North-South Bypass Tunnel Project

# Coordinator-General's Change Report

July 2006

Queensland Government

## 1.0 INTRODUCTION

This is the Coordinator-General's Change Report for the proposed North-South Bypass Tunnel ('NSBT') Project prepared in accordance with section 35I of the *State Development and Public Works Organisation Act 1971* ('the Act'). Its purpose is to evaluate the environmental effects of the proposed changes and their effect on the project which was the subject of an evaluation in the Coordinator-General's Report of 25 August 2005.

## 1.1 Background

The Brisbane City Council ('Council') proposes to construct the North-South Bypass Tunnel which is intended to connect the M3 (South-East Freeway) and Ipswich Road to the south with the Inner City Bypass and Lutwyche Road at Bowen Hills. The NSBT Project also connects with Shafston Avenue at Kangaroo Point to provide access to and from the eastern suburbs of Brisbane.

The NSBT Project comprises:

- two separate parallel north-south tunnels, one for northbound traffic and one for southbound traffic;
- tunnel portals (openings to the surface) at Bowen Hills, Shafston Avenue and Woolloongabba;
- safety systems including safety exits, fire protection and monitoring systems;
- a ventilation system to manage air quality in the tunnel and an elevated ventilation outlet near the Woolloongabba and Bowen Hills portals; and
- surface road changes to connect to the tunnel.

On 15 April 2004 the NSBT project was declared to be a significant project for which an Environmental Impact Statement ('EIS') is required in accordance with Part 4 of the Act. The design of the project assessed in the EIS was a concept design described as the Reference Project for the purposes of a public private partnership offer process.

The EIS was publicly notified for a period of eight (8) weeks from Wednesday 23 February 2005 to Friday 15 April 2005 and submissions invited.

In response to the issues raised in the submissions about the EIS, on 16 June 2005 the Council provided the COG with a Supplementary Report to the EIS. Copies of the EIS and Supplementary Report to the EIS can be found at www.nsbt-eis.com.

On 25 August 2005, I completed my evaluation of the EIS under s 35 of the Act and determined that the project should proceed, subject to a number of conditions. I concluded that, the impacts as described in the EIS were able to be mitigated and managed effectively through implementation of the conditions set by the Coordinator-General. A copy of the Coordinator-General's Report can be found at www.coordinatorgeneral.qld.gov.au.

Section 6 of the Coordinator-General's Report required that the proponent advise me in writing of proposed changes to the project that may result through bidding process undertaken for the project. The Coordinator-General's Report noted that:

> *The design evaluated through the EIS Study is an advanced concept, however may be refined through improvement initiatives proposed by the Proponent or private sector bidders. To the extent that a revised concept is selected as the preferred configuration through the bidding process, the Proponent will need to provide me with*

*written notice of its intention to make a change to the Project detailing the changes and reasons for these changes. This would detail potential adverse impacts that are changed substantially from the original concept, either in magnitude or on areas not previously impacted.*

In evaluating the EIS the Coordinator-General identified the need to provide a suitable mechanism to ensure accountability and transparency in the implementation of the proposed environmental management regime, given that there was no development approval for the town planning 'use' required for the project which might otherwise govern the construction and operation of the Project.

I recommended that the Government consider legislative amendments to provide a mechanism by which the proposed environmental management regime could be attached as conditions to the Project. In November 2005 legislative amendments were made to the Act to provide for the enforcement of the conditions and recommendations set out in the Coordinator-General's Report.

## 1.2 Proponent and proposed delivery mode

The Council is the proponent for the project which it intends to deliver through public-private partnership as a toll road with a concession period of 45 years, including the four year construction period.

In response to a Request for Proposals to finance, construct and operate the North-South Bypass Tunnel Project, Council received proposals in December 2005. Following an evaluation process, the Council selected the RiverCity Motorway Consortium (RCM) to build, own, operate, finance and maintain the NSBT Project.

RCM is a consortium comprising Leighton Contractors, Baulderstone Hornibrook with Bilfinger Berger Concessions and ABN AMRO.

## 1.3 Council's Request for Project Change

Part 4, Division 3A of the Act provides that the Coordinator-General can evaluate changes made to a project by a proponent of a significant project following the completion of the Coordinator-General's report evaluating the EIS, but before the project commences.

Section 35C of the Act enables the Coordinator-General to evaluate the environmental effects of the proposed change to the project and its effect on the project and any other matters that the Coordinator-General considers to be relevant to the evaluation of the change.

I received correspondence from the Council on 11 May 2006 advising that as a result of the evaluation of the bids received, the preferred configuration for the NSBT would be changed and that a request to evaluate the environmental effects of those changes would be made.

By letter dated 23 May 2006, Council provided me with a written notice ('the Notice') in accordance with s 35D of the Act detailing proposed changes to the project, their potential impacts and requesting that I evaluate the changes to the project. Further details of the changes to the project proposed by Council are described in Council's *Request for Project Change Report* which accompanied the Notice. A copy of the Notice and *Request for Project Change Report* can be found at www.nsbt-eis.com.

## 2.0 DESCRIPTION OF THE PROPOSED CHANGES

The changed project retains the key elements of the Reference Project but includes changes to the project design, delivery arrangements, and operation. The proposed changes are restricted to tunnel alignment and grade, surface connections/ portals, worksite layout and area, height of both ventilation outlets and location of the Bowen Hills outlet, spoil haulage arrangements and construction methodology.

The proposed changes to the project identified in the Notice are summarised as:

- Physical changes to the surface road connections and alignments at Bowen Hills and Woolloongabba, including changes to local access arrangements,
- Realignment of mainline tunnels and connections with Shafston Avenue,
- Flattening of grades in the mainline tunnels,
- Relocation of the northern ventilation outlet by 120m closer to Sneyd Street,
- Increases in the height of the ventilation outlets from a minimum of 30m to 33m at the southern outlet and 36m at the northern outlet,
- Refinement of construction methodology including more extensive use of tunnel boring machines, and
- Change in spoil haulage management to include 24hr haulage from the Bowen Hills worksite.

The changes fall into two principal areas, project layout and construction methods, as described in the following sections.

## 2.1 Project Layout

### 2.1.1 Alignment

The horizontal alignment of the tunnel is proposed to be changed south of the Story Bridge. Rather than running parallel to Main Street and the Bradfield Highway, it is proposed to align to the east of Main Street between Bell Street and Mt. Olivet Hospital prior to resuming an alignment parallel to and west of the Story Bridge.

The on-ramp from Shafston Avenue is now proposed to adopt a left-hand spiral, rather than a sweeping right-hand curve to connect with the north-bound tunnel.

The south-bound tunnel is proposed to run parallel to the north-bound tunnel from Go-Print (Vulture Street) to the southern portal. The Ipswich Road exit is now proposed to be located south of the M3, thereby eliminating the exit portal proposed in the Reference project at Ipswich Road in proximity to Balaclava Street.

Grades in the mainline tunnels are also proposed to be flattened.

### 2.1.2 Portals and network connections

The southern portal is now proposed to co-locate with the M3 and Ipswich Road on and off ramps by re-aligning a section of the M3, from around Morrissey Street to Peterson Street, to the west.

A new bridge is proposed to be built over Ipswich Road connecting Morrisey Street to Dibley Street/Park Road.

It is proposed to widen the M3 north-bound lanes between Cornwall Street and Stanley Street and re-align the Ipswich Road north-bound lanes.

The Bowen Hills interchange has been revised to facilitate travel in all directions to and from the Inner-City Bypass ('ICB').

### 2.1.3 Worksites

Worksites are essentially in the same locations as proposed in the Reference Project, though with slightly re-configured footprints to cater for the proposed construction methods. The major change occurs at the northern worksite where spoil loading facilities are proposed to be located on the northern side of Enoggera Creek.

### 2.1.4 Ventilation outlets

It is proposed to increase the height of the ventilation outlets from a minimum height of 30 metres by 3 metres and 6 metres respectively at the southern and northern outlets. In addition, the northern outlet is proposed to be re-located approximately 120m west to Sneyd Street at Bowen Hills.

## 2.2 Construction Methods

### 2.2.1 Use of two Tunnel Boring Machines

The changed project proposes to utilise similar construction methods to those proposed in the Reference Project, however two double-shielded tunnel boring machines ('TBMs') are proposed to be used. The use of two TBMs will enable a staggered start to construction of each tunnel by approximately three months. Both TBMs will commence excavation from the Bowen Hills portal heading south. The TBMs will also be used south from Shafston Avenue to the Gibbon Street worksite, an area where the Reference Project proposed the use of roadheaders. Most spoil would be removed from the Bowen Hills portal under the revised construction process. The proposed use of double-shielded TBMs would allow the installation of pre-cast concrete segmented tunnel lining in parallel with the excavation process.

### 2.2.2 Spoil Haulage

In the changed project most of the spoil, approximately 76%, is proposed to be removed from the Bowen Hills worksite with consequent reduction in amounts being removed from the Gibbon Street and Shafston Avenue worksites. It is also proposed to allow 24 hour haulage from the Bowen Hills worksite. There is no proposed change to hours of haulage from the Gibbon Street and Shafston Avenue worksites.

Impacts of spoil removal, in particular the proposal for 24 hour spoil haulage from Bowen Hills, are proposed to be managed by a system of spoil haulage fleet management initiatives outlined in Annexure 2 of the *Request for Project Change Report*. These initiatives, which are proposed to be incorporated into the Construction Traffic Management Plan, include:

- Ensuring the truck fleet is new and of a high standard;
- Selecting a truck/dog combination with a larger payload (33 tonnes) which will reduce the number of truck movements;
- Managing the fleet in real-time through use of radios and GPS transponders; and
- Selection and training of spoil truck operators to achieve a high level of operator competency.

## 2.3 Operations

The Notice and *Request for Project Change Report* includes recent traffic modelling for the changed project, which incorporates updated demographic and transport preference survey data. It predicts slightly higher traffic volumes and levels of congestion for a 'do nothing' approach as modelled in the EIS. I also note that RCM is forecasting higher levels of tunnel patronage outside of peak hours. The *Request for Project Change Report*, Technical Reports and Council's response to the submissions provide further details about modelling and anticipated traffic volume which compares the reference project, the changed project and a 'do nothing' approach (see Request for Project Change - Response to Submissions, table 4-2).

## 3.0 PUBLIC NOTIFICATION

In accordance with sections 35E, 35F and 35G of the Act, the Coordinator-General may require the proponent to publicly notify the change to the project in a way decided by the Coordinator-General. Accordingly, by letter dated 25 May 2006 to Council I determined that the Council should publicly notify the proposed change to project in the Courier-Mail and any other way decided by Council and set a four (4) week submission period commencing on 27 May 2006 and concluding on 23 June 2006.

On 27 May 2006, the proposed changes were publicly notified in *The Courier Mail* and written submissions were invited about the proposed changes. The Notice and the *Request for Project Change Report* were publicly notified on The Coordinator-General's website and the NSBT project website.

During the submission period details of the proposed change, a CD-ROM and hard copy of the Notice and *Request for Project Change Report* were also made available for review at nominated Council libraries and the NSBT Project Visitors' Centre at 189 Elizabeth Street, Brisbane.

Council also made information available via the NSBT Community Information Line (telephone service).

A total of 32 submissions about the proposed changes were received. Copies of all submissions were provided to Council as the proponent to enable it to respond to the issues raised in the submissions. On 3 July 2006, Council provided the Coordinator-General with its response to the submissions. Further detail on Council's proposed spoil haulage by rail investigations was provided to the Coordinator-General on 6 July 2006. All Council's responses can be found at www.coordinatorgeneral.qld.gov.au

## 3.1 Issues raised in submissions

A total of 32 submissions, 14 of which were of a pro forma type, were received by the Coordinator-General.

Submissions in response to the *Request for Project Change Report* were received from the following Government agencies:

- Transport Portfolio (Queensland Transport, Department of Main Roads, Queensland Treasury)
- Queensland Health
- Department of Primary Industries and Fisheries
- Queensland Police Service
- Department of Emergency Services
- Department of Local Government, Planning Sport and Recreation
- Department of Natural resources, Mines and Water, and
- Department of Housing.

While some agencies sought clarification on some matters, there were no specific major issues of concern raised, and I note that:

- The Transport Portfolio is satisfied with the revised traffic modelling;
- Queensland Health supports the proposed 24 hour spoil haulage from Bowen Hills provided that the complaints management system and fleet management strategies are complied with; and
- The Department of Emergency Services is satisfied construction haulage issues will be resolved through the development of the Construction Traffic Management Plan.

The issues raised in the submissions are summarised below:

- Alternative construction methodology including use of barges for spoil removal
- Truck movements and associated noise and dust impacts
- Adverse impacts on local traffic arrangements
- Health impacts on residents living adjacent to ventilation outlets
- Disagreement with approach to traffic modelling
- Noise and vibration impacts on Kingsford Smith Drive
- Impacts of spoil removal over 24 hr period
- Validity of dispersion modelling used for assessing the impacts of ventilation outlets
- Lack of filtration of ventilation outlets
- Impacts on groundwater
- Constraints to future development and potential financial impacts
- Global warming
- Effect of world oil prices on project viability
- Economic viability of project
- Air quality at sites around portals
- Pedestrian accessibility around southern portal
- Impacts of M3 (South East Freeway) re-alignment
- Inadequacy of consultation process
- Need for further urban regeneration including opportunities for public art
- Need for re-planting of mature trees in the vicinity of M3 re-alignment
- Need for restoration of areas disturbed by marine plants removal
- Construction traffic management and congestion
- Construction noise impacts
- Extent of proposed use of TBMs

In addition, several submissions raised issues unrelated to the proposed project changes including the efficacy of the use of public money on the provision of transport infrastructure for the use of private vehicles rather than encouraging the increased use of public transport.

These issues are considered in the section below which evaluates the proposed changes to the project and impacts associated with those changes.

## 4.0 EVALUATION OF THE ENVIRONMENTAL EFFECTS OF THE PROPOSED CHANGES

Section 35H of the Act identifies the matters which the Coordinator-General must consider in evaluating the environmental effects of the change, its effect on the project and any other related matters. It is not intended that the effects of the entire project be re-evaluated, rather only the effects of the change relative to the project that was the subject of the evaluation made in the Coordinator-General's report.

In accordance with s 35H of the Act, in evaluating the environmental effects of the proposed changes and their effects on the project, I have considered –

- the nature of the proposed change and its effects on the project;
- the project as evaluated in the Coordinator-General's report under s 35;
- the environmental effects of the proposed change and its effects on the
- project; and
- all properly made submissions about the proposed change and its effects on the project.

I have also considered whether any of the Coordinator-General's conditions set out in section 6 and appendix 1 of the Coordinator-General's Report should be amended in accordance with s 35I(2) in order to effectively manage the impacts of the proposed changes.

In making my evaluation I have had regard to the following material:

- Brisbane City Council, *North-South Bypass Tunnel – Request for Project Change*, May 2006;
- Brisbane City Council, *North-South Bypass Tunnel – Request for Project Change – response to submissions,* June 2006;
- Brisbane City Council, *North-South Bypass Tunnel – Request for Project Change – Overview of Traffic Aspects*, 26 May 2006;
- Brisbane City Council, *North-South Bypass Tunnel – Request for Project Change – response to submissions: spoil haulage by rail investigation* – July 2006;
- Katestone Environmental, *NSBT: Air Quality Impact Assessment of Concept Design Ventilation Outlet Configuration – RiverCity Motorway,* May 2006;
- Holmes Air Sciences, *Implications for Air Quality – North-South Bypass Tunnel Tender Change from Reference Report as outlined in RiverCity Motorway Proposal*, May 2006;
- Heggies Australia, *NSBT Change Report – Noise and Vibration,* 24 May 2006;
- Coordinator-General's Report, 25 August 2005;
- Brisbane City Council, *North-South Bypass Tunnel – Environmental Impact Statement*, February 2005;
- Brisbane City Council, *North-South Bypass Tunnel – Environmental Impact Statement – Supplementary Report*, June 2005;
- Properly made submissions about the changed project; and
- Other submissions accepted by the Coordinator-General about the changed project.

Consideration of the issues raised in the submissions has not identified any further key determining factors or other new issues, for either construction or operations, from those described in Section 4 of the Coordinator-General's Report. The effects of the proposed changes will therefore be evaluated against those factors and issues.

The table below illustrates the proposed changes to the project and their likely potential impact.

| | Proposed changes | | | | | |
|---|---|---|---|---|---|---|
| | Project Layout Changes | | | | Construction Method Changes | |
| | **Alignment** | **Portals / Network Connections** | **Work sites** | **Vents** | **Use of two TBMs** | **Spoil Haulage** |
| **Potential impacts** | ***Construction*** | | | | | |
| | Noise, Dust and Vibration in the Vicinity of Worksites | | | | | |
| | ✔ | ✔ | ✔ | | ✔ | ✔ |
| | Spoil Transport and Disposal | | | | | |
| | ✔ | | | | ✔ | ✔ |
| | Local Area traffic management, including Emergency Vehicle Access to hospitals | | | | | |
| | | ✔ | ✔ | | | ✔ |
| | Location of Worksites, Ventilation Outlets and Portals | | | | | |
| | | ✔ | ✔ | ✔ | | ✔ |
| | Cultural Heritage management | | | | | |
| | ✔ | | ✔ | | ✔ | |
| | ***Operations*** | | | | | |
| | Traffic Management, including congestion on approach roads | | | | | |
| | | ✔ | | | | |
| | Air Quality including Health Risks | | | | | |
| | | | | ✔ | | |
| | Tunnel Operational Management | | | | | |
| | | ✔ | | | | |
| | Urban Regeneration following Construction | | | | | |
| | ✔ | ✔ | ✔ | | | |

The following sections will evaluate the proposed changes, their impacts and the suitability of the Coordinator-General's conditions to adequately mitigate potential adverse impacts of the proposed change, its effect on the project or any other related matter.

## 4.1 Project Layout Changes

### 4.1.1 Alignment Changes

The proposed alignment changes have a number of effects. The increase in separation distance from the Mt. Olivet Hospital is expected to reduce construction impacts, specifically noise and vibration, at that sensitive site, as well as at the adjacent heritage listed St. Mary's Church. The revised alignment for the south-bound tunnel south of Vulture Street eliminates the exit portal in Ipswich Road in the vicinity of Balaclava Street, reducing construction impacts and operational traffic impacts and improving urban regeneration opportunities. It also enables the construction of one tunnel to the ventilation outlet, rather than two as proposed in the Reference Project, which is expected to result in a slight reduction in spoil volume.

The depth of the tunnel through the Woolloongabba area has not altered significantly, however, according to *Request for Project Change Report*, the grades have been flattened from around 4% to 3.5% for the section from Woolloongabba to the Brisbane River and from between 3 and 5% to 3.5% from the Brisbane River to Bowen Hills section. The depth of the tunnel around Bowen Hills, beneath the RNA showgrounds, has been reduced by about one metre. The flatter grades should be beneficial to traffic flow and reduce vehicle emissions, however, the marginally shallower depth of the tunnel at Bowen Hills may exacerbate vibration effects at the RNA showgrounds.

*Suitability of existing conditions*

The key issue requiring management attention is vibration and the consequences for impacts on heritage-listed structures and other sensitive places. The accepted approach to this issue is described in Section 4.1.1 of the Coordinator-General's Report which requires the development of a noise and vibration management plan based on predictive modelling and incorporating mitigation measures such as flexible programming of activities, operational techniques such as varying the rate of tunnelling, ongoing monitoring and consultation with potentially affected landholders and the conduct of pre and post construction building condition surveys.

I am satisfied that there will be sufficient flexibility with construction programming, through the use of two TBMs with advance rates of around 90 metres per week, to enable development of an effective vibration management plan as required by the condition specified in Condition 7, Schedule 3 of the Coordinator-General's Report. Therefore, this approach to the management of likely impacts remains relevant and must be applied to the changed project.

### 4.1.2 Portal/Network Connection Changes

The proposed removal of the Ipswich Road exit portal in the vicinity of Balaclava Street will eliminate direct construction impact at this site and facilitate better local traffic and pedestrian access in the vicinity of the Golden Casket Building. The impacts of the construction of a combined portal in the M3 median strip will be more effectively managed by the prior re-alignment of the M3 northbound lanes to the west of the existing alignment.

The rearranged Bowen Hills interchange facilitates travel in all directions to and from the ICB, resulting in the increased utilisation of the ICB capacity. Traffic modelling indicates that, compared with the Reference Project, the changed access arrangements will not substantially alter the congestion experienced on approach roads.

In the vicinity of the southern portal, widening of the M3 northbound to four lanes between Cornwall and Stanley Streets meets the requirements of the Department of Main Roads for traffic management on the M3. The rearrangement of the O'Keefe Street/Ipswich Road intersection will not preclude the installation of bus priority lanes associated with the Boggo Road Busway project or potential works required for the proposed Eastern Busway project. Local area traffic management, including pedestrian, cycle and road access in the vicinity of the southern portal is likely to be enhanced by the elevated extension of Park Road across Ipswich Road to connect with Morrisey Street.

Emergency vehicle access to the Royal Brisbane Hospital is also provided for in the changed project as part of the revised Bowens Hills interchange. This revised interchange will require the construction of five additional bridge structures across Enoggera Creek which will have potential impacts on an additional 150 metres of riparian vegetation including the disturbance of marine plants. The proposed interchange structures will also have a higher level of visual impact on the immediate surrounding area compared to the Reference Project.

*Suitability of existing conditions*

I consider that the management of potential riparian vegetation impacts can be adequately mitigated in the assessment of an operational approval for a fisheries permit under the *Fisheries Act 1994* which will require assessment against *Fish Habitat Guideline 002 – Restoration of Fish Habitats, Guidelines for Marine Areas*, DPI, 1998 as required by Condition 1, Schedule 1 of the Coordinator-General's Report.

The proposed impacts of the removal, destruction and damage of riparian vegetation in the Enoggera Creek corridor can be adequately managed and the impacts mitigated through the implementation of the Construction EMP for flora and fauna as required by Condition 2, Schedule 3 of the Coordinator-General's Report.

The likely visual impact of the proposed interchange structure at Bowen Hills is most appropriately addressed in the detailed design process in consultation with likely affected owners and occupants of premises directly affected by the proposed works. I am satisfied that these impacts can be mitigated by the implementation of Conditions 1 and 12, Schedule 3 of the Coordinator-General's Report.

### 4.1.3 Worksites

The major changes to worksites occur at Bowen Hills where spoil storage and loading is now proposed to be located north of Enoggera Creek. These facilities, as well as the covered conveyor connecting them to the worksite, are proposed to be fully enclosed and acoustically lined to meet noise and dust guidelines specified in the Coordinator-General's Report (Conditions 6 and 7, Schedule 3).

To reflect the proposed changed layout at the Bowen Hills worksite, Council has requested a change to Condition 5, Schedule 3 of the Coordinator-General's Report.

The area of the Shafston Avenue worksite is also proposed to be enlarged slightly by extending it further to the south and east across Connor Street, while the Dibley Street, Woolloongabba, worksite is proposed to be extended to Burke Street.

*Suitability of existing conditions*

The additional footprint area at each of the worksites will require the conduct of cultural heritage surveys, however, the conditions imposed in the Coordinator-General's Report (Condition 1, Schedule 2) are considered adequate to address this matter.

I am confident that impacts associated with the management of local area traffic during construction can be managed satisfactorily through the requirement for a construction traffic management plan. I also note that this should be aided by the proposed separation of spoil haulage vehicles from other construction traffic at the Bowen Hills worksite.

Condition 3, Schedule 3 of the Coordinator-General's Report requires the preparation and implementation of a Construction Traffic Management Plan to avoid where practicable or minimise and mitigate traffic problems likely to arise during the construction stage. This condition is considered adequate to address the likely impacts associated with proposed changes to the worksite.

I consider that there is no change to the nature of the impacts in these areas and I am satisfied that the impacts can be managed effectively through the application of existing conditions with a minor amendment of Condition 5, Schedule 3 to reflect the changed worksite layout at the Bowen Hills worksite.

### 4.1.4 Ventilation outlets

The key impact issue associated with the proposed changes to the ventilation outlets is air quality in the surrounding area. At the southern outlet, the minimum height is proposed to be raised by three metres to improve dispersion characteristics, while the minimum height at the Bowen Hills outlet is proposed to be raised by six metres. Results of that modelling by RCM have indicated that ground level concentrations are higher for $NO_2$ when compared with the EIS modelling, while remaining well below the air quality goals imposed by the Coordinator-General's conditions. The maximum concentration of air emissions at elevated locations (the Telstra Building and Royal Brisbane and Womens Hospital), while generally higher for the changed project, are also well below the air quality goal set for the project.

The air quality modelling approach adopted in the RCM proposal for the changed project is consistent with that adopted in the EIS which was confirmed as acceptable by the Environmental Protection Agency.

Council has advised of a typographical error in the units of measurement referred to in Table 5 – Ambient Air Quality Goals, Schedule 3 and requested that it be changed to reflect the correct units.

*Suitability of existing conditions*

Air quality conditions are specified in the Coordinator-General's Report (Condition 17, Schedule 3) which requires the development of an operational air quality management plan. The Plan is required to include monitoring and public reporting, both for in-tunnel air quality and ambient air quality within 500 metres of each ventilation outlet. While a number of submissions questioned the air quality modelling approach adopted, there is no evidence to suggest that the changes in the air quality modelled for the changed project are significant or that any further condition is required to manage the likely impacts resulting from the predicted change.

Accordingly, I am satisfied that the likely impacts associated with the proposed changes to the ventilation outlets as modelled and presented in the *Request for Project Change Report* can be adequately addressed by the implementation of Condition 17, Schedule 3 of the Coordinator-General's report.

The measurement units in Table 5 – Ambient Air Quality Goals, Schedule 3 will be amended to correct a typographical error.

## 4.2 Construction

### 4.2.1 More extensive use of Tunnel Boring Machines

The use of two TBMs, both operating from the northern worksite, constrains the majority of spoil to be removed from that site. I will comment on the spoil volume and haulage arrangements in the following section. Noise and vibration are the primary impacts of concern in this section.

The reference project envisaged TBM operations, though on a shorter section of the tunnel, with the use of roadheaders south of Shafston Avenue and underneath the RNA Showgrounds. The TBMs have a faster rate of advance (90 metres/week) than roadheaders (20 metres/week), enabling a higher degree of flexibility in construction programming. The use of pre-cast linings associated with the TBMs mean that approximately 80% of the changed project is lined, compared with 50% for the reference project. This will assist with groundwater management between Shafston Avenue and Gibbon Street at Woolloongabba, as well as that the RNA showgrounds.

The issue of noise and vibration impacts through the use of TBMs, roadheaders and drilling and blasting was considered in the Coordinator-General's Report, and target goals and conditions set (Condition 7, Schedule 3). While TBMs will be used closer to the surface, these requirements will not be relaxed and tunneling will be subject to a noise and vibration management plan that requires predictive modeling and monitoring of the noise and vibration during construction. I also note that, if required, the TBMs can also be operated at reduced power as part of a noise and vibration management strategy.

*Suitability of existing conditions*

I am satisfied that the application of the existing Coordinator-General's conditions (Condition 7, Schedule 3), combined with construction program flexibility will be sufficient to manage potential noise and vibration impacts arising from the more extensive use of TBMs.

Council's proposed complaint management procedure, as identified in Annexure 1 of the *Request for Project Change Report*, provides a clear and comprehensive approach to consultation and complaints. I am satisfied the proposed procedure will provide a high level of accountability in responding to complaints and thereby managing construction impacts and when implemented will achieve the requirements of Condition 2, Schedule 3 of the Coordinator-General's Report.

### 4.2.2 Spoil haulage

Changes to the proposed spoil haulage operations result from the proposed use of two TBMs which will extract the majority of spoil from the Bowen Hills worksite. The use of two TBMs will enable construction to proceed at a significantly faster rate than roadheaders as contemplated for the Reference Project. The key differences between spoil haulage for the Reference Project and the changed project are shown in Table 3-4 of the *Request for Project Change Report* and summarised in the table below:

| Worksite | Details of spoil haulage | Reference Project | | Changed Project | | % change compared to Reference Project |
|---|---|---|---|---|---|---|
| | | Quantity | % of total | Quantity | % of total | |
| **Bowen Hills** | Tonnes | 1,596,000 | 43% | 2,629,000 | 76% | |
| | Truck movements | 70,900 | | 79,700 | | +12% |
| **Woolloongabba** | Tonnes | 757,000 | 20% | 278,000 | 8% | |
| | Truck movements | 33,600 | | 8,400 | | -75% |
| **Shafston Avenue** | Tonnes | 1,325,000 | 36% | 539,000 | 16% | |
| | Truck movements | 58,900 | | 16,300 | | -72% |
| **TOTAL** | Tonnes | 3,678,000 | 100% | 3,446,000 | 100% | |
| | Truck movements | 163,400 | | 104,400 | | -37% |

It can be seen that overall the changed project produces slightly less spoil volume and significantly less truck movements (37%) through the use of larger trucks. The increased use of TBMs in the construction will result in a significant redistribution in spoil extraction, with 76% of the spoil proposed to be removed from Bowen Hills, with consequent reductions in truck movements at the Woolloongabba and Shafston Avenue worksites. The proposed changes result in a 75% reduction in truck movements from the Woolloongabba worksite and 72% reduction in truck movements from the Shafston Avenue worksite compared to the Reference Project.

The Reference Project estimated a 14 month period of spoil haulage from Bowen Hills (with an average of 220 loads per day). Council's *Request for Project Change Report* indicates that the proposed change to construction and haulage will result in a longer haulage period of approximately 27 months, but generally with fewer daily loaded truck movements.

The changed project haulage operation is premised on the use of larger trucks incorporating sophisticated fleet management techniques (summarised in Annexure 2 of the *Request for Project Change Report*) and up to 24 hour haulage (6:30am Monday to 6:30am Sunday, leaving 24 hours without haulage) from the Bowen Hills worksite. No haulage would be permitted on public holidays. The relevant impacts of concern are traffic and noise.
For the project overall, there are clear benefits to the Woolloongabba and Shafston Avenue worksites resulting from the expected reduction in loaded haulage truck movements of around 70-75% for each site. The haulage fleet at these sites would also be subject to the high-order fleet management described at Annexure 2 of the *Request for Project Change Report*.

For the Bowen Hills site, the changed project is expected to result in approximately 12% more truck movements, with utilisation of a range of techniques to manage noise during the quietest periods of haulage. These techniques would include selecting routes to avoid residential areas to the greatest extent possible and the implementation of priority signalling at intersections to avoid the need for braking.

Kingsford Smith Drive noise investigation results provided in the *Request for Project Change - Response to Submissions Report*, indicate that the predicted noise level increases between 12 midnight and 5:00am are not expected to be more than 2dBA (i.e. above background noise), and that maximum noise level events throughout the night periods are not expected to be higher than those currently experienced, though there will be more of them.

*Suitability of existing conditions*

Overall, I consider that the benefits that will accrue from the proposed changes to the spoil haulage operations represent improvements to the project, in particular at the Woolloongabba and Shafston Avenue worksites. I consider that the likely impacts associated with these changes, when considered in conjunction with the fleet management and consultation and complaints procedure (summarised at Annexure 1 of the *Request for Project Change Report*), can be adequately managed.

However, the existing conditions (Condition 3, Schedule 1 and Condition 5, Schedule 3) do not allow for the proposed 24 hour spoil haulage. Accordingly, this condition is amended to enable 24 hour spoil haulage from the Bowen Hills worksite.

I note that in response to a Recommendation 3 of the Coordinator-General's Report, Council has further investigated the feasibility and practicality of the use of rail transport for spoil haulage from worksites to spoil placement areas. Council's examination is contained in the *Request for Project Change – Response to Submissions – Spoil Haulage by Rail Report*, which concludes that transport by rail is not a practical solution to the need for spoil removal due to constraints on the volume able to be transported and the constraints on accessing multiple spoil placement sites. Accordingly, I am satisfied that haulage of spoil by rail is not a viable option.

Further, I am satisfied that the implementation of the consultation and complaints procedure as part of the Construction EMP, required by Condition 2, Schedule 3 and as considered above in relation to the proposed use of TBMs, will provide an appropriate means for dealing with any local impacts associated with this proposed change.

## 4.3 Operations

### 4.3.1 Operational Traffic Environment

The Coordinator-General's Report accepted the Brisbane Strategic Transport Model ('BSTM') as an appropriate model to use in establishing the future traffic environment in which the NSBT will operate. I note that since my evaluation, the BSTM has been updated with more recent demographic and transport preference survey data and is now forecasting slightly higher traffic volumes and consequent higher levels of congestion for a 'do nothing' approach.

I also note that RCM is forecasting higher levels of tunnel patronage outside of peak hours and is using this traffic volume in estimating potential earnings, disclosed through its Initial Public Offering process.

*Suitability of existing conditions*

For the purpose of impact assessment the approach has been to evaluate the worst-case scenario either based on peak traffic flows or total daily flows, whichever is appropriate. Peak traffic flows estimated by RCM in the year 2016 are slightly higher than those derived from the updated BSTM used by Council in its *Request for Project Change Report*. Daily traffic flows for the changed project estimated in 2016 along major approach roads are also slightly higher for the changed project than predicted for Reference Project using the updated BSTM.

Table 4-2 in the *Request for Project Change-Response to Submissions Report* presents a comparison of Average Annual Daily Traffic flows for roads in the inner city network based on the updated BSTM. From this it can be seen that the most noticeable changes occur on the ICB to Bowen Bridge Road link, the Ipswich Road link from the SE Freeway to Vulture Street, and O'Keefe Street east of Ipswich Road.

To ensure a conservative approach to the assessment of impacts, the higher traffic projections of RCM have been used when assessing traffic dependent impacts which are considered to be operational air quality and noise impacts. Council has assessed RCM's approach to air quality modeling and compared the results (based on RCM's higher traffic predictions) with the goals set in the Coordinator-General's Report. Council's assessment concludes that RCM's modelling approach is valid and the air emission parameters are well within the goals set in the Coordinator-General's Report.

I consider that valid traffic scenarios have been assessed by Council in the evaluation of noise and air quality impacts during the operation of the NSBT. I am satisfied that under either Council's or RCM's traffic scenarios, the goals set in the Coordinator-General's Report are capable of being achieved. Accordingly, the existing Coordinator-General's conditions remain appropriate.

I note that while RCM has predicted higher traffic levels (albeit outside of peak periods), should these predictions be realised, the corresponding increase in inner city congestion compared with a 'do nothing' scenario would serve to reinforce the stated objective of the NSBT project.

## 4.4 Other

### 4.4.1 Urban Regeneration

In the EIS Council identified a range of opportunities for urban regeneration arising from the project, in particular from changes in traffic management and transport conditions, changes in land use and access to community facilities and changes to the environment adjacent to the tunnel corridor. These initiatives fell into two categories, those that were to be included in the project scope and those that were desirable initiatives but capable of being implemented at a later stage.

In the *Request for Project Change Report*, Section 5 describes proposed changes to certain of the urban regeneration initiatives primarily as a result of physical changes to the location of portals and associated changes to surface connections for the tunnel.

*Suitability of existing conditions*

Condition 4, Schedule 3 of the Coordinator-General's Report makes reference to the urban regeneration initiatives described in Section 2 of the Supplementary Report to the EIS. These initiatives need to be modified to reflect the changes described in section 5.3 of the *Request for Project Change Report.*

The proposed changes to the urban regeneration initiatives are necessary as a consequence of the proposed changes to the design of the project. I am satisfied that the proposed changes to urban regeneration initiatives represent refinements to the initiatives originally proposed and are generally consistent with and capable of achieving the desired urban regeneration outcomes described in section 2 of the Supplementary Report.

The existing Coordinator-General's conditions refer to the urban regeneration outcomes described in section 2 of the Supplementary Report. Accordingly, Condition 4, Schedule 3 should be amended to refer the changed urban regeneration initiatives in the *Request for Project Change Report*.

## 5.0 CONCLUSION

I have evaluated the environmental effects of the proposed changes and their effects on the project according to Part 4 of the Act. I have considered the matters outlined in s 35H of the Act and as outlined in section 4.0 Evaluation of the environmental effects of the proposed changes above.

I consider that the nature of impacts that may result from the proposed changes to the project are limited to the range of impacts as assessed in the Coordinator-General's Report, namely:

- Noise, Dust and Vibration in the Vicinity of Worksites;
- Spoil Transport and Disposal;
- Traffic Management, including congestion on approach roads;
- Air Quality including Health Risks;
- Local Area traffic management, including Emergency Vehicle Access to hospitals;
- Location of Worksites, Ventilation Outlets and Portals;
- Cultural Heritage management;
- Tunnel Operational Management; and
- Urban Regeneration following Construction.

I am confident that the potential impacts arising from the changes in alignment and the use of two TBMs can be sufficiently managed through the development of a vibration management plan and the proposed consultation and complaints procedure. I am satisfied that the use of two TBMs will enable flexible construction programming.

I consider that the management of potential riparian vegetation impacts can be adequately addressed in the assessment of an operational approval under the *Fisheries Act 1994* and through the implementation of the Construction EMP for flora and fauna.

While it is likely that some visual impacts will result from the proposed interchange structure at Bowen Hills, I consider that this is most appropriately addressed in the detailed design process in consultation with likely affected owners and occupants of premises directly affected by the proposed works.

I note that the additional footprint area at each of the worksites will necessitate the extension of the conduct of cultural heritage surveys over the enlarged area.

I am confident that impacts on local area traffic management during construction can be managed satisfactorily through the requirement for a construction traffic management plan.

I am satisfied that the likely impacts associated with the proposed changes to the ventilation outlets can be adequately addressed by the development of an operational air quality management plan.

I consider that the proposed changes to the spoil haulage operations, including 24 hour spoil haulage from the Bowen Hills worksite, are, on the whole, beneficial, particularly in terms of impacts at the Woolloongabba and Shafston Avenue worksites. I consider that the range of mitigation measures and other initiatives proposed by Council, such as the fleet management and comprehensive consultation and complaints procedures can adequately manage the likely impacts associated with the changes to spoil haulage arrangements.

I consider that Council has used relevant traffic scenarios in determining likely traffic dependent impacts of noise and air quality during the operation of the NSBT. I am satisfied that the goals set in the Coordinator-General's Report are capable of being achieved by the changed project.

The proposed changes to urban regeneration initiatives represent refinements to the initiatives originally proposed and are generally consistent with and capable of achieving the desired urban regeneration outcomes described in section 2 of the Supplementary Report.

Following an examination of the proposed changes, I am satisfied that the function of the project in the transport network, as modified by the proposed changes, has not altered from that of the Reference project; that is, to reduce congestion in the inner-city areas by providing a direct link, or bypass, between Woolloongabba and Bowen Hills for cross-city trips.

Finally, I consider that the proposed changes to the project are, on the whole, beneficial and seek to minimise impacts through enhancements to the project design, construction methodology and/or post-construction and operational management initiatives.

A copy of this report will be provided to the Council and the Environmental Protection Agency according to ss 35J and 54B of the Act and will be made publicly available on the Coordinator-General's website.

Ross Rolfe
**Coordinator-General**
21 July 2006

## 6.0 CONDITIONS

In the Coordinator-General's Report I recommended conditions for the undertaking of the NSBT project. In accordance with Division 8 of the Act, these conditions are taken to be imposed for the undertaking of the project and apply to anyone who undertakes the project.

After considering the matters set out in s 35H of the Act I am of the opinion that, for the most part, the conditions of the Coordinator-General's Report remain appropriate and sufficient to ensure that potential impacts arising from the construction and operation of the project are minimized and/or managed appropriately.

For the purposes of s 54B, the project is the NSBT Reference Project evaluated in the Coordinator-General's Report as modified by the changes described in the *Request for Project Change Report.* The effect of this report is that conditions imposed for the undertaking of the project in the Coordinator-General's Report apply in addition to the conditions imposed and amended here.

Unless amended here, the conditions imposed in the Coordinator-General's Report apply for the undertaking of the Project.

In accordance with s 54B(3) of the Act, the entity nominated for the conditions is the Brisbane City Council.

**Schedule 1**

**Stated conditions for Integrated Planning Act Approvals**

**3. For spoil placement**

(e) The spoil haulage fleet is to be managed in accordance with a construction vehicle management plan, which includes:

(i) nominating haulage routes which, as far as is reasonable and practicable, rely upon arterial roads and minimise the use of minor roads;

(ii) nominating the hours for collection and haulage of spoil from construction sites;

A. generally in the range of 6.30 am to 6.30pm Mondays to Saturdays with no haulage on Sundays or public holidays; and

B. for spoil from the Bowen Hills worksite which may be undertaken at any time from 6:30am Monday to 6:30am Sunday and at no other time on Sundays and at no time on public holidays.

(iii) measures for avoiding disruption of scheduled major events (eg Brisbane Exhibition at Bowen Hills, events at the Brisbane Cricket Ground) and to co-ordinate with scheduled major construction works on other major projects (eg Green Bridge, Boggo Road busway, Gateway Upgrade Project);

(iv) the proposed method of haulage vehicle fleet management to:

A. avoid disruption to local traffic movements generally and particularly during peak traffic periods;

B. avoid haulage vehicles queuing in proximity to residential premises schools or health care facilities;

C. avoid generation of dust in and beyond the worksites; and

D. avoid excessive noise from haulage vehicle operations within and at the immediate entries and exits of the worksites;

(v) measures for avoiding more than 200 loaded haulage vehicles per day in Lamington Avenue;

(vi) any other measures necessary to minimise and mitigate the adverse environmental impacts of construction vehicle operations.

**Schedule 3**

**3. Traffic Management**

(a) Construct the Project in accordance with the Construction EMP and the construction traffic management plan.

(b) Prior to commencement of construction, a traffic management plan must be prepared to implement measures that avoid where practicable, or minimise and mitigate, traffic problems arising during the construction phase. Such measures must achieve the environmental objectives and performance criteria set out in Schedule 6 (Construction Phase) and must address the city-wide and local implications of surface construction works for traffic flows, public transport, and pedestrian and cyclist safety, property access and parking. Traffic management measures may include the mitigation measures for traffic and transport described in the Draft Design and Construction EMP in Chapter 19 of the EIS or other measures in accordance with paragraph 2(c)(iii).

(c) For spoil haulage from the Bowen Hills worksite, the Construction Traffic Management Plan should consider as a minimum the following:

(i) Spoil haulage vehicles to access the arterial road network as directly as possible and avoid local roads and residential areas;

(ii) Spoil haulage fleet to:

A. only include modern vehicles and equipment including air suspension systems;

B. have consistent payloads and bin sizes;

C. minimise the emissions of both noise and exhaust emissions, complying with AR28/01;

D. incorporate as standard equipment automatic oil changing and greasing systems to minimise service time, and also allow closed system servicing; and

E. avoid haulage during peak traffic periods and, where reasonable and practicable, peak traffic periods associated with major events at the Brisbane Cricket Ground and the RNA Showgrounds;

(iii) Spoil haulage trucks to be fitted with radios and GPS transponders to facilitate:

A. real time management of trucks and traffic conditions by monitoring location, speed, braking, and times for trips, loading and unloading, and waiting;

B. data collection from the GPS system, to allow investigation of complaints and to assist with management of spoil haulage fleet performance;

C. diversion of trucks to avoid traffic congestion and real time scheduling to avoid queuing, providing this does not involve the use of local roads;

D. scheduling shift changeovers or scheduled maintenance to reduce disruption to local traffic in peak times; and

E. timing of loading operations to prevent queuing of trucks in local streets.

(iv) Spoil haulage fleet systems to address:

A. safety including accident & incident reporting and a Hazard Register, Risk Analysis and Safe Operating Procedures;

B. vehicle routine and preventative maintenance;

C. operator selection using safety performance criteria;

D. operator training in safety, environmental management and community relations;

E. compulsory operator general construction industry inductions (Blue Cards);

F. continual assessment of operator competency and standards of behaviour; and

G. OH&S Tri Safe Audit (Qld Government self insurance audit) to assess the suitability of operators.

(d) The traffic management plan must be subject to periodic review and be updated as required to address construction program requirements and construction sequencing. The traffic management plan is to be provided to Queensland Transport and Department of Main Roads prior to finalisation.

**4. Urban Regeneration**

(a) Prior to construction, a program of urban regeneration activities that form part of the Project must be produced to the Coordinator-General. The program must:

(i) identify the urban regeneration initiatives proposed, generally consistent with those urban regeneration opportunities described in Section 2 of the Supplementary Report as amended by section 5.3 of the *Request for Project Change*;

(ii) identify the location of urban regeneration initiatives; and

(iii) describe the timeframe within which urban regeneration initiatives will be undertaken.

(b) Prior to the commencement of construction, prepare an urban regeneration plan which:

(i) describes the location, nature and extent of urban regeneration works to be undertaken as part of the Project;

(ii) promotes within localities affected by construction works a high-quality urban design outcome for surface works, a sense of place conducive to further and on-going redevelopment in the locality, connectivity for public transport facilities, connectivity for pedestrians and cyclists, and integration with Proponent urban regeneration plans and programs;

(iii) is based on the outcomes of consultation with Proponent and the relevant Community Liaison Group; and

(iv) is integrated, to the extent reasonable and practicable, with other urban regeneration plans of the Proponent or the State.

**5. General Construction**

Construction of the Project must be undertaken generally in accordance with the Construction EMP and EMP sub-plans. Generally, construction must comply with the following:

(a) Subject to Condition 5(d), construction activities for works on or above the surface and which generate excessive levels of noise, vibration, dust or construction traffic movements, must only be undertaken between 6.30am to 6.30pm Mondays to Saturdays and at no time on Sundays or public holidays, except for special circumstances where the above-the-surface works should be conducted outside these days and hours. Examples of such special circumstances include:

(i) works on arterial roads to avoid disruption to peak traffic flows (eg Pacific Motorway north of O'Keefe Street, Lutwyche Road south of Newmarket Road, Shafston Avenue);

(ii) works in rail corridors; and

(iii) works involving large pre-fabricated components (eg bridge works).

(b) Construction worksites along the tunnel alignment must be designed and constructed to provide for the management and mitigation of construction impacts by:

(i) incorporating acoustic lining, ventilation and dust filtration equipment to achieve the environmental objectives and performance criteria set out in Schedule 6 (Construction Phase) of these recommendations. In particular, tunnel shafts servicing tunnel machines should be enclosed with ventilated, acoustically-lined sheds in which spoil handling (being stockpiling, loading into haulage trucks) is to be conducted at all times.;

(ii) installing and positioning night lighting, including security lighting, to avoid light spill onto adjoining premises, at intensities exceed 8 lux measured at the common boundary;

(iii) siting access points for pedestrian and vehicular traffic according to the *Transport, Access, Parking and Servicing Planning Scheme Policy* in City Plan;

(iv) achieving compliance with the requirements of the *Hazard and Risk Assessment Planning Scheme Policy* in City Plan.

(c) Construction sites must be rehabilitated as quickly as reasonable and practicable to manage and mitigate the potential impacts of dust, soil erosion and sedimentation. Surface earthworks must be managed to minimise adverse environmental impacts on waterways, significant places and sensitive receptors.

(d) The collection and haulage of spoil from the Bowen Hills worksite may be undertaken at any time from 6:30am Monday to 6:30am Sunday and at no other time on Sundays and at no time on public holidays.

(e) Sheds and conveyors for spoil handling activities at worksites must be enclosed to achieve the environmental objectives and performance criteria set out in Schedule 6 (Construction Phase)

**17. Air Quality**

Note: Amended table only.

- **Table 5 – Ambient Air Quality Goals**

| Pollutant | Goal | Unit | Measuring Period |
|---|---|---|---|
| Carbon monoxide (CO) | 8<br>or 10 | ppm<br>$mg/m^3$ | 8 hour maximum* |
| Nitrogen dioxide ($NO_2$) | 0.12<br>or 246 | ppm<br>$\mu g/m^3$ | 1 hour<br>maximum |
| Particulate matter less than 10 µm ($PM_{10}$) | 50<br>50 | $\mu g/m^3$<br>$\mu g/m^3$ | 24 hour maximum **<br>annual mean |
| Particulate matter less than 2.5 µm ($PM_{2.5}$) | 25<br>8 | $\mu g/m^3$<br>$\mu g/m^3$ | 24 hour maximum<br>annual mean |
| Total suspended particulate matter (TSP) | 90 | $\mu g/m^3$ | average annual mean |

* One day per year maximum allowable exceedence;

** Five days per year allowable exceedence, not including exceedence in ambient goals due to external events (eg dust storms, fires, major construction works)