those plans and policies.

Planning strategies, policies and statutes applying to the Project corridor and the wider City are discussed at some length in EIS Chapter 11. For overall consistency the urban landscape and design objectives for the Project have been developed with consideration for BCC's Living in Brisbane 2026, as well as the SEQ Regional Plan. These principles would be carried forward to the detailed design stage of the Project, and would also be captured in the Project Environmental Management Plan (EMP). These would include aspects of planning such as species selection for key plantings and the extent of canopy cover.

B.14.4 Goals and Objectives for Key Locations

B.14.4 Issue 1 – Urban Design Treatments – Toowong Surface Roads

An acceptable urban design solution, should alterations be made to Milton Road, Croydon Street, Sylvan Road, Miskin Street, is for these roads to be formed as urban boulevards with appropriate street trees, footpaths and development fronting and overlooking the street.

Response

This issue is resolved by removal of the Toowong local connection from the Project which will mean that Northern Link would not cause any alterations to Milton Road, Croydon Street, Sylvan Road or Miskin Street.

B.14.4 Issue 2 – Urban Design Treatments – Consistency with Stated Objectives

The EIS Reference Design is not consistent with and does not achieve the stated urban design/ landscape goals and objectives, in particular for the Toowong Connection. For example, no safe cycle access is provided for the community north of Milton Road to the Brisbane River. This conflicts with the requirements stated in section 14.4, which states that this access would be provided as a minimum guideline for the EIS Reference Project.

Response

The Project without the Toowong local connection will require no physical change to the area of the Toowong connection or to the cycle access between north Toowong and the Brisbane River. The Project is expected to reduce traffic numbers on Milton Road by 6%, relative to the 'do nothing' scenario, so construction of Northern Link can be expected to enhance the cycle access mentioned in the submission.

B.14.4 Issue 3 – Urban Design Analysis

The urban design analysis is selective, ignoring key qualities and aspects of the neighbourhood. The way the community is able to use the neighbourhood has not been understood. This has resulted in an extremely poor design of the Toowong entry with catastrophic impact on the local community, particularly the widening of Milton Road and Croydon Street.

Response

A comprehensive site analysis of the Western Freeway and Toowong Roundabouts precinct was undertaken for the EIS and is documented in Section 14.4.1, and illustrated in Figure 14-1. The site analysis takes account of local movement patterns including links between residential areas and Toowong Cemetery, between the residential areas north and south of Milton Road, and considers the influence of the local terrain on local development and movement patterns.

The removal of the Toowong local connection from the Project resolves this issue.

B.14.4 Issue 4 – Urban Design – Existing Urban Character (Toowong)

Urban design around Toowong should be traditional in style, not ugly motorway constructions. This area has retained significant character housing and a distinctly suburban environment close to the city. The area should be a tourist destination, not a concrete jungle. Older, established trees should be mapped and retained, along with character housing.

Response

The removal of the local connections from the Reference Project removes the motorway constructions from residential Toowong as referred to in the submission, so resolving this issue

Older, established trees would not be removed unless absolutely necessary. During the detail design phase and in the lead-up to construction, the Western Freeway worksite would be comprehensively surveyed and planned, and works would be limited only to those areas needed for construction.

B.14.5 Assessment of Impacts

B.14.5 Issue 1 – Urban Design, Visual Impacts – Toowong

Quinn Park is an important open space. The EIS Reference Project will require half the area of the park and leave no usable level ground in or shade out the remainder. The Toowong Connection would lead to extreme loss of visual amenity in a character suburb through the loss of trees, parkland and character housing and construction of some extremely wide and visually intrusive roads, ramps and elevated structures.

Response

With evolution of the Reference Project removing the local connection at Toowong the Project will not impact on Quinn Park so resolving this issue.

B.14.5 Issue 2 – Connections – Design and Scale of Development

All proposed connections for Northern Link fail at delivering a human scaled environment. The proposed local connections are equivalent in size to the Ipswich and Logan motorway interchange but are proposed in a residential area and the proposed mitigation measures will not mitigate the impacts on the community. Croydon Street and Milton Road will be a "big scar through the suburbs". The design of the local connections fails to address the State Government's Crime Prevention through Environmental Design Guidelines (CPTED).

Response

The Project has met the challenge of providing a major piece of transport infrastructure within an established urban environment. At the Western Freeway and Northern connections, the Project would integrate relatively easily into the existing road infrastructure, where the scale of the Project would be consistent with existing infrastructure.

The removal of the local connections from the Project resolves the issue raised in the submission, particularly in relation to the connections proposed in residential areas.

CPTED principles have been incorporated into the Project design and are documented in EIS Chapter 13 (Sections 13.3.8, 13.4.1, 13.4.2), and in Chapter 14 (Sections 14.5 and 14.7). Section 14.7 in particular recommends the mitigation measures to be adopted in detail design and construction to ensure safe, legible and comfortable connections for pedestrians, cyclists and public transport users. These measures are in direct response to the urban design and visual guidelines in Section 14.5, and the recommendations for safety and security during construction and operation contained in Chapter 13. These guidelines and recommendations include care in the design of public spaces, such as maintenance of sight lines, pedestrian legibility, casual surveillance, and encouragement of a level of activity in public places.

B.14.5 Issue 3 – Amenity, Visual Impacts of Construction

Amenity and visual issues associated with construction sites being established in urban communities (including hoardings) and the conveyor for spoil through the Mt Coot-tha Botanic Gardens have not been fully addressed. 'Temporary' interruption to the Western Freeway cycle crossing may occur during construction; how long is 'temporary'? Surface changes during construction will impact on pedestrian and cycle routes to Mt Coot-tha.

Response

Construction worksites are addressed in the EIS in Chapter 4 Project Description, and in Sections 14.5.8 through 14.5.11. Each of these sections describes the likely urban design and visual impacts during construction, while Section 14.6 describes the mitigation measures to be adopted at worksites during construction.

With the removal of the local connections, the Project no longer has worksites at Toowong and Kelvin Grove.

The proposed spoil conveyor would encroach on the Mt Coot-tha Botanic Gardens, with associated visual impacts for the duration of construction. As discussed in Sections 14.5.8 and 14.6.1, the conveyor would be built as low to the ground as possible, and would be painted in dark or earth tones to reduce its visibility. Surrounding vegetation would also help to shield the conveyor from more distant views. On completion, the conveyor would be removed and the corridor rehabilitated and revegetated.

The EIS (Volume 1, Chapter 5, Section 5.7.7) indicates that the Western Freeway pedestrian/cycle overbridge would generally not be closed during construction implying that every effort would be made to maintain this accessway. However, some closures may become unavoidable given the proximity of the structure to the construction works and complexity of the works in that area. The EIS further indicates that wherever possible such closures would be restricted to night time works when the overbridge would be least in use and that sufficient public notification of any such closure would be given. The exact duration of any such temporary closure would be determined during the detailed design phase.

B.14.5 Issue 4 – Loss of Significant Trees

The construction phase will result in the removal of several large fig trees (at Kelvin Grove), other significant trees and shrubs. The visual amenity of the whole area will be affected.

Construction will necessitate the removal of the Crows Ash memorial tree at the corner of Milton Road and Sylvan Road, Toowong.

Response

The issues of possible disturbance or loss of the large fig trees at Kelvin Grove and loss of the Crows Ash memorial tree in Toowong are resolved with the removal of the local connections from the Project.

B.14.5 Issue 5 – Urban Design, Visual Impacts - Western Freeway Connection

The Mount Coot-tha Botanic Gardens are designed to give people a place of quiet and greenery. Resuming parts of the Cemetery and the Gardens do not count as maintaining a green belt.

Response

No land within Toowong Cemetery would be resumed or otherwise directly affected for construction of the Project. The tunnels passing beneath the cemetery would trigger a volumetric land requirement (see EIS Chapter 4 – Project Description) which would otherwise have no material impact on the cemetery itself.

No permanent resumption of land would be required within the Mount Coot-tha Botanic Gardens. The proposed western ventilation outlet would be located within land that is part of the Brisbane Forest Park.

The proposed western connection worksite is also located on land that is outside the boundary of the Gardens.

Included in the EIS and the Reference Design is the temporary use of a corridor of land to accommodate the proposed spoil conveyor within the Gardens. At completion of construction, the western worksite and the spoil conveyor route would be rehabilitated and landscaped, and returned to public use.

B.14.6 Mitigation Measures – Construction

B.14.6 Issue 1 – Visual Impact of Noise Barriers - Toowong

Suggest noise and visual barriers to construction sites if the EIS Reference Project goes ahead. Hoardings would need to be 12 – 20 m high to provide some mitigation and would not protect from dust or noise. This section of the EIS does not select a vantage point representing private properties on the northern side of the Toowong connection. The noise-reducing properties of urban design/mitigation structures should take priority over the appearance of these structures. If it is decided that the Toowong connection must proceed, it is requested that consideration be given to ensuring that noise barriers are highly durable, attractive and allow light to Quinn Park.

Response

The Reference Project without local connections as now proposed will not require the worksite or any construction works in the vicinity of Milton Road, Croydon Street and Frederick Street thus resolving this issue

B.14.6 Issue 2 – Urban Design Initiatives – Main Roads Interface

Department of Main Roads will need to be consulted, review and give approval prior to the construction of mitigation measures within State-controlled road corridors.

Response

The Department of Main Roads would be consulted during detailed design and prior to construction of any urban design and landscaping measures implemented as part of the Project, where they affect State-controlled roads.

B.14.6 Issue 3 – Tree Planting During Construction

Planting and mitigations/enhancements should be finished as early as possible and preferably before major works are begun. Consideration should be given to immediate planting of large trees during the construction phase, with residents involved in this process.

Response

The timing of landscaping works would be subject to the timing of completion of works at each respective location to be landscaped. For safety and logistical reasons, tree planting and landscaping may not be possible until work sites are vacated and stabilised, and topsoil has been reinstated.

B.14.7 Mitigation Measures – Operation

B.14.7 Issue 1 – Urban Boulevard Treatments – Toowong

Milton Road, Croydon Street, Miskin Street and Sylvan Road should be given an ‘urban boulevard’ treatment, with appropriate street trees, footpaths and developments fronting and overlooking the street.

Median plantings in Milton Road and Croydon Street should use traditional Brisbane tree species e.g. Jacaranda, Poinsettia, Plane Trees etc.

Response

The removal of the local connections from the Project means that no construction works are required in Milton Road, Croydon Street, Sylvan Road, Miskin Street or Frederick Street and the Project therefore will not involve any treatment of these streetscapes.

B.14.7 Issue 2 – Pedestrian / Cycle Connectivity – Toowong

Safe pedestrian and cycle movements have not been allowed for; the measures recommended in the urban design/visual chapter have not been addressed. Current levels of pedestrian/cycle access from the northern to the southern sides of Toowong are to be maintained, at a minimum. An additional mid-block crossing is needed in Milton Road between Frederick Street and Croydon Street, as well as an additional bus stop for inbound and outbound services. A dedicated cycle path is needed along Croydon Street, and the 'barrier' effect created by Frederick Street for residents wishing to cross to Toowong Cemetery needs to be reduced.

As the EIS does not specify what streetscape works would be implemented, one cannot determine how connectivity would be improved or hindered by the planting of trees.

Response

The removal of the local connection at Toowong from the Project means that no construction work is required in Milton Road, Croydon Street, Sylvan Road, Miskin Street or Frederick Street which resolves the issues raised in the submission.

B.14.7 Issue 3 – Design of Noise Barriers

Acoustic performance of noise barriers should take precedence over their appearance. Suggest a vegetation buffer zone between roadworks and residents, and between noise barriers and residents. The noise barriers at Toowong should be designed to complement the tin & timber character housing, and should also be covered in vines/creepers. The mitigation plans as presented are inappropriate and do not adequately screen visually polluting features of the EIS Reference Project such as noise barriers and access ramps.

Response

The removal of the local connection in the vicinity of Milton Road, Toowong, from the Project means that such noise barriers with the potential to conflict with the character and design of the surrounding residential area will not be required for the Project in this area.

B.14.7 Issue 4 – Mitigation of Visual Impacts

The EIS Reference Project's visual impacts are unlikely to be satisfactorily mitigated or reduced by the proposed landscaping and urban design treatments. The proposed treatments are not in keeping with the design of the suburbs and their local character. The landscape works e.g. on Milton Road east of Croydon Street are not feasible as there is insufficient space in the footpaths to establish trees and plantings. Some of the proposed plantings e.g. urban forest treatments, the Western Freeway median, and the Mt Coot-tha roundabout, would conflict with line of sight and safety standards for main roads.

Response

The proposed measures outlined in EIS Section 14.7 aim to screen the works and integrate the Project as much as possible into its surrounds. With an infrastructure project of the size and scale of Northern Link, it would not be feasible to attempt to completely mitigate or to camouflage the infrastructure. Further, the EIS acknowledges in Chapter 13 that the Project would result in potentially significant changes to the character and appearance of some locations in the vicinity of the proposed surface connections. The overall objective of the recommended urban design and landscape measures is to minimise visual impacts and help the Project to integrate with its surrounds. Final details of the landscaping and urban design measures would be developed during detail design, and the DTMR would be consulted to ensure that safety standards for line of sight, and species suitability, are upheld.

The removal of the local connection at Toowong from the Project means that no construction work is required in Milton Road, ,which resolves the issue raised in the submission regarding the area of Milton Road east of Croydon Street.

B.14.7 Issue 5 – Mitigation Measures – Kelvin Grove Connection

The EIS Reference Project will impact on the land use in the area immediately west of Kelvin Grove Road, with loss of "tin and timber" homes and impacts on existing residential and leisure activities. The proposed mitigation measures do not explain how the loss of traditional/timber & tin character housing will be mitigated. How will the character and streetscape of Upper Clifton Terrace be protected? Character housing that is removed should be 'stockpiled' for future use and/or reconstruction on residual land following completion of construction.

Response

With the removal of the local connections from the Project, the issues raised in the submission are resolved.

B.14.7 Issue 6 – Pedestrian / Cycle Facilities – Kelvin Grove

Recommended measures for pedestrian and cycle connections at Kelvin Grove have not been addressed in the EIS or the Reference Design, especially in relation to a pedestrian/cycle connection between Kelvin Grove Urban Village and the CBD.

The Kelvin Grove Urban Village will derive no benefit from the greater car access to its front door because its urban planning has sought to manage car access and pursue pedestrian, cyclist and public transit accessibility. The EIS Reference Project will:

- lessen amenity of existing pedestrian links to the west and north; and
- fail to deliver pedestrian connectivity to the south and east.

Response

With the removal of the local connections from the Project, the issue of impacts on pedestrian/cycle connectivity in the Kelvin Grove Road corridor is avoided.

B.14.7 Issue 7 – Use of Residual Land

Residual land should be given over to green space/open space on completion of the project. Section 11.8 of the EIS suggests residual land may be developed for medium density residential development, which is undesirable and is in direct conflict with other parts of the EIS which propose that any such land be used for open space.

Response

With the revision of the Reference Project to remove the local connections, residual land will be given over to green space / open space, or similar public uses on completion of the project as identified in section 5.1.7 of the Supplementary Report. Privately owned land is no longer required for the project and the issue of what to do with residual land previously associated with the Toowong and Kelvin Grove connections will not arise.

B.14.7 Issue 8 – Urban Mitigations – Kelvin Grove

The Kelvin Grove mitigations deal only with planting trees and landscaping. They do not take into consideration the aims and objectives of the City West Task Force to "create a new urban neighbourhood of pedestrian friendly streets and buildings with active frontages."

Response

The removal of the local connections from the Project means that the Project will not require the worksite or any construction works in the vicinity of Kelvin Grove Road thus removing any potential impact on the objectives of the City West Task Force with respect to "pedestrian friendly streets and buildings with active frontages."

B.14.8 Visual Assessment

B.14.8 Issue 1 – Visual Impact of Toowong Connection

The view from Sylvan Road or Valentine Street will be of cars, concrete and the flyover. The widening of Milton Road and Croydon Street is visually confronting. The visual environment of Croydon Street and Milton Road will be impacted by the removal of old trees and character housing such as workers' cottages. The character of the Morley Street, Milton Road and Croydon Street intersection will be affected by the Toowong tunnel access. The ramp structures will have visual impact on adjacent businesses and residents that do not fit with the topography of the landscape.

The Toowong connection will create a gross, obnoxious, interruptive visual eyesore with a totally negative impact on the local community. The scale of the Toowong connection is not appropriate in an urban environment.

Response

With the removal of the Toowong Connection including the flyovers, the visual amenity of the Toowong residential areas will not be impacted by the Project. Old trees and character housing will not be affected in the Milton Road, Valentine Street, Croydon Street area.

B.14.8 Issue 2 – Visual Impact of Construction Sites

The visual impact of the Toowong construction site to our residence is recognised in Section 14.6.2, with construction site hoardings suggested as mitigation. Hoardings would need to be 12 – 20 m high to provide some mitigation and would not protect from dust or noise.

The (Kelvin Grove) worksite is to be situated at the end of my street, with smaller workstations along Kelvin Grove Road. 30 private properties will have to be resumed, and Brisbane will lose more of its "tin and timber" homes.

Response

The Project without local connections will not require either the worksite at Toowong or the worksite at Kelvin Grove Road. No construction works are proposed in either area so no hoardings would be required in Toowong, no properties would be resumed on Kelvin Grove Road.

B.14.8 Issue 3 – Illustration and Representation of Visual Impacts

The photographs, photomontages and artist's impressions in the EIS do not provide a complete, accurate or objective representation of the visual impacts of the project as it will be viewed from all aspects. "Worst" visual impacts (Toowong) e.g. from Valentine Street and Croydon Street, have not been shown. The mitigated views show mature landscaping, but this is misleading as trees and landscaping will not reach 'maturity' for up to 20 years. There are no impressions given for Croydon Street, existing or future, therefore there is no way of assessing the visual impact at this location. The 10 lanes of Milton Road have been made to look like seven. This is dishonest and misleading. Specific built elements have not been shown in context and therefore cannot be (visually) understood or assessed (e.g. ventilation stacks).

The view sheds chosen do not show integrated views around all of the connections. The visual context analysis has used different viewsheds to those used for the photomontages. The EIS should objectively demonstrate the full range of visual impacts from all sides of the project, including the worst affected areas.

Response

Removal of the Toowong local connection from the Project resolves this issue by eliminating any visual impact from Northern Link on Croydon Street, Valentine Street or Milton Road.

The images provided were an attempt to illustrate the likely visual changes as would be experienced from a number of key vantage points. Vantage Point TC4 showed potential users of this section of Milton Road the changed view they could expect to encounter as they travelled between the two access ramps to the tunnels. Only seven lanes are shown because the other three are at lower elevation behind the wall shown on the right. The view shown is thus an honest and accurate representation of the view a future motorist heading west on Milton Road could expect.

It would not be feasible to try and capture all of the possible views of the proposed infrastructure at the connections. The artist's impressions are intended as a representation of the Reference Design, and have been compiled based on the Reference Design drawings. It is considered that the artist's impressions and the numerous plan views, along with the design drawings contained in Volume 2 of the EIS, convey a fair visual representation of the Reference Project as presented in the EIS.

B.14.8 Issue 4 – Visual Impact of Ventilation Outlets

The EIS minimises the significant visual impact of the western ventilation outlet that would be higher than all surrounding buildings in the community. The artist's impressions do not show the vent stack from within the Botanic Gardens environment. The proposed vent location does not take into account the Botanic Gardens' future expansion plans, wherein planned new facilities and exhibits will be well within the vent outlet's visual catchment.

The western ventilation outlet would be an eyesore for residents and visitors to Mount Coot-tha Botanic Gardens. The view from the summit of Mt Coot-tha may be adversely affected, if not by direct view of the stack at least by the fumes emitted. The EIS lacks solutions for the size, scale and visual impact of

the ventilation outlets. More detail is required regarding the specific options available to mitigate the visual impacts of the ventilation outlets.

Response

The visual assessment provides a representation of the ventilation outlets based on the recommendation in the EIS (based on the air quality assessment documented in EIS Chapter 8) that the ventilation outlets be a certain height at each of the two proposed locations. Section 8 (Appendix) of Technical Paper No. 14 – Urban Design shows a number of other possible design treatments that may be applied to the ventilation outlets to achieve a different visual outcome.

Vantage Points WC2, WC3, WC4, WC5 and WC6 (EIS Section 14.8.4) provide an impression of not only the visual prominence of the western ventilation outlet, but also its visibility from a number of vantage points near and far. These vantage points include high ground within Toowong Cemetery and the Mount Coot-tha Lookout, as well as low ground in closer proximity such as Wool Street, on the southern side of Anzac Park. The photomontages show that for most vantage points, except those close to or within the Western Freeway road corridor, the western ventilation outlet will be obscured from view by the existing dense vegetation of the Brisbane Forest Park. Other potential vantage points were identified during the assessment process, (e.g. within the Gardens, in the vicinity of the Freedom Wall), but were rejected because the resulting photomontage was visually meaningless, or revealed (based on the current design) that the vent outlet would not be visible because of the existing tree cover.

At the Northern Connection, Vantage Points NC4, NC5, NC6 and NC7 illustrate the lower visual sensitivity of this location relative to other parts of the Study Corridor. Although the ventilation outlet at the Northern Connection is more difficult to screen, it is also lower in height, and is not readily visible from key vantage points in the public domain.

B.14.8 Issue 5 – Visual Impact of Noise Barriers

In the EIS (Volume 1, Chapter 14, Vantage Points: Toowong Connection, TC6) the noise barriers proposed on the ramps near Hutchinson's office are not shown which is misleading because the visual amenity would be much worse if the barriers depicted in the view from TC1 are shown. Noise barriers will be ugly, will encourage graffiti, block air flow and cause isolation and visual segregation.

Response

With the removal of the local connection at Toowong, the noise barriers the subject of the submission are no longer required.

B.14.8 Issue 6 – Minimal Visual Impact

One submission noted that there will be "no severe negative visual impacts, as the design will be unobtrusive and most of the works will be underground. It is likely that remnant land will be better utilised with this tunnel and connection than any existing uses."

Response

Chapter 14 of the EIS presents discussion and illustrations in respect of the Project's potential visual impacts, and the measures proposed to mitigate those impacts. The support in the submission is noted.

B.15 Economic Environment

B.15.1 Economic Objective

B.15.2 Study Area

B.15.3 Existing Economic Environment

B.15.3 Issue 1 – Effect of Global Economic Crisis on Project Viability

Submissions suggest that the EIS does not appear to have considered the current financial crisis in the assessment of the economic environment and that this should be updated. Submissions suggest that the analysis should be updated to take account of the significant changes in the economic environment.

Response

The economic assessment methodology focuses on the economic evaluation of Northern Link over a designated life span following its commencement of operations. Assessment of the project's economic viability is primarily based on Queensland government demographic forecasts and the traffic modelling, which is itself based on population growth forecasts.

Population forecasts are regularly updated from census data, and as such the long-range demographic forecasts are considered to be more reliable than economic forecasts, which are subject to a large number of variables.

Given that the assessment period for the CBA is over 40 years post construction, it is assumed that the economy will continue to fluctuate and it is likely there will be many economic cycles over that period. The current economic conditions will impact on project costs and financing has been considered in the risk assessment that forms the basis of the risk-adjusted cost estimates that have been used in the CBA. Hence the assessment does not place emphasis on current economic conditions, instead examining the Project's long term viability based on the long term relationship between population growth and traffic generation.

The research and data gathering for the economic assessment was done in the first half of 2008 with the EIS released in October 2008. When describing the existing economic environment the latest available published data was used at that time. There was inevitably a lag between when the data gathering took place and when the EIS was published. It is acknowledged that this gap period coincided with the global economic downturn in the third quarter of 2008. The assessment of the EIS Reference Project used current or real construction prices as at June 2008 that corresponded to when project cash flows were provided for CBA and when the CBA modelling was completed. Should it occur that the project is procured during the downturn in an economic cycle, it is possible that construction cost savings could be achieved.

B.15.3 Issue 2 – SEQIPP and Infrastructure Funding Commitments

A submission notes that Technical Report 15 includes the comment that "SEQIPP also includes a 10-year commitment to fund the necessary infrastructure supporting the economic and population growth." The submission is concerned that the Technical Report suggests SEQIPP infers a "funding commitment" to the infrastructure.

Response

As noted in EIS Section 15.3.4, the "estimated investment in Western Corridor transport infrastructure projects over the next 10 years according to SEQIPP is approximately $5,203 million." This reference to

SEQIPP is not intended as an indication of funding commitment, but refers to the estimated investment that would be required to fund the current program of Western Corridor transport infrastructure projects (as identified in SEQIPP).

B.15.3 Issue 3 – Household Structure, Demographics

There is a comment in EIS Section 15.3.3 that "as there are neighbourhoods in Milton that are still largely residential in character, Milton has a higher percentage of separate houses." No similar statement is made about Toowong, which gives the impression that Toowong is not residential and therefore the impacts of the project will be minimal.

Section 15.3.3 also contains a reference to "… with Northern Link 40% of dwellings being rented." This appears to be a typographic error; the sentence should read: "In Toowong the percentage of dwellings occupied by the owners or purchasers is slightly higher at almost 58%, with 40% of dwellings being rented."

Response

It is considered that the statement regarding Milton having a higher percentage of separate houses has been taken out of context, or perhaps misinterpreted. Section 15.3.3 of the EIS discusses (among other things) household structure, demographics and the demand for diverse housing types in the suburbs that make up the Study Corridor. Being close to the City explains why both Toowong and Milton have higher proportions of medium density dwelling types "compared to Queensland generally." The reference to Milton having "a higher percentage of separate houses" is relative to Queensland generally, and not to Toowong.

There is no intention in the EIS, implied or otherwise, to convey an impression that "*Toowong is not residential and therefore the impacts of the project will be minimal*", as stated in the submission. The impacts of the EIS Reference Project in Toowong were recognised as significant and long term and Council made the decision to remove the local connections, including the Toowong connection, from the Project.

The sentence referred to in EIS Section 15.3.3 contains a typographical error, as suggested in the submission. As suggested, the sentence should read: "In Toowong the percentage of dwellings occupied by the owners or purchasers is slightly higher at almost 58%, with 40% of dwellings being rented."

B.15.4 Future Economic Environment

B.15.4 Issue 1 – Economics of Car Dependency

A submission raises the issue of the economics of car dependency over alternative and active transport modes and conflicts with Council's desired environmental outcomes for transport and mode share under City Plan 2000.

Response

This issue is similar to other issues raised and addressed in Section B 2 1 Issue 7 of this Appendix B regarding increasing use of private vehicles. As addressed previously, the EIS, in Chapter 5, presents a comprehensive assessment of the consequences of doing nothing to address the increase in travel demand arising from a combination of population growth, demographic change and economic development. The EIS also recognises the importance of promoting a balanced approach to the transport needs of both the city and the region.

Transport planning at the national, regional and local levels is generally consistent in seeking to increase the mode share for both public transport and active transport. The EIS analysis, presented in Chapter 5, demonstrates that even with a quantum change in mode share to public transport and active transport, the forecast travel demand will not be addressed. In such circumstances, the city's liveability and economic competitiveness will decline as congestion increases.

Northern Link is proposed as a tolled road. Traffic modelling undertaken for the EIS, presented in Chapter 5, indicates that the payment of a toll acts as an effective suppressant on demand. The Project's key objectives relate to the efficient movement of people, goods and freight between the Western Corridor and the north of the city. The Supplementary Report demonstrates that the Project's key objectives can be met, with overall net economic benefits.

B.15.5 Strategic Property Impact Assessment

B.15.5 Issue 1 – Impacts on Property Values

The EIS does not evaluate the impact to property values during construction or operation. Studies should be undertaken to evaluate these impacts, including in the immediate vicinity of the Toowong connection and Croydon Street, based on existing major road infrastructure projects. An assessment (of impacts) on a more localised scale is required. To assess the true potential impacts of Northern Link, an assessment of property values and sale volumes within a few hundred metres of potential connection points for Airport Link needs to be undertaken.

Restored character homes will lose value and people will leave the area. The Toowong connection will reduce liveability and property values. The suburb will gradually become run-down and the character housing will deteriorate. Nobody will be able to sell their properties because the connection is so close to a residential area. The Project will result in the end of Toowong.

Response

Chapter 15 of the EIS and Technical Report No. 15 – Economic Assessment have responded to the EIS Terms of Reference through an assessment of the likely long-term impacts of the Project on residential property values, based on other current similar projects in Brisbane. Section 15.5.3 of the EIS and Section 3.4.5 of the Technical Report consider the impact of a large-scale project on residential property values, and conclude there is little direct evidence that the CLEM 7 or Airport Link Tunnels, which are at different stages of construction, have negatively impacted property values.

Council has decided to remove the local connections at Toowong and Kelvin Grove Road from the EIS Reference Project. The Project no longer directly impacts on surface private property in Toowong and around the Kelvin Grove Road connection. While the ICB connection to and from the Project remains close to the residential area of Normanby Terrace, the EIS identified measures to mitigate identified construction and operational impacts of the Project.

B.15.5 Issue 2 – Impacts on Property Values - Independent Research Needed

To state that the proposed Toowong connection would support property values is entirely speculation, based on premature information from uncompleted tunnel projects in completely different locations of Brisbane. The EIS should provide updated data on property values in Brisbane, in general, and should "undertake independent research to obtain unbiased information on the impacts of tunnel projects on property values in Australia, including potential impacts on property values as a result of the entire suite of TransApex projects".

Response

Investigations were undertaken for the Northern Link EIS in regard to the TransApex projects and their impact on property values. In 2001 the NSW Department of Urban Affairs and Planning commissioned a study by property consultant Hill PDA, who produced a report titled *"Proposed Parramatta Rail Link Impacts on Property Values – Independent Peer Review"* (Hill PDA, 2001, Sydney). This study was prompted partly by concerns that the (then proposed) Parramatta Rail Link could have a negative impact on property values. In carrying out the study, the consultants investigated a number of recently-completed and/or operating road and rail tunnels in Sydney and Perth including the M5 East Freeway tunnel, the Eastern Suburbs Railway, the New Southern Railway (Airport Rail Link), and the Perth Northern Bypass (Graham Farmer Freeway).

The Hill PDA Study concluded, based on the experiences associated with the other tunnel projects investigated, that the (proposed) Parramatta Rail Link "should have a marginal negative impact on property values above the alignment in the short term (until completion of construction), with the impact decreasing over time as other factors that influence property values outweigh the PRL in the long term."

With particular reference to the M5 East Freeway tunnel, which bears some similarities with the proposed Northern Link tunnel, the Hill PDA study found that the tunnel has had a "minimal" impact on the value of properties above the tunnel alignment.

B.15.5 Issue 3 – Impacts on Property Values - Volumetric Acquisition

The taking of volumetric title below properties along the alignment of tunnels may decrease value of those properties especially where the tunnel is closer to the surface and could restrict future development of the site (e.g. if zoned for high density residential or commercial use excavations for basement car parking or foundations for high rise buildings may be affected or indeed impossible).

Response

As identified above, the mainline tunnels would have "minimal" impact on the value of properties above their alignment. There are also no high density residential or commercial use areas above the alignment of the tunnels for the Project.

The tunnels that in places were relatively close to the surface were largely associated with the local connection ramps under the residential areas of Toowong, Paddington and Red Hill. Areas where these tunnels were shallow, such as between 6 and 15m between the natural ground surface and the tunnel crown (identified in Chapter 4 of the EIS) could impact on higher density residential development structures and commercial development requiring deeper foundations and underground car parking. The only location where this may have presented some impact on such development zones would have been in the area between Upper Clifton Terrace and Musgrave Road which is zoned for medium density residential development (up to 3 storey multi-unit dwellings). These local connections and associated tunnel ramps have been removed from the Project and there will be no potential restriction on future development in this area.

None of the locations where the remaining mainline tunnels for the Project would be at their shallowest, (between the ICB and Kelvin Grove Road, in the vicinity of Hayward Street between Plunket and Charlotte Street and between the Western Freeway and lower elevations of the Toowong Cemetery), are identified as suitable for medium density residential development (City Plan 2000, Local Area Designations; see EIS Chapter 11 Figures 11.2 to 11.4). Other designated medium density locations (e.g. between Cairns Terrace and Musgrave Road, Red Hill, and around Baroona Road/ Elizabeth Street,

Rosalie) would have more than 25 m of cover separating the surface from the crown of the tunnel. At this depth, the tunnel would be highly unlikely to present obstacles to future excavation for basement car parking or building foundations to support the scale of medium density residential development that typically occurs in these areas.

Owners of properties affected by volumetric acquisition will be entitled to compensation under the *Acquisition of Land Act 1967*.

B.15.6 Employment

B.15.6 Issue 1 – Employment of Toll Collectors

Please confirm that employment figures for toll collection do not include attendants at toll booths given that Northern Link employ e-tolling.

Response

No toll booths would be required for the Northern Link tunnel, therefore toll booth attendants would not be required and they are not included in the employment figures.

B.15.7 Cost Benefit Analysis

B.15.7 Issue 1 – CBA Inputs, Assumptions and Results

A submission has questioned the inputs and assumptions presented in Table 15-3, in that the CBA adopts $2008 for CAPEX, $2007 for RUC parameters, and $2002 for accident values. The inputs and assumptions also vary from those in the DMR/Austroads endorsed values for Urban Travel Time 2007.

A submission suggested that a common base year is used for all assumptions. Suggest that 2008 may be appropriate as this has been used elsewhere, and that assumed figures (e.g. VOC, road safety benefits etc) be indexed to this figure and including an explanation of the indexation rate used. The submission further suggests that there is insufficient information presented to determine whether the cost assumptions in the CBA are reasonable e.g. raw materials for construction have had significantly different escalation rates for steel compared to cement and escalating these costs by the building price index for example would not be reasonable if these raw inputs were materially significant.

The sensitivity analysis using the discount rate of 8% (rather than 6% as in the EIS), which is more realistic given the anticipated involvement of private sector funding, produces a BCR of 0.9 indicating that more consideration should be given to alternative economic arrangements. Another submission questioned the discount rates used in the sensitivity testing, and requested that they be changed, or an additional sensitivity added, for consistency with the rate used by Infrastructure Australia.

Submissions ask whether BCC is holding a report, not included in the EIS that shows the BCR of the straight through option to be 1.3. A CBA of the straight through option without local connections should be provided in the Supplementary Report. A submission adds that because there is inconsistency between the straight through and the connected options, that it would be appropriate to undertake a CBA on each.

A submission has questioned the 'residual value' of $0 used in Table 15-3 of the EIS, claiming that even though the accounting value after the concession period may be $0, the asset would have a terminal value. The submission also questioned the lack of an explanation regarding how a split between private and business light vehicles (i.e. for vehicle occupancy rates, Table 15-3) was determined. A submission also questioned the forecast traffic impacts on the surface network (Technical Report 15, Section 5.2) in

that "reference to the tunnel carrying 6% commercial vehicles is vague, should this reference be heavy freight vehicles or does it include light commercial vehicles also?"

Response

- Base year for modelling assumptions

In reference to the differing year / dollar values used in Table 15-3, there are difficulties in using CPI or consumer price indexing to escalate the 2007 values. It is not simply a matter of applying an escalation factor (such as CPI), and there is considerable Australian Road Research Board (ARRB) research underpinning the road user cost (RUC) parameter values. To retain the integrity of the RUC values it was decided to adopt endorsed 2007 values rather than escalate to June 2008 prices. Overall the impact of this would be to very marginally understate the benefits stream and hence very marginally impact on the BCR and NPV.

The items and assumptions used as inputs to the CBA are listed in Table 11 in Section 5.3.4 of Technical Report No. 15. These assumptions and inputs are consistent with the accepted methodology for BCA of large scale projects contained in the *Queensland Treasury Project Evaluation Guidelines*, and in this regard the analysis has complied with the ToR for the EIS. Similarly, calculating the CBA over the project's anticipated 45 year concession period using the risk adjusted P50 CAPEX estimate, at a discount rate of 6%, is also consistent with Treasury guidelines.

Travel time parameter values were obtained from the Austroads document *"Update of RUC Values to June 2007"*, which was sourced from QDMR in February 2008.

- Sensitivity testing

The Infrastructure Australia discount rate was not specified in the EIS Terms of Reference and hence the standard discount rate of 6% was adopted in accordance with current DTMR guidelines for major road projects. Historically, the standard discount rates adopted for the sensitivity testing for road projects in Queensland is 6%, with sensitivity at 4% and 8%. In relation to traffic volume sensitivities and submitters' claims regarding 'optimism bias', the comment is noted but is considered a statement of opinion only. The sensitivity of the financial parameters to underachievement of traffic forecasts was not required under the EIS Terms of Reference.

It is agreed that it is preferable to align the price period for the cost side with the price period for the benefits side of the CBA. Austroads usually releases updated road parameters for travel time, VOC, road safety and externalities approximately every two years. Austroads does considerable research into average weekly earnings and freight rates for travel time valuations and similarly into fuel prices, car maintenance and parts and new vehicle prices for VOC by vehicle segment. It is not as straight forward as identifying a CPI change between June 2007 and June 2008 and escalating endorsed Austroads road parameter values. Notwithstanding, changes in average weekly earnings and CPI can be generally and indicatively used to escalate Travel Time parameter values and VOC/road safety/externalities values respectively. In this regard average weekly earnings increased by 4.8% between June 2007 and June 2008 while (Brisbane) CPI increased by 5% over the same period. If these escalations were adopted it would indicatively increase the Present Value of Benefits by around $140m to $3,001m (previously $2,861m) returning a NPV of approximately $690m (previously $550m) and a BCR 1.30 (previously 1.24). Therefore the use of the escalated parameter values does not have a material impact on the BCR.

- Comparative CBA: EIS Refernce Project v the Project (without local connections)

A comparative CBA has now been calculated for the Project . For the sake of comparison, the CBA for both the EIS Reference Project and the Project scenarios were calculated using dollar values (costs, benefits etc) escalated to December 2008 dollars. The results are presented together in the following table. The scenarios modelled are the EIS Reference Project and the Project, using the P50 risk level and a discount rate of 6 per cent (as per the EIS).

- **Table B-49 Comparative CBA**

Output	EIS Reference Project	The Project
Present Value of Benefits (PVB)	$3,720.2 m	$3,260.8 m
Present Value of Costs (PVC)	$2,456.6 m	$1,514.6 m.
Net Present Value (NPV)	$1,263.5 m	$1,746.2 m
Benefit Cost Ratio (BCR)	1.5	2.2

The reader will note that the values and results for the EIS Reference Project are different to those published in the EIS. This is because updated traffic modelling inputs were required for the assessment of the Project, and therefore it was necessary to update the traffic modelling inputs used in the CBA for the EIS Reference Project as well, to guarantee consistency of inputs.

The updated traffic modelling inputs varied considerably from the traffic modelling inputs into the previous EIS CBA modelling. Further, the change in traffic modelling inputs was larger for the tunnel non-user segment than the change in tunnel user benefits; in other words, the 'gap' between road user benefits for tunnel users (travel time benefits, vehicle operating costs, road safety benefits, externalities) and non-user costs or dis-benefits, widened as a result of the revised traffic modelling inputs. The change in traffic modelling inputs was central to the CBA for both the EIS Reference Project and the Project, and these inputs were the most significant factor in the (relatively high) NPV and the BCR.

In conclusion these revised CBA results, while differing from those published in the EIS, provide a useful comparison between the EIS Reference Project and the Project. The results illustrate clearly that the Project achieves an overall improvement in economic viability when compared with the EIS Reference Project.

Residual and Terminal values

'Residual' and 'terminal' values are a contentious issue. The Austroads literature recommends using a terminal value of $0. This value generally means that the effective life of the road asset has been fully used up by year 40. In other words, at a 6% discount rate in a discounted cash flow approach, $1 today will be worth only 9.7 cents in 40 years time. However, it is acknowledged that the formation, structure and land will have some residual value that transcends the 40 year period (i.e. the effective life of the asset may transcend this period). This reflects the CBA methodology, which uses real rather than nominal prices.

The inclusion of a residual value would serve to increase the BCR and NPV. Whether this impact is material or not depends on the treatment of residual value in the CBA modelling since the value at 40 years is likely to be heavily eroded by the application of the discount rate at the end of the assessment period.

Split between private and business light vehicles

The split between private and business light vehicles (in Table 15-3) is based on the South East Queensland Travel Survey that identifies up to 25% of average daily travel is for work and work related business. It is understood that 'heavy vehicles' does not include light commercial vehicles.

B.15.7 Issue 2 – Economic Justification Based on CBA

Northern Link can not be justified on cost-benefit reasoning alone. Travel time savings are not significant for families. The CBA is constructed simply to provide a positive answer. The 1.2 obtained is a very small margin given the large amount of unproven modelling.

The cost of just the Toowong connection was not outlined in the EIS and nor was a project sensitivity analysis conducted without the inclusion of the Toowong connection.

Response

See Issue 1 response above in respect of the CBA methodology and the economic assessment of the Project.

The justification for the Northern Link Road Tunnel Project as presented in the EIS is not based on the economic assessment alone. The EIS presents a balanced assessment of all of the relevant issues and potential impacts of the Northern Link project, of which the economic assessment is one part. The overall justification for the Northern Link project is discussed in the EIS In Brief, and also in Chapter 2 of the EIS itself.

B.15.7 Issue 3 – Inclusion of Externalities Impacts in Economic Analysis; Externality Unit Costs

A submission suggests that impacts of spoil haulage (e.g. noise, air pollution, increased traffic congestion etc) should be included in the economic analysis. The submission also notes predicted truck spoil haulage volumes on Western Freeway and questions whether the truck numbers quoted include return trips; i.e. that the quoted figures are likely to double. This also needs to be counted as an externality.

A submission has questioned the externality unit cost values used for heavy vehicles, which do not match published material in the Update of RUC Unit Values to June 2007.

A submission has queried whether the externalities associated with construction have been included as an economic cost and set off against the benefits of the project.

Response

No construction externalities have been modelled in the CBA since these are very difficult to monetise. Spoil truck trip numbers quoted in EIS Section 4.3.18 relate to round trips, i.e. 58 truck loads per day means one round trip for each truck load. In other words, each truck would pass a given point on the route twice, so a bystander would see 58 trucks pass in each direction, or 116 trucks in total.

The externalities used for heavy vehicles in the CBA include the monetised costs of noise, air pollution etc. With regard to externality unit costs, these values were obtained from the Austroads document *"Update of RUC Values to June 2007"*, sourced from QDMR in February 2008. These aspects of the project have been taken into account in the CBA, and are counted among 'Externalities'. See EIS

Section 15.7.5 and Table 15-6 on p. 15-25 of the EIS. For further information see Technical Report No. 15 Economic Assessment, Section 5.4 pp. 51-56.

B.15.7 Issue 4 – Justification for Toll Price

The economic evaluation of Northern Link as a tolled road tunnel generated only modest returns using favourable assumptions. Greater community benefit would be obtained by providing Northern Link without a toll, as increased traffic through the tunnels would reduce congestion on much of the surrounding road network.

Without the imposition of a toll, economic returns from the project would be greater. The toll diverts 25,000 vehicles per day onto surface roads such as Milton Road and Coronation Drive. A submission requested that the justification/rationale for a $3.93 toll price be provided in the EIS.

Response

Section 5.4.5 of the EIS (Chapter 5) discusses the toll value assumptions and the likely effect of the toll on traffic using the Northern Link tunnels. For the purposes of the transport modelling, the toll price has been assumed to be the same as the toll price that has been set for the CLEM7 (Clem Jones Tunnel, formerly referred to as the North-South Bypass Tunnel). This toll price has been expressed in terms of its value in 2008 dollars, including GST.

The actual toll price to be set for the Northern Link Project may differ from the price that has been used as the basis for the EIS traffic modelling. However, the assumed price of $3.93, expressed in 2008 dollars, is within the toll range considered reasonable.

Section 5.6.1 of the EIS discusses the likely effect of the toll on traffic demand for Northern Link. The effects of the toll at four future years, 2014, 2016, 2021 and 2026 has been assessed using a toll value of $3.93 (including GST) in 2008 dollars, with future year tolls indexed to rise in line with the Consumer Price Index. The traffic modelling indicates that in 2014 approximately 32% of potential Northern Link users would not be prepared to pay the toll (and would choose to remain on surface roads). However, as travel times on alternative routes increase by 2026 this would decline to 25%, as users perceive that greater benefits in travel time savings can be realised by using the toll road facility.

Calculating the CBA for the project without a toll would not affect the overall result. As discussed in Section 5.3.5 of Technical Report No. 15 – Economic Assessment, the consistent economic approach is to "include tolls as both a cost to road users and a benefit to the operator thereby cancelling out each other in any analysis." Tolls are considered in the context of the economic CBA as a transfer payment between motorists and the tollroad operator. The toll will have an impact on traffic demand; for example the higher the toll the lower will be the traffic demand for the road infrastructure. The reduced traffic volumes are captured in the CBA model, which in turn impact on the road user benefits and the CBA results.

B.15.7 Issue 5 – Comparative Assessment of Alternatives

A submission argues that without a full comparative economic assessment of the alternatives considered, it is not possible to determine whether the project would deliver comparable value for money in comparison with, for example, an alternative optimising public transport.

Response

While the Terms of Reference required the EIS to undertake an evaluation of alternatives to the Northern Link project (see EIS Chapter 2, Section 2.5), there was no requirement in the ToR for a full comparative economic assessment of the alternatives considered. To do so would have required the alternatives to be worked up to a level of detail sufficient to provide, for each, a comprehensive cost estimate, a detailed transport model and/or patronage forecasts. This was outside the scope of the EIS.

B.15.7 Issue 6 – Heavy Vehicles and Dangerous Goods Vehicles – Travel Time Savings

A submission asks what is the basis for deriving the Heavy Vehicle travel time savings. Specifically, what heavy vehicles are allowed in the tunnel (most classes would appear to be excluded); there do not appear to be significant time savings on surface road travel across the Western Corridor to the Airport/ATC route that Heavy Vehicles would presumably travel.

The submission also questioned the CBA Project Case Description (in Section 5.2 of Technical Report 15), and suggested that "the Project Description include patronage figures for those bus services (routes) that are being referred to in the statement regarding improved journey times for express buses using the tunnel".

Response

Dangerous goods are substances or articles that pose a risk to people, property or the environment, due to their chemical or physical properties. Dangerous goods are usually classified with reference to the immediate hazard they pose rather than the long-term health effects. In Australia, dangerous goods are defined by the Australian Dangerous Goods Code (ADG). The classification criteria used in the ADG is based on the United Nations Recommendations for the Transport of Dangerous Goods. Section 4.2.2 of the EIS states that certain 'placarded' vehicles would be excluded from using the tunnel, which includes vehicles carrying:

- any load of bulk dangerous goods;
- a load containing at least 250 kg or 250 litres of dangerous goods, any of which are Class 2.1 (flammable gas) or Class 2.3 (toxic gas);
- any quantity of Class 6.2 (infectious substances); and
- any other load of dangerous goods of at least 1000 kg or 1000 litres.

Only those vehicles carrying dangerous goods, which represents a small proportion of heavy vehicles, would be excluded from the tunnel. All other heavy and light commercial vehicles would have access to the tunnel and would therefore be able to take advantage of the predicted travel time savings.

Buses that use the tunnel will have improved journey times. However, the quantum of buses comparable to light and (other) heavy vehicles is not material, and therefore has not been modelled separately in the CBA. If bus and passenger travel time was modelled, it would serve to further improve the BCR and the NPV, but only to a minor extent.

B.15.7 Issue 7 – Timing of Project Delivery

The window of opportunity referred to in the discussion of "Timing of Project Delivery" (EIS, Volume 3, Technical Report No. 15, Section 5.7) should be updated to reflect current market conditions. There

is a significant degree of uncertainty about labour costs in particular and increased costs of 5-10% would appear unlikely in the current economic climate.

Response

Section 5.7 of Technical Report No, 15 acknowledges the risks in forecasting construction costs owing to the unpredictable nature of unforeseen economic conditions and how these can impact on material and labour costs. The Report therefore acknowledges and highlights the possibility that the project's development costs may escalate, between 5% and 10% per annum, depending upon a range of economic variables.

This issue has also been addressed in the discussion of the project in the context of the global economic crisis, in Section B.15.3 (Issue 1) of this Appendix B, above.

B.15.7 Issue 8 – Results of CBA – Net Present Value

A submission commented that "It should be noted that this is an economic NPV as the term NPV usually relates to the financial cash-flows of a project, discounted at an appropriate rate, not the economic costs."

Response

The NPV for the EIS Reference Project resulting from the CBA model in the EIS is an economic NPV since it is assessing road user benefits over the 45-year concession period against the initial construction costs and the annual recurrent expenditure.

B.15.7 Issue 9 – Recognition of Social Costs in CBA

A submission suggests that there is no recognition in the CBA of the social costs associated with the Toowong Connection. The EIS fails to measure the social costs as can be readily done by standards and recommended techniques by Commonwealth Government and OECD. The importance of the social costs is dismissed by assertion when their importance is an empirical matter which can be readily calculated.

Submissions suggest that the social costs of the Toowong Connection be calculated separately to the project as a whole and provided within the Supplementary Report. The social costs as measured should be the monetary compensation paid to the Toowong residents if the Toowong Connection is approved.

Response

Section 15.7.5 of the EIS discusses the CBA modelling results, including a discussion of externalities, or direct and indirect impacts to the natural and built environment, that can be considered and assessed in the CBA process. Externalities include issues of relevance to the 'social costs' referred to in the submission such as noise, local air quality, nature and landscape, urban separation, and upstream and downstream costs. Table 15-6 in Chapter 15 of the EIS provides the Austroads-endorsed unit costs for measuring and monetising externalities for the project, based on assumptions about the extent to which light passenger vehicles and heavy vehicles will specifically generate noise, local air quality, water quality, greenhouse gas, nature and landscape, and urban separation impacts, and upstream and downstream costs and benefits. The CBA results include an overall discounted externalities benefit for the Project of approximately $182.1m, or 5.6% of the total economic benefits to the Project.

The Project (without connections) will not have any direct impact on the residential areas of Toowong. Therefore, it is unlikely that the Project would incur any direct social cost in this locality. The Project is

likely to deliver social benefits to Toowong from reduced traffic flows through the Western Freeway – Milton Road corridor and as discussed in Chapter 13 of the EIS. However, social costs in terms of the relocation of residents, resumption of property, and the potential disruptions from construction, will be significantly reduced through the adoption of the Project without the Toowong (or Kelvin Grove) connections.

B.15.7 Issue 10 – CBA inputs – Cost Assumptions

A submission questioned the variances between the Project Case Cash Flows represented in Table 10 of Technical Report 15: Economics. The (risk adjusted) P10 and P90 cash flows vary from the project case (i.e. the P50 risk adjusted Project Case cash flow) by approximately 4 percent, which "…appears low given, for example, recent past performance in cost estimation of transport infrastructure in SEQ and that the level of yearly construction cost has been increasing at approximately 15 to 20 percent per year."

A further submission adds that "there is insufficient information presented to determine whether these cost assumptions would appear reasonable. For example, raw materials that form part of construction costs, have had significantly different escalation rates for goods such as steel when compared with cement, and escalating these costs by, say, the building price index would not be reasonable if these raw inputs were materially significant."

Response

The range from P10 to P90 is narrow because many of the cost risks associated with the project are identified as 100 percent likely to happen, but there is uncertainty regarding in the magnitude of the impact on capital cost. In other words, because the project is currently at the EIS stage, the accuracy of the CAPEX estimate takes into account that the detailed design stage will reveal much more about the construction method, and the cost of construction, than can be calculated or estimated based on the Northern Link Reference Design. It is therefore 100 percent likely that the cost estimates will be inaccurate. However, what is less certain is the magnitude of the inaccuracy. The P90 (high-risk) estimate represents a 'worst case' scenario. The P10 and P50 case cash flows reflect estimates with the same likelihood of risk occurrence, but which are adjusted according to the likely magnitude of the cost impact. The uncertainty of the magnitude of cost impact, when entered into the risk model, results in the P10 and P50 values being pushed up without changing the P90 significantly, therefore effectively narrowing the range.

Exercises have been carried out in the past where the makeup of the project costs for a large tunnel project were split into more specific groups (i.e. labour, steel, concrete, plant, mechanical and electrical) and these were escalated at rates based on the particular group. Those investigations resulted in escalation rates similar to those used for the Northern Link Project. Therefore, the cost assumptions reflect different escalation rates for different labour, material and other construction inputs rather than being based on a single escalation index.

B.15.8 Conclusions

B.15.8 Issue 1 – Future Debt Risk

The economic assessment does not consider the "enormous debt burden" which will be imposed on Brisbane's ratepayers and taxpayers by 2026. The tunnel will be an impost for future generations and the

company charging the toll will go bust, and both the users and non-users of the tunnel will continue to pay.

Response

The Commonwealth has committed $500M towards the implementation of Northern Link, as described in the EIS. The Council also made application to the Commonwealth through Infrastructure Australia for additional funding. Both applications were revised on the basis of Council's decision to proceed with the Project without local connections. The National Infrastructure Priorities were released by Infrastructure Australia in May 2009 and while the Northern Link Project did not receive additional funding it was recognised as a project which would make a clear and positive contribution to Australia's transport infrastructure policy goals.

The funding arrangements for Northern Link are not matters to be addressed in the EIS or the Supplementary Report to the Coordinator-General. Such matters are being resolved between the Commonwealth, the State and Council elsewhere.

B.15.9 Technical Report and Appendices

B.15.9 Issue 1 – Appendices Not Published with Technical Report 15

A submission identified that appendices from Technical Report 15 Economic Assessment were not provided on the website (or published with the EIS documents).

Response

Through an oversight, Appendices A and B were not included in the published version of Technical Report No. 15. Further, instead of being appended to the report, the material for Appendix C was included in the body of the report, as Chapter 6. In addition to lodging the submission, the submitter also contacted Brisbane City Council directly (through the Northern Link Community Consultation team) to request copies of the Appendices. These were duly provided to the submitter through a personal communication.

B.15.9 Issue 2 – Computable General Equilibrium Modelling

A submission has queried the following aspects of the CGE modelling results as published in Technical Report No 15 – Economic Assessment:

- Clarification is needed as to what is meant by "(exclusive of expenditure on other transport via tolls)".
- Why is the impact of the toll removed in Section 6.3.5 when reporting Queensland real household consumption?
- There is a need for some clarification as to the difference between Queensland real household consumption and Queensland real consumption as in its current format it appears that real consumption is first said to be negative $1.5 million then later stated as positive $1.5 million.

Response

First dot point: The Monash Multi-Regional Forecasting (MMRF) CGE model has a transport industry sector and this model can produce state and national aggregates excluding the impacts of other transport-related expenditure and tolling expenditure during the operational phase of the project. Monash indicated that while Road passenger transport and Road freight make up a substantial portion of commercial vehicle operation, there are a number of other MMRF industries which include sizeable

commercial transport activities (particularly, Trade & hotels and Financial & business services). However, time constraints on the project meant that Monash restricted the commercial transport 'shocks' to the road passenger and freight industries.

Second dot point: The payment of a toll transfers the out of pocket vehicle usage costs from the road user to the facility operator. The toll is therefore a cost to road users and a production benefit to the operator.

Third dot point: The reference to real household consumption during the operational period of the Northern Link in Section 6.3.3 is correct (i.e. negative $1.5m on an average year while a similar reference in 6.3.5 is incorrect. It should read "projected around $1.5m below the baseline forecast for this variable." There are no implications for the assessment in making this correction.

B.16 Hazard and Risk

B.16.1 Description of Existing Environmental Values

B.16.2 Hazardous Materials and Activities

B.16.2 Issue 1 – Dangerous Goods Transport and In-Tunnel Fires Generally

Concerns have been expressed with respect to the transport of dangerous goods through the tunnel. Placard marked dangerous goods vehicles will be prohibited from using the tunnel but vehicles such as diesel tankers will not be prohibited. A major fire involving a fully loaded diesel tanker or the like could be beyond the capabilities of the fire safety measures currently proposed for the tunnel.

How would placard marked dangerous goods vehicles be prevented from entering the tunnel?

Where traffic merges underground, as is the case with secondary entries, the risk of fire or explosion due to accidents or acts of terrorism is elevated from low to moderate. Any incident would affect the local community through emissions from the ventilation outlets as well as those motorists trapped underground.

Response

The legal requirements for placarding the storage and transport of dangerous goods and combustible liquids is in the *Dangerous Goods Safety Management Act 2001* and the *Dangerous Goods Safety Management Regulation 2001* and *Transport Operations (Road Use Management – Dangerous Goods) Regulation 1998*. The law identifies that transporters are responsible to determine suitable routes to reach their destination, which minimises the risk of injury to people or harm to property or the environment. Vehicles so placarded will be excluded from the tunnels and this will include all fuel tankers including diesel tankers. This requirement is applied specifically to remove the potential for oversized fires in the tunnels. The Traffic Management Control System described in the EIS (Volume 1, Chapter 4, Section 4.4.1 and Chapter 16, Section 16.3.2 on page 16-6) would be designed to provide vehicle surveillance such that any placarded vehicle attempting to enter the tunnels could be identified and signalled not to enter with the option to close the tunnel available. It is important to note that DTMR in consultation with Brisbane City Council can establish various parameters that restrict the transportation of dangerous goods (class dependant) on critical Council infrastructure that include tunnels and bridges.

The risk of fire or explosion within the tunnels through accidents or acts of terrorism has been included in the risk assessment process reported in the EIS (Volume 1, Chapter 16, Table 16-4). The requirement for appropriate incident response procedures and other safety measures to deal with hazards are contained in the draft outline EMP in the EIS (Volume 1, Chapter 19, Section, 19.8, Element 7 Hazard and Risk). The extraction of smoke from an accident in the tunnel, predicted to be a rare occurrence, may cause an extremely short term change in pollutant levels exiting the ventilation outlet but the dispersion at elevation and at sites more than 200 m from the nearest residences means that the impact on the local community would be negligible.

B.16.3 Potential Impacts and Mitigation Measures

B.16.3 Issue 1 – Risk Assessment Process

There is no evidence of risks identified in risk assessment processes being listed and systematically addressed for their impact. The EIS does not consider the safety impacts on motorists, pedestrians and

cyclists during construction of the Toowong Connection or on motorists using the completed road tunnel.

Response

The issue of safety impacts on motorists, pedestrians and cyclists during construction of the Toowong Connection has been removed due to the decision to proceed with the Project without to need to construct this connection.

The risk assessment process for the EIS Reference Project is provided in the EIS (Volume 1, Chapter 16). Potential risks to safety and to the community are listed in Tables 16-3 and 16-4 of the EIS. 'Motorists, pedestrians and cyclists who would use the road network and footpaths near the portals and roads which result from the tunnel' are identified as one of a number of environmental values that may be potentially impacted by hazardous events and need protection. A number of safety management measures to be put in place during construction are listed. A key element for avoiding hazards to motorists, pedestrians and cyclists would be the Construction Traffic Management Plan and Construction and Operation Hazard and Risk SubPlans each of which are outlined in Chapter 19 of the EIS and for which it can be expected that the Coordinator-General's Report on the EIS for the proposed Northern Link Road Tunnel Project would contain further specific conditions.

B.16.3 Issue 2 – Role of QFRS

QFRS is unclear whether it has similar roles and responsibilities to those listed in Schedule 3 of the Coordinator-General's Change Report on the Airport Link Project, July 2008 - Appendix 1, Condition 12 - Hazard and Risk (construction) and Condition 22 - Hazard and Risk (operation).

Response

The draft outline EMP in the Northern Link EIS (Volume 1, Chapter 19, Section 19.8, Element 7) implies similar consultation, roles and responsibilities for the agencies within DES as those listed in Schedule 3 of the Coordinator-General's Change Report on the Airport Link Project, July 2008 - Appendix 1, Condition 12 - Hazard and Risk (construction) and Condition 22 - Hazard and Risk (operation). It would be expected that, in line with the Airport Link Project, the Coordinator-General's Report on the EIS for the proposed Northern Link Road Tunnel Project would contain similar conditions with respect to the Hazard and Risk Subplans for Construction and Operation.

B.16.3 Issue 3 – Flooding and Cave-ins

Tunnels can fill with water and land above tunnels can cave in.

Response

Tunnel flooding and cave-ins are recognised as potential hazards in the EIS (Volume 1, Chapter 16, Table 16-3) which provides the potential environmental impact, likely frequency of occurrence, level of impact, risk level and proposed mitigation measures. Further assessment of potential for flooding is provided elsewhere in the EIS (Volume 3, Technical Report 6 – Flooding).

B.17 Waste Management

No submissions were received on this chapter.

B.18 Health and Safety

B.18.1 Potential Public Health Impacts of Northern Link

B.18.1 Issue 1 – Pregnant Women and Children

The EIS should have addressed the potential health impacts on pregnant women and children under three years as a specific category.

Response

The EIS (Volume 3, Technical Report 8, Table 9) recognises that pregnant women and the foetus they carry may be at risk of reduced growth rate of the foetus if exposed to high concentrations of CO. A discussion of the acute effects of short term exposure to above ambient levels of CO is provided on pages 42-46 of Technical Report 8. The forecast increases in CO concentrations due to Northern Link at the monitoring sites of Bowen Hills, Toowong and Brisbane Grammar School are zero or very close to it as shown in the EIS, Volume 3, Technical Report 8, Table 28 where the ambient level of CO is identified as 2.5µg/m^3 or 2.4µg/m^3 through to 2026 with or without the road tunnel, against an EPP(Air) and NEPM goal of 10µg/m^3. This identified impact of the Project on ambient air quality could not be construed as a health risk to pregnant women.

The EIS (Volume 3, Technical Report 8, most Tables from page 115 on and the appendices) has addressed the potential health impacts on children providing potential increases in the daily rate of health events as a result of the largest forecast pollutant increases for several age groups (including 1-4 year olds). All of the assessed health risks are miniscule or negligible.

B.18.1 Issue 2 – Construction Workers

The EIS makes little reference to the health and safety of construction workers particularly tunnel workers.

Response

The proposed methods and program of works to construct the various elements of the Project have been developed to allow for safety and minimum risk as paramount considerations providing appropriate work practices are employed. In practice, the employer of the construction workers would have the direct responsibility for personal safety and risk to the construction workers on a day to day basis under the provisions of the Workplace Health and Safety Act, such responsibility to be acknowledged in contractual arrangements for the construction of the Project.

B.18.2 Health Assessment of Air Quality Changes

B.18.2 Issue 1 – Dust

The over-sized construction for the Toowong Connection can be expected to generate dust levels that will make living in the area a health hazard.

Response

The Project, with the removal of the local connections, avoids construction works from the residential part of Toowong along Milton Road and Croydon Street. This resolves the issue in the submission.

B.18.2 Issue 2 – Vehicle Emissions

Current standards of measuring air quality grossly underestimate the health impacts of car and truck emissions, particularly diesel emissions.

Diesel exhaust is 100 times more toxic than gasoline exhaust, even when carbon monoxide is considered.

Response

The submission claiming underestimates of health impacts using current standards of measuring air quality does not provide any basis in fact for this claim. The Project follows the EPP(Air) 2008 and NEPM standards and the assessment of health impacts in the EIS is based on the best available medical research in the field. Queensland Health has supported the finding that the construction and ongoing use of the roads of Northern Link will not result in an unacceptable increase in health risk to the community from the predicted small increase in air pollution levels.

B.18.3 Health Risk from Ventilation Outlet Emissions

B.18.3 Issue 1 – Western Ventilation Outlet

Assurance is sought that there will be no negative health impact in West Toowong through unpleasant aroma or contaminated air as a result of the stack's output of fumes, especially if a westerly wind blows towards residential areas and educational institutions. Similarly the assessment that there will be no or minimal health impacts from the Victoria Park ventilation outlet emissions is challenged.

Response

The dispersion modelling study of the effects of the Project on the ambient air quality in the study area shows that pollutant concentrations in the study area in future years arising from motor vehicles would be expected to be similar to existing concentrations. This is the case both with and without the Project. These results are considered conservative because they do not include any allowance for improved technology in motor vehicle engines to reduce pollutant emissions. Regionally across the study area the ambient air quality is expected to be similar whether the Project is constructed or not.

The health effects resulting from the Victoria Park and western ventilation outlets as well as from the cumulative effect of three ventilation outlets in the Bowen Hills area are presented in the EIS (Volume 3, Technical Report 8, Section C2.1 on page 127, Section C2.2 on page 139 and Section C3 on page 151, respectively. The forecast health effects are extremely small, in the order of 1 in 3 million to 1 in 200 million on the day and at the location where the forecast worst case occurs.

Numerous studies have demonstrated that living near a busy road is detrimental to the health of adults and children. The worst case increase in acute air pollution from roadways associated with Northern Link are unlikely to have an increased impact on health, due to the relatively small increases in pollutants and potential exposure of a relatively small number of people.

The Environmental Management Plan requires monitoring of in-tunnel (using monitors along the length of the tunnels and in the ventilation outlets) and ambient air quality around the portals and ventilation stacks. Standards of air quality are set by the EPP(Air) 2008 and are required to be met by the operating road tunnel. If these standards are exceeded remedial action would be required. On the best available medical research, adherence to these standards would see minimal health impact if subjected to such levels continuously over a long period.

B.18.4 Health Risk Assessment for Roadside Air Pollution

B.18.4 Issue 1 – Toowong Connection Air Pollution

During operation, the Toowong Connection can be expected to generate unacceptable air pollution levels that will make living in the area a health hazard.

The NHMRC report on air quality in and around road tunnels in 2008 indicates that short term exposure to NO_2, particulate matter and diesel exhaust pose health risks and indicates the various health conditions that such exposure may cause or worsen.

Response

The dispersion modelling study of the effects of the Project on the ambient air quality in the study area shows that pollutant concentrations in the study area in future years arising from motor vehicles would be expected to be similar to existing concentrations. This is the case both with and without the Project. These results are considered conservative because they do not include any allowance for improved technology in motor vehicle engines to reduce pollutant emissions. Regionally across the study area the ambient air quality is expected to be similar whether the Project is constructed or not.

With the removal of the Toowong local connection, the issue raised in the submission is resolved.

B.18.5 Sensitive Places

B.18.5 Issue 1 – Bible College of Queensland – Childcare Centres

Concerned about the close proximity of an unfiltered ventilation outlet to the Bible College of Queensland and the effect it may have on air quality at the college and the health and safety of the staff and students, including those who reside at the College. Seeking assurance that there will be no negative impact by way of unpleasant aroma or contaminated air as a result of the stacks output of fumes. Particularly concerned if there is a westerly breeze blowing from the stack towards the College.

A childcare centre within the study area needs to be chosen and monitored for effects of air quality before any tunnel ventilation shafts begin operation to offer a comparative before and after scenario to monitor the health of this important population sub-group. This has not been done to date. The health of sample children should also be monitored.

Response

The potential impact of ventilation outlets in Victoria Park and in Toowong on ambient air quality at any sensitive places including residences, places of education and medical facilities is shown to be minimal in the EIS (Volume 3, Technical Report 7, Section 8.2 and Figures 47-51). The EIS (Volume 1, Chapter 19, Section 19.8, Element 5) in the draft outline EMP has the requirement for monitoring of air quality in the vicinity of each ventilation outlet to begin 12 months in advance of operation and to continue during operation so that adherence to standards can be verified.

B.18.6 Health Risks from Noise and Vibration

B.18.6 Issue 1 – Toowong Connection Noise

The over-sized construction for the Toowong Connection can be expected to generate noise levels that will make living in the area a health hazard during construction and operation.

Response

With the removal of the Toowong local connection, the issue raised in the submission is resolved.

The EIS (Volume 1, Chapter 18, Sections 18.6 and 18.7) provides assessment of potential health impacts from noise and/or vibration. Operation of the road tunnel is not expected to hold any potential for health risk due to noise or vibration. Expected vibration levels from Northern Link tunnelling would be much lower than the calculated equivalent peak particle vibration where health risks may become an issue so that health risk from vibration is considered to be extremely low.

Without mitigation, noise from some construction activities may have the potential to cause annoyance, hearing impairment or loss of sleep and the EIS acknowledges that mitigation measures would be necessary under these circumstances to avoid adverse impacts.

B.19 Environmental Management Plan

B.19.1 Project Overview

B.19.2 Management Structure

B.19.3 Monitoring, Auditing and Reporting Strategies

B.19.3 Issue 1 – Community Monitoring

Ensure an independent tribunal with technical and legal expertise is set up as a community monitoring measure to have regard to all complaints during the construction phase and assess the basis for compensation and relocation. Identify who will enforce the EMP. Effective and continuous monitoring and reporting systems should be installed which are transparent, are seen to be transparent, and are operated by an independent authority.

Response

Monitoring, auditing and reporting strategies to ensure conformance or to identify non conformance with environmental standards, goals or conditions of approval are included in the draft outline environmental management plan (EIS, Volume 1, Chapter 19, Section 19.3, Section 19.7, Section 19.8). The specific requirements of a complaints and responses process are provided in the EIS (Volume 1, Chapter 19, Section 19.4.2). As stated in the EIS (Volume 1, Chapter 19, Table 19-4) all reporting will be to the Coordinator-General and will be made available to relevant agencies on request. Appropriate State Government agencies also have responsibility for aspects of the construction process in which that agency has particular responsibilities and expertise.

The EIS (Volume 1, Chapter 19, Section 19.3.2) outlines the general requirements and responsibilities for monitoring, auditing and reporting and more specific requirements for monitoring of performance are outlined in the Draft Outline EMPs (Appendix D, Sections D6 and D7). These requirements will be detailed in the EMPs to be developed during the detailed design phase and approved by the Coordinator-General before works commence.

B.19.3 Issue 2 – Community Advisor

Where residents are affected by construction/operation, there should be a process whereby individual residents or groups can be supported by a "Community Advisor' in their dealings with the proponent, chosen consortium, contractor or subcontractor. The advisor is to be an appropriately qualified person not associated in any way with any of the above and paid by the Queensland Government. (the salary to be recouped from the proponent).

Ensure an appropriate process for individual/group appeals to be made against minor or major decisions of the PPP Co, which would bear too adversely on individuals or communities. The evaluation of the EIS by the Coordinator General under the Act and other regulations and guidelines is appropriate except that too many times discretion is allowed to the Coordinator General through the use of the word 'may'.

Response

The management regime proposed to be implemented by the Proponent for the construction of the Project, in particular the arrangements proposed to monitor impacts and manage complaints during construction are outlined in the Supplementary Report (Appendix D) and will be developed in consultation with relevant regulatory agencies during the evaluation of the EIS and associated Supplementary Report by the Coordinator-General.

B.19.3 Issue 3 – NSBT Complaints

A number of complaints about excess noise, dust and other construction related impacts were made in relation to the CLEM7 (formerly NSBT) tunnel construction. The EIS for Northern Link is being prepared by the same consultants, and should include an assessment of the lessons learned from the CLEM7 Project and how to apply these to Northern Link.

Response

The EIS for Northern Link has been undertaken in the full knowledge of the environmental impacts of the construction of the CLEM7 Project in relation to the EIS and EMPs for CLEM7 as well as the Coordinator-General's conditions of approval and the performance against each of those documents through prescribed monitoring as well as investigation of complaints received from the public. All of this information has been incorporated into the development of the Northern Link EIS.

B.19.4 Community Engagement and Communication Plan

B.19.4 Issue 1 – Community Consultation

The Coordinator-General should mandate the effective community consultation, enhancements and improvements to local areas be undertaken as effectively and as early as possible, in the interests of health, safety and harmony, and that there be community involvement in the design of this and similar community-related consultation measures.

Response

The requirement for effective community consultation leading up to and during the construction phase is recognised as essential within the EIS (Volume 1, Chapter 19, Section 19.4.1). The process outlined in the EIS requires community consultation committees for each major works area that would meet regularly until completion of construction to provide timely, open advice and representations of community issues and concerns arising from design or construction.

B.19.5 Outline EMP

B.19.5 Issue 1 – Draft Outline EMP

The outline EMP lacks sufficient clarity and rigour in the description of objectives and criteria to be put in place and monitored through the construction and operation of the Project.

Response

The EIS provides a Draft Outline Environmental Management Plan that clearly identifies the environmental objectives and performance criteria to achieve these objectives. These criteria form the basis for detailed performance criteria and mitigation measures to be set in the detailed EMP during the detailed design phase when the Coordinator-General's environmental conditions are known for the Project. If the Coordinator-General recommends that the Project proceeds, the imposed conditions are expected to provide the guidelines for establishing the performance criteria and mitigation measures more explicitly in the detailed EMP.

B.19.6 Environmental Requirements and Obligations

B.19.6 Issue 1 – Definition of ERAs

The EIS does not adequately define the scale and scope of Environmentally Relevant Activities (ERAs) required for the Project. It will be difficult for DERM to develop recommended conditions for these ERAs without this information. Details such as the scale and nature of the proposed work, predicted

impacts on land, air, water and acoustical environmental values and proposed mitigation measures for these impacts are required.

The Environmental Protection Regulation 2008 (the 2008 Regulation) takes effect on the 1 January 2009 and replaces the Environmental Protection Regulation 1998. The 2008 Regulation contains changes to the definitions of ERAs including the ERA number. The proponent is to note the following ERAs may apply to the Project:

- 8 Chemical storage;
- 63 Sewerage treatment; and
- 64 Water Treatment.

Response

As explained in the EIS (Volume 1, Chapter 19, Section 19.6) the EMP provided in the EIS is a draft only. It provides a framework for the detailed EMPs and subplans and identifies the permits and approvals etc. necessary for the Project. The development of the detailed EMPs by the preferred tenderer is also explained in terms of its timing through the Project. The level of detail being sought will be provided in the application for each ERA for the Project.

The Project acknowledges implications of the Environmental Protection Regulation 2008 in respect to defining and numbering of ERAs. The ERAs that may be required for the Project include:

- ERA 8 Chemical Storage;
- ERA 63 Sewerage Treatment;
- ERA 64 Water Treatment;
- ERA 16 Extractive and Screening Activities (for screening); and
- ERA 43 Concrete batching.

B.19.7 Design and Construction Environmental Management Plan

B.19.7 Issue 1 – Soil Erosion and Sediment Control Guidelines

The draft outline EMP makes reference to the "Soil Erosion and Sediment Control, Engineers Guidelines for Queensland". It should be noted that there are new guidelines being released. These guidelines are the Best Practice Erosion & Sediment Control, International Erosion Control Association (Australasia). These are to be released in late 2008.

Response

The IECA guidelines, mentioned in the submission, are now published and present a very useful tool in planning worksites. The reason for mention of the "Soil Erosion and Sediment Control, Engineers Guidelines for Queensland" is because they are Queensland specific and because the Terms of Reference indicates that these guidelines include measures suitable for preventing soil loss and consequent degradation of local waterways.

B.19.7 Issue 2 – Awareness for Site Visitors

Training and awareness on Northern Link should not only be undertaken by on-site staff, but by visitors to the site as well. Environmental awareness for visitors should also be covered in the site-specific safety induction.

Response

The Contractor, who would be in charge of the worksite, would have certain responsibilities under the Workplace Health and Safety Act for site inductions for all personnel entering the worksite, whether they are staff or visitors. The level of training should be commensurate with the involvement of the person entering the site. A staff member for whom it may be his/her place of work for a year or more will clearly require a great deal more training and maintenance of that training over time than a visitor who may be on site for an hour or two. Appropriate levels of site induction and environmental awareness would be developed under the requirements for training and awareness to be included in the detailed design and construct EMP.

B.19.7 Issue 3 – Main Roads Traffic Noise Management CoP

The "Interim Guidelines and Technical Notes for Road Traffic Noise Amelioration (1991)" were superseded in 2000 by the Road Traffic Noise Code of Practice. That edition has now been superseded by the October 2007 version. The reference should be to the Main Roads Road Traffic Noise Management: Code of Practice (Oct 2007)

Response

It is acknowledged that the most recent edition of the 'Guidelines and Technical Notes for Road Traffic Noise Amelioration' would be applied to the Project works with respect to monitoring and auditing of performance.

B.19.7 Issue 4 – Urban Design Element

Numerous submissions raised issues of urban design and visual amenity, particularly in the areas of the Toowong and Kelvin Grove Connections. Although these issues are addressed in Section 4-14 of this Supplementary Report a new element is included in the draft outline Construction EMP to ensure these issues are integrated into the detailed EMP and planning approval process.

Response

An Urban Design and Visual Landscape element is added to the Draft Outline EMP is provided in this Supplementary Report as Appendix D, Section D6, Element 13.

B.19.8 Operation Environmental Management Plan

B.19.8 Issue 1 – Performance Criteria for Groundwater

The 'Performance Criteria' do not include criteria for groundwater quality.

Response

Since groundwater reporting to the tunnel is coming from an inaccessible source within the rock it is not possible to control its quality before it reaches the tunnel. The criteria for groundwater quality that would need to be met would be in relation to its quality at release on the surface into the stormwater system and are provided in the Draft Outline EMP (Appendix D, Section D. 6, Element 4 – Surface Water in this Supplementary report).

B.19.8 Issue 2 – Stormwater Runoff from Roads

The Mitigation Measures for Storm Water for Northern Link in Section 19.8, Element 4 of the Operation EMP only identifies the management of stormwater for the tunnel operation. The management of stormwater runoff from roads has not been addressed in the EMP for areas outside the

tunnel, e.g., entry/exit ramps. Section 7.5.6 of the EIS includes "Operational Surface Water Quality Monitoring Program" and this should be inserted into the Monitoring row of the EMP, Element 4.

Response

The operational monitoring program identified in Section 7.5.6 of the EIS has been inserted into the Operation EMP for the Project. This includes:

Establishing an operational water quality monitoring program utilising the following guidelines:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000;
- Queensland Water Quality Guidelines 2006; and
- EPA Water Quality Sampling Manual 1999.

Water quality monitoring requirements for water quality objectives have also been inserted into the EMP. The objectives are to be established to protect environmental values in the vicinity of the discharge in accordance with the Environmental Protection Regulation 2008 and the Environmental Protection (Water) Policy 1997.

B.19.8 Issue 3 – Fire and Life Safety Design

To help ensure that the fire and life safety design of the Project meets their requirements, QFRS seeks:

- consultation with DES/QFRS on the planning and design development process for the fire and life safety component of the Project, including the establishment of a 'Fire and Life Safety Committee' or similar to facilitate the input of key stakeholders;
- suitable independent third party/peer review of the fire and life safety aspects of the design in accordance with QFRS's Community Safety Guideline "Third Party/Peer Review of the Fire and Life Safety Design or Major Infrastructure Projects (Issue 1, December 2006)"; and
- endorsement by DES/QFRS, of the fire and life safety design of the Project including testing prior to operation of the tunnel.

Response

The EIS (Volume 1, Chapter 19, Section 19.8, Element 7) requires the Contractor to develop a Hazards and Risk Management Plan including all design and procedural aspects relevant to the agencies within the Department of Emergency Services through consultation with DES during the detailed design phase of the Project following on from preliminary discussions between DES and the Proponent that have already been held.

B.20 Urban Regeneration

B.20.1 Introduction

B.20.2 Context

B.20.2 Issue 1 – Bicentennial Cycleway

A submission requested clarification of the Project-specific works intended by the statement in Section 20.2 of the EIS that "Brisbane City Council and Queensland Transport could also coordinate the staged upgrade of the Bicentennial Cycleway with Project-specific mitigation measures to maximise the benefits for people wanting to walk or cycle to work". It was submitted that this perhaps should be addressed in the Northern Link project. It was also questioned, "what are the Project-specific mitigation measures and has the Northern Link team (MIPO) spoken to Brisbane City Council and QT".

Responses

As stated in the opening of Section 20.2 of the EIS, a framework for urban regeneration in the study corridor would be implemented through:

- the integration of project-specific requirements or conditions;
- the implementation of existing policies and programs; and
- the management of the development and redevelopment of land in accordance with established land use and infrastructure plans.

For the EIS Reference Project, the EIS proposed a comprehensive suite of urban mitigations (Chapter 20) in addition to the environmental management measures and mitigation measures (Chapter 19) for the construction and operational phases. The urban mitigations were proposed to mitigate and off-set community impacts, whereas the environmental management measures and mitigation measures were proposed to avoid or mitigate and manage the predicted impacts on local properties.

The removal of the local connections at Toowong and at Kelvin Grove removes many of the impacts predicted to affect those localities. Consequently, there is no need to provide urban mitigations in localities not affected by the Project. The need for some local urban mitigations remains in the vicinity of the mainline portals at Mt Coot-tha and at Herston.

The urban mitigations that would be provided in Toowong as part of the Project are now presented in **Table 2-1** of this Supplementary Report and include enhanced pedestrian and cycle connectivity through the provision of safer pedestrian and cycle crossings across Dean and Miskin Streets for the existing off-road bikeway between Anzac Park and Sylvan Road.

In detailed design, details of the urban mitigation proposals will be identified, being generally consistent with those urban mitigations described in Section 2.5.2 of the Supplementary Report. These details will be required to be submitted to the Coordinator-General prior to their construction and must be developed in consultation with relevant agencies, including BCC, QT and Main Roads with regard to pedestrian and cycleways.

B.20.3 Framework for Urban Regeneration

B.20.3 Issue 1 – Urban Outcomes

A submission requested more detail about the benefits of increased land use intensity expected to be realised due to the Northern Link Project and clarification of its function in a regional sense and how it contributes to achieving the outcomes of the SEQRP.

Response

The framework for urban regeneration outlined in Section 20.3 of the EIS identified that the EIS Reference Project would act as a catalyst for land use change which needs to be managed through existing State and local government land use and transport planning programs in order to achieve agreed public policy outcomes in this area, such as the *draft Brisbane CityShape 2026* [16] outcomes. The removal of the local connections has substantially lessened the effect of the Project in opening up potential development fronts in areas affected by the local access ramps. While the Project, having now removed the local connections at Toowong and Kelvin Grove Road, significantly reduces the Project's position as a catalyst for land use change, the broader principles for urban regeneration remain, based largely on the Project's benefits to local accessibility and traffic congestion within the inner west of Brisbane.

The function of the Project, in a regional sense, and how it contributes to the SEQRP are outlined in relation to traffic and transport in Chapters 2 and 5 of the EIS and further in Chapter 4 and the responses to submissions in Appendix B of this Supplementary Report. In short, Northern Link, including the Project as now presented without the local connections at Toowong and Kelvin Grove Road, would complete a high-quality regional transport route and would complement other investment in transport infrastructure by the Queensland Government in Airport Link and the Airport Roundabout Upgrade, and by Brisbane City Council in the Clem Jones Tunnel (CLEM7)[17].

B.20.3 Issue 2 – Stimulate Economic Development

A submission questioned the wording in Section 20.3.5 of the EIS regarding enhanced accessibility to the motorway network for the commercial precincts especially in Indooroopilly and Toowong. Enhancing accessibility to the motorway network for Toowong and Indooroopilly should not be promoted as a driver for this project. It was also questioned how Northern Link would facilitate enhancement of public transport services, particularly on Coronation Drive? It was also submitted that the following statement was not clear in regard to its meaning - "*To avoid the costs, or limited gains of speculative economic activity, development needs to be planned and managed. Value in property and economic activity could then be harnessed for enduring benefits. An integrated planning approach is required to capture the short to medium term benefits that would flow from these network improvements*."

Response

As stated in Section 20.3.5 of the EIS – "Experiences in other places suggests that investment in public infrastructure, and transport infrastructure in particular, leads to strong economic development in areas benefiting from enhanced accessibility." As was also noted in the submission, these centres need to be developed to capitalise on public transport and active transport linkages due to their proximity to the

16 Brisbane City Council, 2006, draft Brisbane CityShape 2026, Council, Brisbane

17 Formerly known as the North-South Bypass Tunnel (NSBT).

CBD and they would also benefit from freed up road space on the local road network. The commercial precincts in Milton, Indooroopilly and Toowong would benefit from congestion relief brought about by the Project. Public Transport services would be enhanced through Northern Link providing opportunities for Rocket bus services from the Western Freeway to access the Inner Northern Busway via the ICB, and also indirectly through changes in traffic conditions or traffic volumes on the existing road network, particularly on Coronation Drive. Equally however, there is a role for integrated land use and transport planning and management to capture the short to medium term benefits that would flow from these transport network improvements.

B.20.3 Issue 3 – Project Impacts and Claims

The Urban Regeneration chapter in the EIS explicably and incorrectly denies the existence of any high level impacts of the project. It also makes impossible claims about the benefits of the project.

Response

As with all major infrastructure projects, community expectations for Northern Link are that it will achieve its Project objectives and deliver a range of transport-related benefits to communities both within and beyond the study corridor. Such benefits can be characterised as 'high level' benefits, whereas the predicted impacts are more readily characterised as 'local level' impacts.

As discussed in Chapter 20 of the EIS, the preliminary rounds of community consultation undertaken to support preparation of this EIS, identified that while there was broad community support for Northern Link in terms of its potential for "high level" or wider road network benefits, that these would be at the expense of "low level" or local community impacts. There was no intention to insinuate that the benefits were of an impossibly high scale and that the impacts were at a lesser scale to the wider benefits. Urban mitigations were specifically identified in an attempt to balance the local level impacts against the wider level benefits of the EIS Reference Project. Preliminary community consultation for Northern Link identified the following community concerns and expectations:

- recognition that traffic congestion in the inner western suburbs is 'a problem', and the need for traffic management and reduction in the inner western suburbs;
- concerns over construction and operational aspects of the Project, particularly for communities near the surface connections at Toowong and Kelvin Grove (e.g.: traffic congestion on approach roads, and project justification, visual impacts of surface infrastructure, noise, vibration, air quality, vent location and appearance);
- concerns that surface infrastructure and road widenings associated with connections at Toowong and Kelvin Grove will create physical barriers between neighbourhoods and to community facilities; and
- expectation that local residents should benefit from the Project equally, if not more so, with the people who presently drive through their suburbs to access employment in the CBD.

The Urban Regeneration chapter in the EIS, particularly in regard to the impacts of the Toowong connection, does not deny the existence of any significant or long term impacts of the project. The following is an extract from Section 20.4.2 in relation to Toowong.

The Toowong worksite, bounded by Milton Road, Frederick Street and Valentine Street, would be transformed as a consequence of Project construction activities. The removal of existing buildings, earthworks and removal of trees would expose residents on the northern side of Valentine Street to Milton Road, as well as change the land use character of the existing commercial and mixed use area on

the northern side of Milton Road. Also, Project works such as the elevated road infrastructure above Milton Road, would impact on the commercial precinct on the southern side of Milton Road. Project works would also remove dwellings on the southern side of Morley Street adjacent to the intersection with Frederick Street.

In consideration of the submissions on the EIS, including being able to better balance the issue of providing for these wider or higher level public benefits from the Project without inflicting unreasonable impacts on the local community supporting the infrastructure, Council has decided to remove the local connections at Toowong and Kelvin Grove Road from the Project.

B.20.4 Implementation and Outcomes

B.20.4 Issue 1 – Implementing Urban Regeneration

A submission identified that it is not clear what government programs are referred to in Section 20.4 of the EIS, apart from a reference to the City West project and needs rewriting to improve its clarity.

Response

The intention is for the delivery of existing government programs in the study corridor to optimise the potential for community benefit from each of these programs brought about, or through, the delivery of major infrastructure, such as Northern Link. Section 20.4.1 identifies the need for program initiatives for urban regeneration to be developed within a consultative framework involving agencies, stakeholders and local communities. Program sponsors, and potential urban regeneration initiatives, in the inner western suburbs that would have a potential for community benefit through the delivery and operation of Northern Link identified in this section of the EIS included:

- *Queensland Government* - further development of the 'City West' master plan to determine the feasibility of implementing the Normanby action plan for improved urban amenity along Kelvin Grove Road and Musgrave Road in the vicinity of the Inner City Bypass.
- *Brisbane City Council* - investigation of local planning at Toowong and continuation of local planning at Milton and at Kelvin Grove to manage land use change and to achieve a high level of integration in land use and transport planning, consistent with the growth management strategy developed under the SEQ Regional Plan.
- *Proponent* - investigation of employment schemes for youth, disabled people, indigenous people and prematurely retired or long-term unemployed people, in conjunction with employment initiatives of the delivery vehicles.
- *Proponent* - investigation of possible participation in Project construction or in community-based, project-related activities building community capacity for people who don't speak English as their first language, people with low education levels and people with special needs.

The point, attempting to be made in the EIS, was to get these programs and initiatives "on the table" and for these programs and initiatives into the documentation supporting the procurement of the Northern Link Project. It was also recognised that there may be other, equally effective means of integrating and coordinating the delivery of programs across the three tiers of government.

While the removal of the local connections from the Project alleviate to a significant extent the direct relationship between the Project and some of these initiatives, the principles of implementing urban regeneration initiatives through the effect of constructing and operation such a significant transport project as Northern Link remain.

B.20.4 Issue 2 – Redevelopment Initiatives – Toowong

A number of submissions opposed the potential redevelopment of residual land acquired for the Project's construction for future commercial, medium to high density residential or industrial uses. Residual land should be preserved as green space and should be used to increase community facilities (e.g. BBQ areas, pools, tennis courts, etc) when the project is finished. Developing commercial premises on available land at the end of the project is not in keeping with the historical character housing and residential nature. The residual land between Valentine Street and Milton Road should be planted with trees to act as a visual screening from the flyovers.

More generally it was also submitted that the parks provided by the roadworks are in residual spaces left over after the road construction in undesirable locations next to the road infrastructure and edged by high acoustic walls and freeway flyovers.

Response

As stated in Section 20.4.2 of the EIS, the use of residual land ought to be determined through an orderly planning and development assessment process, established through *City Plan 2000.* As redevelopment occurs in the study corridor, partly in response to the strategic advantages of the corridor (i.e.: proximity to key employment centres), and partly in response to the opportunities created by Northern Link, further consultation in the plan-making process will take place. The discussion of potential future uses for residual land merely identifies potential future uses with the views of the community, including those raised during the EIS process, taken into account through the proper planning process.

The decision to remove the local connections from the Project, particularly at Toowong, has removed the issue associated with the potential redevelopment of residual land acquired for the construction of the connecting ramps at Toowong. This also applies to the issue of residual spaces being proposed for use as open space, even though such areas were proposed not to be used as open space but as landscape buffers, to be owned and maintained by the tunnel operator.

The only residual land from the Project considered by BCC to be suitable for public use would be the land occupied by the Western Freeway worksite. This land is owned by BCC and areas not required for the operation of the Project will be returned to Council with the intent of incorporating the available land into the Mt Coot-tha Botanic Gardens Master Plan. The Botanic Gardens has already developed draft plans for the use of this area despite its location adjacent to road infrastructure, and the master plan will take into account changes to the existing road infrastructure brought about by the Project.

B.20.4 Issue 3 – Redevelopment Initiatives – Kelvin Grove

Following meetings with the Northern Link consultation and technical team, Kelvin Grove Urban Village (KGUV) is satisfied that the "island" of land between the ICB, Lower Clifton Terrace and Kelvin Grove Road will be made available for community use after the completion of construction works.

Response

The decision not to proceed with the Kelvin Grove local connection means that this land would no longer be made available for community use because the Project would not impact it at all..

B.20.5 Urban Mitigation Initiatives

B.20.5 Issue 1 – Toowong Connectivity

The project fails to address connectivity in the provision of crossing roads. An example is the current dangerous informal road crossing between Gregory Street and Quinn Park. The project makes it impossible to cross here at all and people will have to walk 200 m and wait for six changes of lights in order to make the crossing. Crossing time will also be slow and there will be decreased safety on Croydon Street and lack of cycling facilities. Concern was also expressed about the lack of pedestrian and cycle crossing points to the Toowong Cemetery. Table 20-2 in Chapter 20 identifies the need to re-establish signalised pedestrian crossings of Milton Road and Croydon Street as a high priority. The submission suggests that this comment infers that the author of this chapter does not support the reduction in traffic light pedestrian crossings as proposed in the reference design.

Response

There will be no change to the existing provisions for the crossing of roads as a consequence of the Project following the decision to remove the local connections, particularly affecting the crossing of Croydon Street and Milton Road in Toowong. The Project also does not affect the existing situation regarding pedestrian and cycle access, including the lack of existing crossing points, to the Toowong Cemetery.

B.20.5 Issue 2 – Quinn Park

A number of submissions were concerned that the EIS failed to suitably address mitigation measures for the loss of a large portion of Quinn Park and the reduced accessibility to the park. The EIS outlines a bike path in the park, but it is unclear where the entry and exit point are and how it would connect to pedestrian and cycle activity in the area. The inclusion of the bike bath would cause Quinn Park to be "lost as a park" as it would essentially become a bike path. The loss of more than half of Quinn Park will be another blow to the community. The park will lose its open feel, lined by trees due to the tall ramps on Milton Road and the cul-de-sac on Quinn Street, potentially resulting in the park not being a safe place. The footpath that is proposed to be relocated to go down through the park will lead to reduced use of this basic amenity as people will have to walk or cycle further and it will not feel safe to walk down at the bottom of the towering structure. A submitter did not support "urban art" for Quinn Park of the style shown in Figure 20-2 of Chapter 20 nor public art as an appropriate use of the public benefit portion of funding for the project. A new park on the corner of Milton Road and Croydon Street opposite the shops can link into existing playing fields and open space but has poor urban interfaces and is hidden behind a high acoustic wall. The cross section of Quinn Park as shown in this figure is also a misrepresentation, as it excludes the retaining wall adjacent to the edge of the road, as is shown in all other representations of the post-project Quinn Park.

Response

The EIS acknowledged that the impact on local open space at Quinn Park would be significant and long-term and that urban design and landscaping measures proposed to the balance of the area would unlikely compensate fully for the loss of area. In consideration of the EIS and submissions, and in weighing the potential impact of further mitigations to offset the significant loss of parkland, such as Quinn Park by the EIS Reference Project, the Council has decided to proceed with the Project without the local connections. As a result, there will be no change to the current size and state of Quinn Park as a result of the Project.

B.20.5 Issue 3 – Croydon Street Median Plantings

It was submitted that Milton Road and Croydon Street should have median strip plantings down the middle of the road, including jacarandas, poinsettias, palm trees, golden cane and other traditional Brisbane trees. "Avenues" of trees are [preferred] to improve the design if the current streetscape is to be decimated.

Response

As a result of the decision to remove the local connections from the Project there will be no change to the landscape treatment of Milton Road and Croydon Street as a result of the Project. The EIS identifies in the Appendix to Technical Report 14 a "Planting Palette" inspired by the vegetation character of the study area and includes a number of cultural plantings and subtropical species. It is intended that the Project plantings would provide landscape treatments that integrate with and reinforce local vegetation patterns and enhance local landscape character. While generally native species would be recommended, introduced species, such as those recommended in the submission, may be used where their use complements existing local vegetation specimens of high visual significance.

B.20.5 Issue 4 – Cycle Related Mitigation Measures

Submissions commented that the cycle-related mitigation measures proposed are underwhelming in relation to the scale of the project and its impacts. There is opportunity to positively provide a better long term cycling outcome through the design and construction process and relatively small cost, but see no evidence of this within this project. More specifically the concerns included:

- The bicycle path along Mt Coot-tha Road to the Botanic Gardens from the bridge is already committed to by Main Roads and can not be claimed to be part of the Northern Link project.
- Better usage of liberated road-space and better long term connections through the high impact construction sites around the tunnel portals. Busy narrow roads such as Milton Road and Kelvin Grove Road have long been recognised on existing State and Council cycle plans as needing cycle facilities. As Milton Road should experience a drop in traffic volumes, the opportunity exists for incorporating cycle lanes onto them.
- Given the barrier effect of the project around Kelvin Grove, a link between Victoria Park and Spring Hill would be highly desirable, but this needs to be clarified. The proposed reinstatement of the path in Victoria Park must happen. The proposed pedestrian link to Lower Clifton Terrace seems to be a minimal effort that will not provide a good level of service to either pedestrians or cyclists.
- The proposed off-road bicycle facilities along Sylvan Road make little sense. Council is already working to find a solution for the crossings of Dean and Miskin Streets, if there are alternatives, the EIS should detail them.
- A better connection along Milton Rd between Croydon Street and Dean Street would be desirable, but the proposed path through Quinn Park suffers from safety issues.
- The proposed re-establishment of signalised pedestrian crossings of Milton Rd and Croydon Street is not a mitigation, but reinstatement of existing conditions, which will be worsened by the project. It is unclear what is meant by "support pedestrian crossing with urban design and landscape treatments."

Response

The Project recognises the need to firstly ensure that construction and operational impacts do not adversely affect the existing and continued operation of the active transport network and secondly to

facilitate opportunities for beneficial community and economic activity through project-specific initiatives to optimise the potential benefits of the Project's delivery.

The decision to remove the local connections from the Project has considerably reduced the scale of the Project and its community impacts. Pedestrian and cycle project works to be delivered as urban mitigations for the Project are now identified in Section 2.5.2 of the Supplementary Report. These initiatives are considered a reasonable response to mitigate and offset Project impacts that have been already significantly mitigated through the decision to remove the local connections from the Project, as well as capture potential benefits provided by the Project.

In relation to the extension of the Western Freeway Bikeway to the Botanic Gardens gate, this project mitigation remains included as it is understood that this element of the shared path has not been provided as part of this facility. The Project would remain responsible for ensuring that this cycleway and pedestrian path remains functional during construction and where necessary is relocated to maintain the connectivity and functionality as planned and extended by the Project.

The EIS Reference Project design did not consider it to be feasible to provide on-road cycle facilities on either Milton Road or Kelvin Grove Road in the vicinity of the then proposed tunnel portals due to both safety concerns and also project costs associated with the further widening that would be required. No change to this position is proposed , particularly as the Project without the local connections, has no significant impact on these areas.

Enhancement would be provided for the existing off-road bike way between Sylvan Road and the Western Freeway bikeway by providing improved and safer pedestrian and cycle crossovers at Dean Street and Miskin Street. At the ICB connection for the Project it is proposed to reinstate the pedestrian and cycle path disturbed by construction works along ICB.

In regard to what is meant by "support pedestrian crossings with urban design and landscape treatments", this refers to project design works such as pavement improvements, plantings, possible barrier designs, shade structures and other elements that may help support the average pedestrian or cyclist in both waiting to cross and in making their crossing. Where proposed, such urban design and landscape treatments are now identified in Section 2.5.2 of the Supplementary Report.

B.20.5 Issue 5 – Toowong Connection

It was submitted that the EIS does not commit to implementing any of the mitigation measures identified and that pre-existing projects should not be counted as mitigation measures as part of the project. It was also submitted that comments in Chapter 20 (Urban Regeneration) suggest a range of urban mitigation measures be considered, including detailed design studies. This infers that the Toowong Connection is not an acceptable design and requires redesign before it can be considered acceptable to construct. It was submitted that the Toowong connection requires re-design.

Response

The mitigation measures proposed in Chapter 20 of the EIS for the EIS Reference Project included a range of urban mitigation options to be considered should Northern Link be implemented in its connected form at Toowong as proposed in the EIS Reference Project. These further mitigation options were included in recognition that the local connection as proposed in the EIS Reference Project required further detailed design studies to further investigate possible opportunities to reduce the scale and impact of the connection. In particular this referred to the effect of the elevated road structures and the

need for further mitigation that either avoids or reduces the impacts on nearby properties, the streetscape of Milton Road and the amenity of Quinn Park. The EIS openly recognised that the Toowong connection as described would have long term adverse impacts in its immediate vicinity. The detailed design process provided an opportunity for further impact reduction, or mitigation, through design and the scope of urban mitigations would be refined to address any likely impacts arising from detailed design.

In consideration of the uncertainties associated with the need for further studies to attempt further design and mitigation to address the recognised impacts of the connection (as well as the connection at Kelvin Grove Road), and in consideration of the submissions on the EIS, Council has decided to remove the local connections from the Project. With the removal of the Toowong connection from the Project, including previously identified mitigation measures and further design studies, further urban mitigations are no longer required for this element of the Project design. As identified above, pre-existing projects, such as the Main Roads pedestrian and cycle overpass of the Western Freeway would be retained and reconstructed to suit the design of the Western Freeway connection as well as being enhanced to provide a shared path all the way to the Botanic Gardens gate.

B.20.5 Issue 6 – Kelvin Grove Connection

A submission supported the proposed mitigation activities as they would assist in reducing the need for local private vehicle trips.

Another submission commented that the base case appears to deal only in planting trees and other vegetation. While in some particular places that might be reasonable (and the suggested cutting down of significant trees in the locality is noted), there is a fundamental difference between the "cover it with planting" response and the "creating a new urban neighbourhood of pedestrian friendly streets and buildings with active frontages" proposal by the City West Task Force. Indeed some of the EIS drawings of the base case appear at odds with basic CPTED Principles as defined by the Government's own Guidelines document. It is not immediately clear that the EIS Report has considered this important community safety (and therefore social and economic sustainability) issue.

Response

Council has decided to remove the local connections from the Project and as a consequence the urban mitigations required for the Project's connection to the ICB at Herston have been significantly reduced as identified in Section 2.5.2 of the Supplementary Report. As addressed in Chapter 14 (Urban Design and Visual Environment), CPTED Principles are to be included in all of the urban design mitigations. This will also apply to the urban mitigation project works identified in Section 2.5.2 of the Supplementary Report. The application of these principles will be reiterated through both the design and construction EMP performance criteria and the project specification, as identified below:

- Include CPTED principles in all of the urban and landscape design for the Project works in accordance with 'Crime Prevention through Environmental Design Guidelines for Queensland Part A: Essential features for safer places. 2007';
- Mitigate any potential safety concerns in respect of land underneath elevated structures (including bridge structures) through innovative use of CPTED principles;
- Incorporate CPTED principles along pedestrian and cycle networks and in the design of elevated and bridge structures, including maximising illumination, visibility and sightlines for pedestrians and cyclists, avoiding the creation of loitering and hiding places, promoting natural surveillance from adjoining areas and clearly defining public spaces;

- Provide safe, legible and comfortable connections to and from all areas affected by the Project for pedestrians, cyclists and public transport users (e.g. shade and CPTED principles); and
- Provide lighting along connections and at decision points in accordance with CPTED principles.

B.21 Cumulative Impacts

B.21.1 Methodology

B.21.1 Issue 1 – Definition of Cumulative Impacts

It was submitted that the definition of cumulative impact requires modification – the cumulative impact is the combined effect of this project and other developments. Suggest amend to "Cumulative impacts are normally associated with the compounding and synergistic interactions on the environment arising from a proposed project and other developments, occurring in the same area over similar timeframes to the project being assessed."

Response

The statement provided in the opening paragraph of Chapter 21 in the EIS is consistent with the suggested amendment.

B.21.1 Issue 2 – Cumulative Impacts

This chapter does not adequately address the cumulative impacts of Northern Link and the combination of the other currently-planned projects on the receiving environment.

Response

Chapter 21 addresses Part B, Section 5.14 of the Terms of Reference (ToR). The interrelationship of the impacts of the Project are identified and discussed in the context of the overall effect of the Project. The cumulative impacts as they relate to particular issues are considered over time or in combination with other impacts due to the scale, intensity, duration or frequency of the effects. The chapter also considers the effect of the Project in combination with other known infrastructure projects relevant to the northern and western suburbs of Brisbane particularly in regard to traffic impacts arising form construction overlapping in time and/or location. The assessment includes impacts during construction on the regional road network, impacts on local communities, impacts on labour markets, and impacts of other projects emerging from existing transport plans, strategies and studies, including the SEQ Infrastructure Plan and Program.

B.21.2 Interrelationships of Overall Impacts within the Project

B.21.2 Issue 1 – Hale Street Connection to ICB

The Report does not acknowledge the serious flaws in the design of Hale Street in the Normanby area which must be rectified and seems to take its existing geometry as a given in its base case and presumably its modelling. For the Northern Link project to be conceived in isolation from existing traffic and urban problems in the area created by the 1980s Hale Street infrastructure is poor EIS practice. It is inappropriate for the Northern Link project and its EIS to focus only on "mitigating" what it identifies as its own direct impacts in isolation when it should deal also with the impact of not using its project power to fix existing problems in adjacent interconnected relevant infrastructure.

Response

This is not within the scope of the Northern Link Project. Investigations were confined to confirming that the Northern Link northern connections would not 'design out' (preclude) the future undergrounding and realignment of the 'Hale Street chicane'.

B.21.2 Issue 2 – Intent of SEQRP

It was submitted that statements in Section 21.2.7 of the EIS are not consistent with the intent of the SEQ Regional Plan to "protect the region from urban sprawl, focusing on urban growth..." through "more compact forms of development."

Response

The submission has been selective with regard to the "intent" of the SEQ Regional Plan in relation to this section of the EIS. The SEQ Regional Plan covers a wide array of planning intents, and while supporting more compact forms of urban development, the Regional Plan also supports facilitating the development of the Western Corridor, particularly through more effective and efficient transport connections. The improved connection that the Project would provide between the Western Corridor and the Australia TradeCoast (ATC) is consistent with the aims and objectives of the SEQ Regional Plan. Regional land use changes associated with the Project are likely to contribute to economic development in terms of helping to create employment opportunities. This too is an objective of the SEQRP.

At the local level, Northern Link would make a positive contribution to the development of the proposed transit-oriented development around Milton Railway Station. The forecast reductions in surface traffic volumes on local and higher order roads in the study corridor would improve amenity generally and would therefore create other opportunities for local development or changes in land use, or changes in the intensity of certain land uses. For example, with Northern Link in operation there may be opportunities for further increases in residential density around transport nodes in or adjacent to the study corridor such as Auchenflower, Taringa and Toowong.

B.21.2 Issue 3 – Community Severance

It was submitted that the interrelationships of social impacts addressed in Section 21.2.8 of the EIS has not addressed the potential splitting of the community in the Toowong precinct particularly in the vicinity of the widened Milton Rd and Croydon Street. Residents north of Milton Rd in the Toowong precinct would find it difficult to walk or cycle to the Toowong activity centre or use active transport to access essential services, e.g., Toowong State School. This is contrary to the State government's desire to increase the use of active transport. Options for dedicated pedestrian and cycle connections need to be the subject of a more detailed analysis at EIS stage to ensure that the Northern Link Project does not sever the community as drastically as currently shown.

Response

The Project without local connections as now proposed, resolves this issue by removal of the Toowong connection and associated surface roadworks that were perceived to increase the social divide resulting from the Milton Road corridor.

B.21.2 Issue 4 – Impacts on Freight Task

It was submitted that while reference is made to increasing air travel and air freight derived from the Australia TradeCoast there is no overall freight component on the improved economic outcome afforded by the Northern Link Project. More information on the economic analysis of NL's contribution to improved freight distribution needs to be articulated given it is one of the Project's primary objectives. What percentage of freight is forecast to use Northern Link during the 20 hours of lowest traffic demand, i.e., during off-peak periods, compared to Milton Road?

Response

This section on the economic relationships of the Project discusses the Project's broad cumulative economic effect in terms of the identified economic growth centres it is proposed to serve and the impact it is predicted to have on employment centres. Several major economic growth centres (Brisbane Airport, Australia TradeCoast, Port of Brisbane, Western Corridor) are projected as important future employment generators benefiting from improved access through Northern Link. The Project is expected to have a positive cumulative effect on employment during the construction phase and beyond and is also projected to contribute to rising property values through the study corridor and surrounding areas. Economic activity in the Brisbane metropolitan area is forecast to continue to expand with the Western Corridor, Brisbane Airport, the Port of Brisbane and other major commercial and industrial development in the outer North area likely to be a catalyst for substantial economic growth.

The link between the ATC transport hub with its integrated air, sea, road and rail facilities, and the Western Corridor industrial hub and its interstate transport centre, would be strengthened by the Project. The specific details of freight traffic proportions and patterns are part of the traffic modelling study reported in Chapter 5 of the EIS rather than the economic discussion contained in Chapter 21 of the EIS.

B.21.3 Cumulative Construction Impacts

B.21.3 Issue 1 – Haulage

It was submitted that Section 3.6.3 (Project Development) does not address cumulative impacts of spoil haulage by North South Bypass Tunnel, Airport Link, Hale Street Link and Northern Link. The submission requests that the cumulative impacts be reviewed and addressed (in 2007 values). It was also submitted that the EIS assumes that use of Centenary Motorway by Northern Link haulage would be finished prior to the start of substantial construction activities on this project. If the Centenary Motorway / Northern Link Interface Project proceeds, this won't be correct and needs to be factored in. BCC is requested to develop alternative haulage plans in consultation with Main Roads should Centenary Motorway Northern Link Interface proceed.

Response

The cumulative impact of spoil haulage for the EIS Reference Project is addressed in Chapter 21 of the EIS, rather than Chapter 3. Spoil haulage from CLEM7 (the North South Bypass Tunnel) was expected to be completed before any spoil haulage commenced from the EIS Reference Project. Projected overlap of the two projects (EIS, Volume 1, Chapter 21, Table 21-3) indicated an overlap of 9 months between the two projects while driven tunnel construction for the EIS Reference Project was not then programmed to start until the second half of 2010 (EIS, Volume 1, Chapter 4, Figure 4-14). Spoil haulage from the Hale Street Link was also projected to be minimal and also completed before mid 2010 so preceding Northern Link. Airport Link and the EIS Reference Project were expected to be using the same spoil haul route along Kingsford Smith Drive for 15 months and the cumulative effect of this was assessed and reported in the EIS (Volume 1, Chapter 21, section 21.3.4).

The removal of the Kelvin Grove Road connection and associated worksite and spoil requirements for the local ramps has significantly reduced the spoil haulage component of the Project to the Port of Brisbane. This would also reduce any potential for significant cumulative impact with other major projects in this area including Airport Link and the Northern Busway as well as the last stages of the Gateway Motorway Upgrade Project.

The removal of the Toowong worksite removes the need to haul spoil between that worksite and the Western Freeway worksite via the Western Freeway and the Moggill Road ramps, estimated at 43 truck

loads per day. The remaining soil haulage task from the construction of the Western Freeway surface road works, transition structures and cut and cover tunnels remains with the Project although slightly reduced from 60 loads per day to 58 loads per day due to the absence of the initial Toowong worksite establishment. As reported in the EIS for the Reference Project, the haul route to Swanbank, used by 60 trucks per day would represent only 0.1% of traffic on this route, so cumulative effects with various stages of the Ipswich Motorway Upgrade would be minimal, and even less so with the effects from the Project without the local connections.

As indicated in the EIS Reference Project, an upgrade of the Centenary Highway and Western Freeway from four to six lanes inclusive of a single T2 lane each way between Mt Coot-tha Road and (approximately) Warrender Street, Darra with no upgrading of the Centenary Bridge, has been assumed to be operational by 2016. QTMR has advised in submission to the EIS that there is no commitment to this project despite its identification in the SEQIPP. Should this upgrade of the Centenary Motorway eventuate, as reported in the EIS, it is likely that use of the Centenary Highway and the Western Freeway by the Northern Link Project construction haulage vehicles would be finished prior to the start of substantial construction activities on this project.

If the upgrading of the Centenary Motorway were to proceed within an earlier time-frame, and there was an overlap between Northern Link haulage truck use and construction activities associated with upgrading of the Centenary Highway and/or Western Freeway, it would be anticipated that the corridor would continue to remain fully operational. As the number of road haulage vehicles generated by the Project construction activities is small, ,i.e 48 truck movements per day in each direction to Swanbank, it would be anticipated that these would remain an allowable within the corridor due to their minor contribution to overall traffic volumes.

B.21.3 Issue 2 – Hale Street Overlap

Most significant project overlap is identified to occur from November 2009 to March 2010. No mitigation or management is identified.

Response

As identified in Section 21.3.3 of the EIS, this period (from November 2009 to March 2010) corresponded with the preliminary works for the EIS Reference Project, predominantly focussed on site establishment and early works that did not require significant traffic management measures. With construction of the Project starting later than anticipated for the EIS Reference Project, the Hale Street Link would be completed by mid 2010 and in operation before the anticipated commencement of the Project in late 2010, so removing any potential for cumulative impacts with the final stages of the Hale Street Link construction. The Project no longer requires the coordination of construction traffic between the two projects. A coordinated approach should however still be taken to the delivery of major transport projects within the western and inner western transport corridor of Brisbane.

B.21.3 Issue 3 – Construction Industry Capacity

The EIS does not address the implications of the project's requirements on construction industry capacity in the region. The project may have flow on effects to the government's ability to deliver on the SEQ Infrastructure Plan and Program, both by way of further escalating construction costs and through straining capacity of industry and its suppliers to deliver other priority projects.

Response

The ability of the construction industry to service this project was carefully considered with respect to all known infrastructure projects across Australia at the time of the EIS. The envisaged procurement program for Northern Link took into account the procurement timeframe of when other toll road projects were likely to be put to the market in order to plan for a clear market window to create the most favourable market effects for the Project. Significantly, CLEM7 be concluding at about the same time as Northern Link construction is planned to begin. There are also now significantly changed economic conditions in Queensland whereby construction costs may actually go down and the capacity for industries and suppliers to delivery major infrastructure projects will have increased.

B.21.3 Issue 4 – Road Network Performance

This section should not just focus on cumulative construction impacts (i.e. spoil transport) but the cumulative impacts on road network performance as a result of construction and operation of Northern Link. The Northern Link traffic model would be useful start to develop a picture of the road network performance across Brisbane given all the scheduled construction projects. Potential impacts could be described both temporally and spatially. The EIS should recommend that BCC, the State and other relevant agencies convene to develop and coordinate planned incident response resources at key locations within the network and the relevant times to help manage traffic in and around the various construction projects. BCC needs to begin to describe potential impacts on road network performance within the study area as a result of construction of Northern Link. Reiterate the major conclusions from Chapter 5 in terms of the effect of Northern Link on road network performance once commissioned.

Response

The potential construction impacts on the road network performance as a result of the Northern Link Project are clearly set out in Section 5.7 of the EIS. Recommended mitigation measures are also identified in Sections 4.3.17 and 5.7.9 of the EIS. In regard to operational effects, there is no need to reiterate the major conclusions from Chapter 5 in terms of the effect of Northern Link on the road network performance once commissioned. The Northern Link traffic model was also used to assess the potential cumulative effects of the operation of the Project, without local connections, on a number of key future projects with the potential to add materially to cumulative impacts with the Northern Link post construction as set out in Section 21.4 of the EIS. These cumulative operational effects are described in Chapter 4 of the EIS Supplementary Report.

B.21.3 Issue 5 – Construction of WBTNI

With three tunnel portals built close to each other in Toowong, the construction period could be over a decade. Hence the construction air pollution and traffic congestion will be essentially permanent and result in more serious problems. The cumulative social, environmental and construction traffic impacts on Toowong from the construction of Northern Link, the Everton Park to Toowong tunnel and the East-West link needs to be assessed.

Response

As identified in Section 21.4.2 of the EIS, whilst a range of corridor options were identified by the WBTNI in the April 2008 consultation round, it was identified in the display material that no decision has been made as to whether any of the options or combinations are required at this time. If a corridor option is required for the future construction of the Everton Park to Toowong tunnel, further work on its social, environmental, engineering, and economic feasibility including government affordability, would need to be undertaken along with community consultation. Similarly, the *TransApex* Prefeasibility

Report of March 2005 identified that the East-West Link is not anticipated to be delivered prior to 2026. There is therefore no known or anticipated cumulative construction impacts associated through the construction of these projects within the same construction time frames. There is also no identifiable project design, construction location and delivery timeframes available for these projects to base a cumulative impact assessment on their potential staged construction over the submitted extended construction period.

B.21.4 Future Network Upgrade Projects

B.21.4 Issue 1 – Cumulative Traffic Effects with WBTNI Options

The EIS has not considered the traffic impacts of the proposed East-West Link tunnel and the planned Toowong to Everton Park tunnel on local roads in Toowong, including potential local connections and feeder roads such as Jephson Street and Croydon Street and also on the commercial centre of Toowong (amongst other impacts). Such consideration is required under the Terms of Reference as the project is within the required window for forecasting traffic volumes, that is, up to 2026.

The submission suggested that the statement - "the preliminary testing of cumulative effects indicates minimal change to the local streets and city distributors in the Inner West with the combination of Northern Link and the WBTNI projects" appears unrealistic without detailed WBTNI planning being available. There are forecast Northern Link Project impacts of up to 52% on surface roads and as suggested, further analysis is required when WBTNI outcomes are known.

The assumption in the Northern Link assessment [in the absence of any other advice] is that the WBTNI options 3, 6 and 15 would be tolled at a rate of 50 cents (2008 value)per kilometre. Northern Link was treated as tolled at $3.93 in 2008 value. The biggest difference between modelled outcomes of the two projects is that the Northern Link assessment determined an approximate 12% reduction in Northern Link traffic while the WBTNI (Inner Orbital) forecast a reduction of approximately 40% in Northern Link volumes. WBTNI's model was not a toll model, but an estimate of the impact of a tolled Inner Orbital was made by assuming about 35% of trips would choose not to pay the toll.

Response

Section 21.4.3 of the EIS assessed the potential cumulative traffic effects from a number of key WBTNI options including Option 3 – Toowong to Everton Park and Option 5 – TransApex East-West Link. As there is some overlap of the cross-city functions (west-east, west-north and west-south) performed by the WBTNI Options and Northern Link, a small reduction in traffic use of Northern Link is forecast. This preliminary modelling indicates that the average weekday traffic volume using the Project, without local connections, would reduce by 12.6%, from 48,800 vehicles per day in 2026 to 42,600 vehicles per day. It is noted that the proposed toll rates for these other facilities have not been published to date, so preliminary assumptions only have been applied.

As further stated in the EIS, this preliminary testing of cumulative effects indicates minimal change to the local streets and city distributors in the Inner West with the combination of Northern Link and the WBTNI projects. As also stated in the EIS, this was a preliminary testing of the EIS and would need to be further examined when connection details are established or as stated by Main Roads, when WBTNI outcomes are known. The graphic effect however on local roads in Toowong, from preliminary assessment of the EIS Reference Project was indicated on Figure 21-3.

Figure 4-10 in the EIS Supplementary Report shows the cumulative effects of the Project, without local connections and the WBTNI projects on the road network This figure indicates the potential for a decline in traffic use of both the mainline Northern Link tunnels (as described above of 12.6%) and a range of local roads in the inner west.

B.21.4 Issue 2 – General Cumulative Effects WBTNI

The EIS does not consider the designs, or the traffic, environmental or socioeconomic impacts of the proposed Toowong-Everton Park and Toowong-Buranda tunnels, particularly on local Toowong streets including Croydon Street and Jephson Street. Details of how these projects would connect to the road network have not been prepared and are thus not available for community comment. This lack of planning fundamentally compromises the EIS. If there is some *TransApex* proposal for a future link from Toowong to the south side of Brisbane it should be explained in the EIS. If the Project is allowed to proceed without connections to the two other tunnels at Toowong being planned and impacts properly assessed, the resultant impact on Toowong resulting from the flawed planning and approval process will be potentially catastrophic.

Response

Cumulative traffic effects of the Project with WBTNI options are addressed in Issue 2 above. While there is some ability to provide preliminary testing of anticipated traffic interactions provided through the traffic model, this would need to be further examined when WBTNI outcomes are known and connection details are established.

Details of how these future projects would connect to the road network are not available. There is currently no public release of the WBTNI outcomes or strategic development sufficient to provide for an assessment of cumulative environmental or socioeconomic impacts with the Northern Link Project. The prefeasibility assessment of the *TransApex* East-West Link identified that the East-West Link is not anticipated to be delivered prior to 2026. The Project does not preclude the ability for future connections to be provided for the Toowong-Everton Park and Toowong-Buranda tunnels. The cumulative impacts of other tunnels in the Toowong area will be determined if and when these projects enter the environmental assessment phase.

B.21.4 Issue 3 – Cumulative Air Quality WBTNI

The EIS has not considered the cumulative impact of a second and third stack from the planned Toowong-Everton Park and Toowong-Buranda tunnels near the proposed Northern Link stack and an increase in local discharge at the western entry to Northern Link. The EIS does not consider air quality or visual impact of additional ventilation outlets in Toowong and the effect that will have on filtration.

Response

The cumulative impacts of ventilation outlets in the Toowong area will be determined if and when these projects enter the environmental assessment phase, as identified in Issue 2 above. At this stage there is insufficient detail to carry out a meaningful assessment. However it is useful to note that the assessment of the three roadway tunnel vents at the northern end of the Project (Airport Link, Clem7 and Northern Link) showed that the cumulative impacts for each pollutant was only a small fraction of the respective air quality goal.

B.21.4 Issue 4 – Centenary Motorway

It was submitted that the ultimate configuration for the Centenary Motorway at the northern end would be 8 lanes while the EIS assumes that Centenary Motorway would be 3 general purpose lanes in each direction. This is also inconsistent with all other assumptions made in the EIS, i.e., 2GP + T2 or 2GP + HOV. BCC is requested to review, correct and use consistent assumptions about such key design/model inputs.

Response

As described in Section 5.4.4 of the EIS, a preliminary planning study is in progress by DTMR for the proposed Centenary Highway and Western Freeway transit lane project identified within SEQIPP. This investigation has not been finalised, and the ultimate form of the corridor has not yet been determined. WBTNI corridor options (such as the Toowong to Everton Park "Inner Orbital" corridor) would also have an influence on the overall configuration of the Centenary Motorway in the future. Council has worked closely with DTMR to ensure that the engineering layout of the Northern Link connections to the Western Freeway allows flexibility for potential future corridor re-configuration and/or widening.

Based upon advice provided by DTMR, for the purposes of traffic modelling within the EIS an upgrading from 4 to 6 lanes inclusive of a single T2 lane each way between Mount Coot-tha Road and the Ipswich Motorway was assumed, with no upgrading of the Centenary Bridge. This project was incorporated in the traffic model runs and analysis presented in the EIS for 2016, 2021 and 2026. These assumptions have also been applied for traffic modelling of the Project as documented in Chapter 4 of the EIS Supplementary Report.

In the preliminary modelling undertaken to test the potential cumulative effects of the Project, in combination with the WBNTI projects, the Centenary Motorway was assumed to be ultimately operate as three general purpose lanes in each direction, inclusive of widening of the Centenary Bridge. This assumption was adopted in consultation with Main Roads and QT, to allow a suitable balance of feeder network capacity to the 3 corridors (i.e Northern Link, WBTNI Option 3 – Toowong to Everton Park, and WBTNI Option 5 – TransApex East-West Link). Detailed feasibility studies for the WBTNI projects would be needed to confirm ultimate requirements.

B.22 Conclusions and Recommendations

B.22.1 Overview

B.22.1 Issue 1 – Overview and Sustainability

Conclusions made within the Northern Link EIS do not provide a balanced overview and do not contribute to ecologically sustainable development, as required in Section 7 of the Terms of Reference.

The EIS glosses over adverse impacts as "impacts", "changes" or simply issues to be mitigated. Ignoring significant local adverse impacts leads to a superficial consideration of whether key planning criteria are met, it is not socially equitable and does not contribute to Toowong's liveability. Regional, traffic and specifically freight considerations are given inappropriately greater weight than human, social factors.

Critical consideration should be given to whether Northern Link with the resulting adverse impacts, including local connection ramps, associated road widening and house resumptions, does in fact meet sustainability criteria

Response

The issues raised in support of the contention that conclusions of the EIS lack balance are dealt with in other sections of this Supplementary Report (Appendix B, Section 1.6 issues 3 and 4) where individual arguments alleged to contain bias are shown, based on the EIS studies, to be objective and reasonable. The conclusions drawn from the design studies and the EIS do acknowledge potentially adverse impacts where they exist as well as identifying benefits. Therefore, the conclusions are considered to provide a balanced overview of the Project and do not gloss over potential adverse impacts as witnessed by several quotes from the EIS, in this submission, identifying potential adverse impacts. As is the appropriate process, the EIS study does treat adverse potential impacts as impacts requiring mitigation and seeks to determine whether it is feasible to reasonably mitigate such impacts.

The conclusions of the Northern Link EIS (Volume 1, Chapter 22, Section 22.4) include a sustainability framework identifying where in the project key indicators of sustainability are to be incorporated with reference to the four focus areas identified in the Sustainability Policy supporting the Corporate Vision *Our Shared Vision —Living in Brisbane 2026*, namely:

- resource Efficiency;
- sustainable places and urban form;
- biodiversity conservation; and
- health and well-being.

Some more detailed approaches to *resource efficiency* are provided in Section 22.4.2 because they have not been included in Chapter 4 where construction has been described. The *Sustainable places and urban form* focus is elaborated upon in Chapter 14 – Urban Design and Visual Environment of the EIS. The *biodiversity conservation* focus is not highly applicable to this project because of the highly urbanised nature of the area in which it is cited but some points are presented in support of the focus in the EIS in Chapter 10 - Ecology. The *Health and well-being* focus is addressed in the EIS in Chapter 13 – Social Environment and in Chapter 18 – Health and Safety. Sustainability in these focus areas, as well as in the other disciplines of the project outlined in Table 22-1, is a pre-eminent aspect of the planning and design phases. With a determination to incorporate the sustainability principles outlined in the EIS into the final detailed design as shown through their inclusion in the Request for Proposal

documentation leading to the tendering phase the requirements of the Terms of Reference in this regard are considered to be fully met.

B.22.2 Rationale for Northern Link

B.22.3 Project Objectives

B.22.4 Sustainability

B.22.5 Economic Implications

B.22.5 Issue 1 – Economics

One submission raised a number of issues with respect to this section, mostly asking for more detail or clarification:

- When discussing employment growth for the CBD and the Australia Trade Coast (ATC), there is a need to specify whether the employment figures given are growth figures or actual employment numbers.
- Jobs and Investment are the same thing. Need to clarify the meaning and state that this amount of investment would lead to this many jobs. They are not mutually exclusive or additive.
- Some comment here on absolute jobs and population growth in the region is appropriate given that these are the key drivers of the Northern Link Project.
- BCC may have the causation wrong. People predominantly don't move to the Western Corridor to be unemployed. Jobs bring people (not the other way around). Reword.
- At a discount rate of around 4 per cent, economic benefits are effectively 0 after 20-25 year. Even quicker at higher discount rates. Quoting undiscounted benefits remain problematic. The financial assessment has been undertaken over a 45-year period. As the forecasting period gets longer, it becomes harder to provide an accurate estimate of future cash flows. Quoting undiscounted benefits remain problematic. Perhaps in this case a terminal value approach can be used when forecasting past a certain time. (This would involve using a simple annuity to estimate terminal values.
- Have negative amenity values been considered in the underlying analysis? There are likely to be long term effects on property prices, effects/possible unsightliness of ventilation towers and the flow-on effects of changed traffic flows on nearby roads.
- Regarding Table 22-2, more explanation of how figures and conclusions were reached in the Cost Benefit Analysis would be useful.
- The Western Corridor, supported by the SEQ Regional Plan as the focus for much of the regional population growth, already…' Reword this sentence – a bit ambiguous?

Response

The conclusions on economic implications are an overview of key points from the economic analysis reported in Chapter 15 and the details are available therein. Responses listed here are provided in the corresponding order:

- The employment figures for the CBD and the ATC (See EIS, Volume 1, Chapter 15, page 15-10, second dot point from top) are projections from 120,000 in the CBD in 2006 to 190,000 in 2026 and for the ATC the 34,000 jobs in 2006 are predicted to increase to 80,000 in 2026;

- It is well understood that the investment figures quoted include a component to service the new jobs. Assessment of the project makes no calculations or further inferences from these projections and so they have not been added or separated. The investment in dollars is quoted to indicate the magnitude of expected expansion that would benefit from the improved connectivity provided by the Northern Link project. The job numbers are quoted to indicate the projected increases in key employment centres that would also benefit from the improved connectivity provided by the Project. Significantly, jobs are projected to increase by approximately 130% at the ATC but by less than 30% in the CBD.
- Data on regional population levels and projected increases in population and jobs are provided at several places within the EIS (Chapter 1 – Introduction; Chapter 2 – Rationale; Chapter 13 – Social Environment; and Chapter 15 – Economic Environment) providing a clear picture of Southeast Queensland development upon which the conclusions are based. The conclusions have been written in the belief that interested readers will have read the EIS rather than reprinting of all the basic data upon which they are based or if clarification of the conclusions section was desired a reader would seek the details in the technical reports provided in Volume 3 of the EIS.
- The sequence of development (presumably "causation" of the submission) is correctly interpreted here as is clearly outlined in Chapter 15 – Economic Environment. Migration to Southeast Queensland, mostly from southern States, has continued over the last 10 years at steady to generally increasing rates. The strength of the Queensland economy has provided jobs for all these new arrivals in a variety of centres but accommodation close to major employment centres has been unable to keep up with demand and new residential areas have had to be developed. Large new residential areas to cope with this increase in population are being developed in the western corridor. The major employment centre of the ATC has very little residential accommodation nearby and very large projected increase in job numbers; the conclusion is that Northern Link will facilitate the connectivity of the new residential areas with the new employment areas.
- The details of the Cost Benefit Analysis are provided in full in the EIS (Volume 3, Technical Report 15 – Economic Assessment) explaining each of the points in this issue. The conclusions in Chapter 22 quote the key conclusion from that assessment. The franchise period is 45 years (not 25); as stated in Technical Report 15, Table 11, the 6% discount rate is in line with current State guidelines for major road transport projects; sensitivity analyses of the results of the BCA for discount rates of 4% and 8% at P10, P50 and P90 risk levels provided the data presented in Technical Report 15, Table 18. The submission does not clarify which figures are referred to when it claims undiscounted figures have been quoted, certainly the figures in Table 22-2 have had the discount rate of 6% applied to them, as is indicated by the footnote to the Table. Again the conclusion section was written on the basis that a reader would have read the details in the pertinent earlier section of the EIS or, if interested, would seek the detail in the Technical Reports.
- All the assumptions of the Cost Benefit Analysis are clearly outlined in the EIS (Volume 1, Chapter 15, Table 15-3 and Volume 3, Technical report 15, Section 5.3.4). As noted in the EIS (Volume 1, Chapter 15, Section 15.7.2) "The CBA does not and cannot measure and/or monetise everything of importance to decision makers and the public."
- Table 22-2 is provided in the conclusions as the Project case result from the BCA analysis in the belief that readers interested in more detail would read the Economic chapter of the EIS and the pertinent Technical Report. The basis for all the figures in Table 22-2 is provided in the EIS, Volume 3, Technical Report 15, Section 5.

- The meaning of the first sentence of the second paragraph of Section 22.5 of Volume 1 of the EIS is not considered ambiguous and without more specific details of the issue being raised it is impossible to understand the point of the comment.

B.22.6 Project Impacts and Mitigations – Construction Phase

B.22.7 Project Impacts and Mitigations – Operations Phase

B.22.7 Issue 1 – Potential Operational Impacts – Toowong

The EIS does not adequately address a number of significant adverse social impacts that are raised. The project does not demonstrate social equity, justifying this inequity by implying that the regional benefits of the project outweigh the impacts that would be experienced by the community of Toowong.

There is a strong and widespread discontent within the Toowong Community regarding the Toowong Connection portion of the proposed Project. The mitigation measures currently proposed by the proponent are insufficient for the level of impact that will result from the construction and operation of the Project. These mitigation measures will, in themselves, create considerable additional adverse impacts, some of which can not be mitigated.

Response

The local issues in Toowong are resolved by the removal of the local connection at Toowong from the Project.

A range of potentially adverse impacts were identified, providing a balanced view of the Project in the EIS. The identified impacts were accompanied by a range of mitigation measures that were put forward as a means of avoiding or mitigating and managing those potential impacts. In the detailed feasibility stage (i.e. the EIS studies) the emphasis has been on determining whether it is feasible that the potentially adverse impacts may be avoided or mitigated and managed.

The Project will have regional benefits as acknowledged in the submission.

B.22.8 Recommendations

B.22.8 Issue 1 – Recommendation for Detailed Design

Recommendation 1(ii) needs to be more specific as to nature of the potential or predicted impacts. Amend (ii) to "detailed design embracing an innovative approach in seeking to resolve, to the extent feasible, the potential or predicted construction and social impacts of the reference project, particularly with regards the configuration of the local connections at Toowong and Kelvin Grove."

Response

Recommendation 1(ii) seeks to ensure all potential or predicted impacts of the Project are dealt with in the detailed design stage. There is no substantial issue raised in the submission and Recommendation 1(ii) as stated in the EIS (Volume 1, Chapter 22, Section 22.8) is entirely consistent with the suggested amendment.

With the removal of the local connections at Toowong and Kelvin Grove, the issue raised in the submission is resolved.

B.22.8 Issue 2 – Approvals and Permits

With regard to the recommendation (Recommendation 2, Clause 1) that the Coordinator-General require the Project to obtain all necessary approvals and permits the responsibility for approvals needs to be clarified.

Response

The majority of the approvals and permits necessary for the Project would be the responsibility of the Contractor as outlined in the EIS (Volume 1, Chapter 19, Table 19-7) to be achieved during detailed design or at an appropriate time prior to commencement of the activity.

B.22.8 Issue 3 – State-BCC Coordination of Multiple Infrastructure Projects

Emphasis in Recommendation 2, clause 3 should be on the State and BCC working together to manage road network impacts (through appropriate traffic management/incident management measures) associated with construction and delivery of the Project in conjunction with other major infrastructure projects in the metropolitan area either underway or planned to be underway at the same time.

Response

The Council would work with the State to manage road network impacts (through appropriate traffic management/incident management measures) associated with construction and delivery of the Project in conjunction with other major infrastructure projects in the metropolitan area either underway or planned to be underway at the same time.

B.22.8 Issue 4 – Recommended Conditions

A submission recommends the following conditions be placed on the project if it is approved to proceed.

- Should the proponent enter into agreement with the State to implement widening of the Western Freeway between Moggill Road and Toowong Roundabout, neither the project nor any such upgrade should negatively impact on bus throughput along the Moggill Road corridor.
- The project should not preclude upgrades of the Centenary Highway between Moggill Road and Ipswich Motorway at Darra (including allowance for bus priority if required in the future) nor the Inner City Bypass at Herston/ Kelvin Grove as a consequence of the proposed project.
- Maintenance of connectivity and capacity for effective public transport services in the vicinity of the project throughout the construction and operation of the project.
- Maintenance of cycle and pedestrian connectivity on both principal regional cycle network and local connections throughout the construction and operation of the project.
- The proponent to provide all cycle and pedestrian facilities in conformance with relevant standards and guidelines.
- Bus priority measures should not be precluded on Moggill Road, Milton Road and Coronation Drive. In this regard the proponent's cooperation with the state should be sought to capture potential public transport benefits resulting from the project.
- The Northern Link must not, in any way, preclude, limit or impede the potential future provision of the "Inner Orbital" project from Toowong to Everton Park. (This condition is likely to require re-visitation of the location and arrangement of the portals and related works at Toowong).
- No encroachment on the Queensland Rail corridor alongside the Inner City Bypass.
- No funding input to be required from the State Government.

Response

The Project would work with these conditions apart from being in a position to comply with commitments to unknown future projects such as the “Inner Orbital”.