# *WINDSOR FLOOD EVACUATION ROUTE*

***Director-General's Report***
*Section 115C of the Environmental Planning and Assessment Act 1979*

***May 2003***

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# FOREWORD

The Roads and Traffic Authority of NSW (RTA) is proposing to construct a new flood evacuation route for Windsor. The proposal will also serve as a new arterial road. The proposal involves the construction of a new 2.6 kilometre two-lane road between Windsor and Mulgrave, including a 1.04km long high-level bridge structure across South Creek and its floodplain. Construction of the road is expected to cost $64 million and take three years to complete (2003-2006). The proposal is being funded as part of the implementation of the Hawkesbury-Nepean Floodplain Management Strategy (HNFMS) and the Windsor Road Upgrade Program.

The proposal is subject to assessment under Division 4, Part 5 of the *Environmental Planning and Assessment Act 1979* (the Act). As such, the approval of the Minister for Planning is required for the works. The RTA has sought the approval of the Minister under Section 115B of the Act.

This report has been prepared in accordance with Section 115C of the Act which requires that the Minister obtain a report from the Director-General of the Department of Urban and Transport Planning prior to making a decision.

The purpose of this report is to: review the Environmental Impact Statement (EIS); the issues raised in representations made in response to the public exhibition of the EIS; the additional information provided by the proponent; and other relevant matters pertaining to the potential environmental impacts of the proposed works. The report documents the outcome of an assessment of the proposal and concludes that the potential environmental impacts associated with the project can be mitigated to an acceptable level by adopting management measures referred to in this report and reflected in the recommended conditions of approval. On that basis, it is recommended that the proposal be approved subject to the recommended conditions.

**Jennifer Westacott**
**Director-General**
**Department of Infrastructure, Planning and Natural Resources**

## Preface

This report includes a reference to the following: the Department of Planning (The Department); the National Parks and Wildlife Service (NPWS); and the Department of Land and Water Conservation (DLWC).These agencies are currently in the process of being reorganised. The assessment of the proposal by each of these agencies was undertaken prior to the restructure process. Each of the agencies is therefore referred to, as specified, at the time of the assessment.

It should be noted, that some functions of these agencies will change and some responsibilities may be transferred to other agencies. This could affect some of the responsibilities identified in report where they relate to the Department, the NPWS, and the DLWC. This report should be read in the context of these changes.

# EXECUTIVE SUMMARY

## The Proposal

The Roads and Traffic Authority (RTA) proposes to construct a flood evacuation route for Windsor between Day Street, Windsor and Railway Road South, Mulgrave, as part of the implementation of the Hawkesbury-Nepean Floodplain Management Strategy. The proposal will also provide an arterial road link between Richmond Road, Windsor and Windsor Road, Mulgrave as part of the Windsor Road Upgrade Program.

The proposal would consist of a two-lane road of approximately 2.6km in length. It would have a minimum centreline height of 17.3m AHD. It would include three bridge structures, embankments and reinforced walls.

The proposed Windsor Flood Evacuation Route would cost approximately $64 million to construct. It is being funded as part of the Hawkesbury-Nepean Floodplain Management Strategy (HNFMS) and the Windsor Road Upgrade Program.

## EIS Exhibition and Approval Process

An Environmental Impact Statement (EIS) was prepared by RTA for the proposal. The EIS were exhibited between 29 August 2002 and 4 October 2002. Fourteen (14) representations were received in response to the EIS.

The key issues raised in the representations to the EIS were:

- design changes to ameliorate amenity loss;
- restricted access into various properties;
- noise levels resulting from construction and operation of the proposal;
- impact of potential acid sulphate soils;
- water quality and capacity of water quality ponds;
- property loss; and
- route selection.

The proposal is subject to assessment under Division 4, Part 5 of the *Environmental Planning and Assessment (EP&A) Act 1979* and as such, the approval of the Minister for Planning is required. The RTA sought the approval of the Minister on 1 January 2003.

This report has been prepared in accordance with Section 115C of the EP&A Act which requires the Director-General of the Department of Planning to assess and report to the Minister on the proposal.

## Project Justification

Studies by the Stated Emergency Services (SES) indicate that the existing flood evacuation routes serving the Windsor region do not provide adequate time or capacity to evacuate the population in the event of a severe flood. The proposed Windsor Flood Evacuation Route has been developed primarily to provide greater opportunity for the populations of Windsor and South Windsor to evacuate within the available timeframe. The proposal is predicted to

improve the evacuation times available for Windsor and South Windsor by 8.1 hours, from a deficit of 4.5 hours to an excess time period of 3.6 hours. The proposed Windsor Flood Evacuation Route also improves evacuation opportunities for other regional towns. Concurrently, the additional capacity on the existing evacuation routes will increase evacuation times available for Richmond from a deficit of 5.4 hours to a deficit of 1.6 hours, and for Bligh Park and Windsor Downs from a deficit of 3.4 hours to a deficit of 0.4 hours. It has been indicated through modelling that further traffic management processes have the potential to overcome the remaining time evacuation time deficits.

Windsor Road is currently experiencing a poor level of service, especially between Pitt Town Road and Macquarie Street. The proposal has also been developed to enhance this existing arterial network as part of the Windsor Road Upgrade Program.

**Environmental Impact Assessment**

The selection of the preferred route was undertaken in consultation with the community and key agencies to reduce environmental impacts to acceptable levels. Notwithstanding, the following key issues were identified: future development, urban design, noise levels, traffic impacts, water quality, public transport issues, and localised impacts on Forbes and Mileham Streets.

*Future Development*

The proposed Windsor Flood Evacuation Route would enable the full evacuation of the existing population of Windsor and South Windsor. Through the freeing up of capacity on other flood evacuation routes there would be an added improvement in evacuation times for existing development in Richmond, Bligh Park and Windsor Downs. The State Emergency Service raised concerns that any future increases in population within the Windsor region may compromise the capacity of the existing and proposed flood evacuation routes. In addition to other issues such as flora/fauna, flooding liability, etc; any future subdivisions on the floodplain would also need to augment the current evacuation routes or provide new evacuation routes.

*Urban Design*

The proposed Windsor Flood Evacuation Route will constitute a large and imposing new element across the floodplain. The proposed embankments will effectively slice the floodplain in half and block view lines along it. An independent urban design report commissioned by the Department, recommended that the proposal be designed with minimum contact to the ground to visually offset its structural dominance. A recommended Condition of Approval therefore requires the Proponent to undertake further design investigations about the provision of bridge structures compared to embankments, most notably at areas prominently viewed from Windsor and Mulgrave. The Proponent is also required to investigate other measures to ameliorate the visual impacts of the proposal such as the form, colour and texture of retaining walls and bridge structure and landscape measures to ameliorate the visual impacts of the proposal.

*Noise*

The EIS indicates that construction noise levels would be significant and would not meet construction noise goals. A recommended Condition of Approval therefore requires the

Proponent to prepare a Construction Noise and Vibration Management Sub Plan that would detailed construction activities, assess associated noise impacts and detail specific noise mitigation measures and consultation protocols. Limits to construction vibration will also be defined, to minimise structural damage and unacceptable human exposure.

A recommended Condition of Approval requires that the Proponent prepare an Operational Noise Management Report to accurately determine noise mitigation options along the alignment of the proposal and undertake noise monitoring. Should the monitoring indicate that the traffic noise levels are higher than the criteria identified in the Operational Noise Management Report, the Proponent would be required to implement further mitigation measures.

*Traffic*

The existing arterial route through the Windsor region is along Windsor Road and Macquarie Street. Congestion on this route causes queues and delays at a number of locations. The primary impact of the proposed Windsor Flood Evacuation Route would be a substantial decrease in traffic on the main Windsor Road and Macquarie Street route through Windsor. Approximately 40 to 45 percent of the total traffic on this route would transfer to the new arterial road, providing significant relief from existing peak hour congestion and queuing on key intersections. A number of representations noted concern over the construction and operational traffic impacts of the proposal. The Proponent would be required to prepare a comprehensive Construction Traffic Management Sub Plan to cover all construction stage traffic management requirements. The RTA is required to have strategies in place to manage operational traffic impacts through their Operational Maintenance and Monitoring systems.

*Water Quality*

The proximity of the proposal to sensitive waterbodies may result in potential adverse water quality impacts. The Department agrees with the Proponent's recommendation that a Soil and Water Management Sub Plan be prepared that includes site specific Erosion and Sediment Control Plans. These Sub Plans would provide details of the exact locations and size of water quality control structures, details of the water quality monitoring and contingency plans to deal with spills and contaminated discharge. The crossing of South Creek should be designed to ensure that the completed bridge does not interfere with water flow or restrict the dry land connectivity for fauna. A recommended Condition of Approval therefore requires that the design of South Creek bridge be developed in consultation with NSW Fisheries and Department of Land and Water Conservation (DLWC) and consider the impact on water flow and fauna.

*Flora and Fauna*

Section 5A tests undertaken as part of the EIS and the Representations Report indicated that the proposal would not have significant impact on endangered ecological communities. A recommended Condition of Approval will require the mitigation measures be outlined under a Flora and Fauna Management Plan to be undertaken by the Proponent.

The Proponent has proposed to undertake revegetation works along South Creek complementary to other works being undertaken by the DLWC and community groups. To ensure that these revegetation works are effectively coordinated, a recommended Condition of

Approval requires the Revegetation Plan to be prepared in consultation with relevant government agencies and community groups.

*Pedestrian and Cycle Facilities*

The Proponent does not support the provision of a pedestrian walkway along the proposal due to the additional cost and low predicted patronage. A shared pedestrian/cycle way between Mulgrave and Windsor is currently being upgraded which should provide an alternative pedestrian route between the two townships. The Department agrees that the provision of a pedestrian footway along the proposed Windsor Flood Evacuation Route is not cost effective. A recommended Condition of Approval, therefore, requires that the alternative shared pedestrian/cycleway be completed prior to the opening of the proposal to adequately cater for the pedestrian traffic. A recommended Condition of Approval will also require the erection of signage restricting pedestrian access to the proposal. The adequacy of this signage is to be reviewed and modified, as appropriate, after 12 months of operation.

*Forbes Street*

As part of the proposal, Forbes Street Windsor will be transformed from a residential cul-de-sac to an important section of the arterial road network. The proposal would thereby result in substantial increases in the volume of traffic in Forbes Street, as well as noise levels substantially above the noise criteria goals set by the EPA. It will also result in restricted access to Forbes Street properties. Due to limited noise amelioration options for Forbes Street, the Proponent has offered a Property Value Guarantee. If requested, the Proponent would purchase properties located along Forbes Street at current market value and provide various other allowances associated with moving.

The Department is concerned that the Property Value Guarantee only provides a short term solution for existing land owners along Forbes Street. There may be longer term, adverse social impacts for people continuing to reside on Forbes Street. The Department has concerns that the noise levels generated by the current proposal would not be acceptable for future residents. The preliminary design alternatives investigated by the Proponent did not adequately address these concerns. A recommended Condition of Approval, therefore, requires the Proponent to investigate alternative intersection design and street alignments for Forbes Street within six months of the date of the Approval.

*Mileham Street*

Day Street and Mileham Street Windsor are local streets in Windsor containing both residential and industrial development. Day Street will be extended south of Mileham Street to form an integral part of the Flood Evacuation Route. Views of the floodplain from dwellings along Mileham Street will be blocked by this structure. The proposed Windsor Flood Evacuation Route will be 2.35m higher than neighbouring properties at the intersection of Day and Mileham Streets. Access and outlook from these properties will therefore be restricted.

An independent urban design report commissioned by the Department recommended that the Day Street extension be constructed as a bridge and relocated 20 metres away from the rear eastern boundaries of the two Mileham Street properties. The independent urban design report also recommended that the intersection be redesigned. A recommended Condition of Approval therefore requires the Proponent to investigate and report on alignment and design

changes at Day and Mileham Streets to reduce the visual and access impacts of the proposal. The report must evaluate the impact of any design changes on the heritage property of Trevallyn.

**Conclusions and Recommendations**

The Department recognises that the proposal would substantially improve the opportunities to evacuate Windsor, South Windsor and the surrounding townships in the event of severe flooding. Further more, it would increase the capacity and improve travel times of the local arterial road network.

The Department has undertaken an assessment of the likely impacts of the proposal and has identified key areas where comprehensive mitigation measures would need to be implemented to ensure adverse impacts are mitigated to an acceptable level. In particular, mitigation strategies relating to noise, water quality and flora and fauna would be developed beyond processes outlined in the EIS to ensure that the level of impact would be acceptable.

The proposal will substantially impact upon properties bordering Forbes, Mileham and Day Streets Windsor. The Department has recommended that further investigations into the alignment and design of the proposal along these streets be undertaken, in order to limit the adverse impacts of noise, access and outlook on these properties. Due to the imposing size of the proposal, the Department has also recommended that the Proponent investigate methods to effectively integrate the proposal across the floodplain environment.

The Department has also undertaken an assessment of other likely environmental impacts of the proposal including future development, traffic, indigenous and non-indigenous heritage, air quality, soils and public transport. The Department's review has indicated that, provided all comprehensive mitigation measures are implemented, the impacts of the proposal would be acceptable.

The Department also recommends that the Proponent prepare comprehensive Environmental Management Plans (EMP) for the construction and operation of the proposal which embody the mitigation measures contained in the EIS, Representations Report and the recommended Conditions of Approval for the proposal. The key elements of the recommended Conditions of Approval include:

- preparation and implementation of comprehensive Construction and Operational EMPs;
- the preparation of detailed Sub Plans as part of the EMPs for:
    - traffic management;
    - flora and Fauna;
    - noise and vibration;
    - dust;
    - acid sulfate soils;
    - soil and water quality;
    - flooding and drainage;
    - ground water;
    - non-indigenous heritage;
    - soil and fill;
    - waste management and reuse; and
    - hazards and risk management.

The Department's assessment has concluded that, provided the Recommended Conditions of Approval contained in Section 8 of this Report are adopted, the proposal could be approved by the Minister for Infrastructure and Planning.

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# GLOSSARY AND ABBREVIATIONS

| | |
|---|---|
| AADT | Annual Average Daily Traffic |
| AHD | Australian Height Datum |
| Acid Sulfate Soils (ASS) | Naturally acid clays, mud and other sediments usually found in swamps and estuaries. These may become extremely acidic when drained and exposed to oxygen, and may produce acidic leachate and runoff which can pollute receiving waters and liberate toxins |
| Ambient Noise | The background noise at a point being a composite of sounds from near and far |
| ANZECC | Australian and New Zealand Environment and Conservation Council |
| ASS | Acid Sulfate Soils |
| Department, the | Department of Planning |
| Director-General | Director-General of the Department of Planning |
| DLWC | Department of Land and Water Conservation |
| The Department | Department of Planning |
| EIS | Environmental Impact Statement |
| EMP | Environmental Management Plan |
| EPA | Environment Protection Authority (NSW) |
| EP&A Act | Environmental Planning and Assessment Act 1979 |
| Floodplain | Flat large area of alluvium adjacent to a watercourse, characterised by frequent active erosion and aggregation by channelled and overbank stream flow |
| Grade separation | The separation of a road, rail or other traffic so that crossing of movements, which would otherwise conflict, are at different elevations |
| HCC | Hawkesbury City Council |
| HNFMAC | Hawkesbury-Nepean Flood Management Advisory Committee |
| HNFMS | Hawkesbury-Nepean Flood Management Strategy |
| HNSQS | Hawkesbury-Nepean Scenic Quality Study |
| Interchange | A grade separation of two or more roads with one or more interconnecting carriageways |
| LALC | Local Aboriginal Land Council |
| LEP | Local Environmental Plan |
| LGA | Local Government Area |
| Level of Services (LOS) | An indicator of performance of the road network |
| Median | A strip of road not normally intended for use by traffic, which separates carriageways for traffic in opposite directions |
| MDP | Metropolitan Development Program |
| NPWS | National Parks and Wildlife Service |
| PAD | Potential Archaeological Deposit |
| PMF | Probable Maximum Flood |
| RTA | Roads and Traffic Authority |
| SES | State Emergency Service |
| Shoulder | The portion of the carriageway beyond the traffic lanes adjacent to the land flush with the surface of the pavement |
| SIS | Species Impact Statement |
| SEPP 14 | State Environmental Planning Policy 14 - Coastal Wetlands |

| | |
|---|---|
| SREP 20 | Sydney Regional Environmental Plan 20 – Hawkesbury-Nepean River |
| SWC | Sydney Water Corporation |
| TSC Act | Threatened Species Conservation Act 1995 |
| Wetland | Land either permanently or temporarily covered by water, usually characterised by vegetation of moist-soil or aquatic type |

# 1. INTRODUCTION

## 1.1 Nature of the Proposal

The Roads and Traffic Authority (RTA) proposes to construct a flood evacuation route for Windsor between Day Street, Windsor and Railway Road South, Mulgrave as part of the implementation of the Hawkesbury-Nepean Floodplain Management Strategy (NHFMS). The proposal includes connections to the existing road network at Forbes Street, Day Street, Groves Avenue and Railway Road North. The proposal would also provide an arterial road link between Richmond Road, Windsor to Windsor Road, Mulgrave.

The proposed Windsor Flood Evacuation Route would consist of a two-lane road of approximately 2.6km in length. It would have a minimum centreline height of 17.3 AHD. The proposal would include:

- three bridge structures, namely a 1040m long structure over South Creek, and a 40m long bridge and 25m bridge;
- an extension of Day Street, Windsor involving a vertical reinforced soil wall on the western side and vegetated 5:1 batters on the eastern side;
- embankments up to 7.5m in height, with 5:1 batter and 3m wide berms with reinforces soil walls on top in sections between Day Street Windsor and the three bridges;
- full height reinforced walls between Mulgrave Road and Groves Avenue; and
- 7.5m wide service road between Mulgrave Road and Hudson Place providing access to properties on Railway Road North and Hudson Place.

The proposal location and design is shown in Figure 14.3 of the Environmental Impact Statement (EIS).

The proposed Windsor Flood Evacuation Route would cost approximately $64 million to construct. The proposal is being funded as part of the implementation of the NHFMS and the Windsor Road Upgrade Program.

## 1.2 Background and History

The pattern of development and the unique flood behaviour in the Hawkesbury-Nepean Valley has created a situation whereby flooding downstream of the Warragamba Dam may have significant adverse effects on the population and property of the Hawkesbury-Nepean Floodplain. Heavy rainfall may result in flooding and the isolation and inundation of towns including Windsor.

In 1997, the NSW State Government established the Hawkesbury-Nepean Flood Management Advisory Committee (HNFMAC). The primary function of the HNFMAC was to prepare a detailed floodplain management strategy detailing regional and local level actions to manage the effects of severe flooding. This strategy, 'Achieving a Hawkesbury-Nepean Floodplain Management Strategy' together with a Supplementary Report was adopted by the Government in 1998.

The strategy examined a range of options to minimise flood risk. The primary recommendation was to evacuate the at-risk population via road using private vehicles. The strategy thereby identified preliminary road improvements to assist with evacuations and recommended the development of a

detailed evacuation infrastructure program. The Interim Regional Road Upgrade Plan (2000) identified evacuation routes including a high level crossing over South Creek for Windsor.

A series of technical environmental investigations and stakeholder consultations in early 2000 resulted in the development of six route options for crossing South Creek. Additional investigations and consultation resulted in refinement of these six options to two options. In October 2001, the Minister of Roads announced the preferred Windsor Flood Evacuation Route to be assessed through an EIS.

The proposed Windsor Flood Evacuation Route has a secondary function of augmenting the arterial road network, as part of the Government's strategy to upgrade Windsor Road to four lanes. In March 2001, the Government announced that the upgrading program would be completed by 2006. The upgrading strategy identifies the proposed Windsor Flood Evacuation Route as part of the Windsor Road corridor upgrading program.

## 1.3 Preparation and Exhibition of the Environmental Impact Statement

The RTA sought the requirements of the Director-General for the preparation of an EIS for the proposal on 7 July 2001. The requirements were subsequently issued on 10 August 2001.

An EIS for the proposal was prepared on behalf of the RTA by Connell Wagner. The EIS was exhibited from 29 August to 4 October 2002 at nine locations in the Sydney and Windsor region. Written representations from public authorities, interested organisations and the general community were received until 11 October 2002.

Fifteen representations were received by the RTA in response to the EIS. Copies of all representations were forwarded to the Department as required by the *Environmental Planning and Assessment Act, 1979* (EP&A Act).

## 1.4 Statutory Provisions and Assessment Process

The proposal is subject to Part 5 of the EP&A Act 1979. As the RTA is both the proponent and determining authority for the proposal and an EIS was prepared, Division 4 of Part 5 of the EP&A Act applies. As such, the approval of the Minister for Planning is required for the proposal.

The consent of Hawkesbury City Council (HCC) is required under Clause 27 of the *Hawkesbury Local Environmental Plan (LEP) 1989*, for works affecting the 'Trevallyn' property and the Roman Catholic Cemetery. These properties are listed as items of environmental heritage significance under Schedule 1 of the Hawkesbury LEP. A Development Application to Council is, therefore, required for these works, in accordance with the provisions of Part 4 of the EP&A Act.

A Permit from the National Parks and Wildlife Service (NPWS) may be required under Section 90 of the National Parks and Wildlife Act 1974. The Permit is to knowingly destroy, deface or damage or knowingly cause or permit the destruction or defacement of or damage to a relic, or Aboriginal place. This permit would relate to sub-surface testing of four Potential Archaeological Deposits (PADs) traversed by the proposed route.

The Proposal would not affect any matter of 'National Environmental Significance' and as such approval by Commonwealth Government under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* is not required.

## 1.5 Request for the Approval of the Minister for Planning

In accordance with Section 115B of the EP&A Act, the RTA sought the approval of the Minister for Planing by way of letter dated 1 January 2003. The request for approval was accompanied by a Representations Report which presented the RTA's response to the issues raised in response to the public exhibition.

## 1.6 Purpose of this Report

The purpose of this report is to review the EIS for the proposal, the issues raised in representations to the public exhibition, submissions made by the proponent and other matters pertinent to the potential environmental impact of the proposal.

This report has been prepared in accordance with Section 115C of the EP&A Act, which requires the Director-General of the Department of Planning to assess and report to the Minister on the proposal. The report documents the outcome of an independent environmental impact assessment by the Department accounting for all issues raised in representations to the EIS.

# 2 DISCUSSION OF PROPOSED WORKS AS DESCRIBED IN THE EIS

*This section of the report provides a description of the project as described in the EIS. The purpose is to provide an overview of the information presented in the EIS and does not necessarily represent the views of the Department. The Department's consideration of the proposal is provided in Sections 5 and 6.*

## 2.1 Introduction

The proposed Windsor Flood Evacuation Route is to be located between Day Street, Windsor and Railway Road South, Mulgrave. The proposed route will be approximately 2.6km in length and will include three high level bridges and an elevated roadway with a minimum centreline height of 17.3 AHD.

The proposal will provide an arterial route for daily traffic from Richmond Road at Windsor to Windsor Road at Mulgrave. The proposal will incorporate one traffic lane in each direction with provision for cyclists and breakdowns on the road shoulders. During its use as a flood evacuation route, the eastbound lane of the proposal would be used for evacuation traffic and the westbound lane would provide access for emergency vehicles. The eastbound shoulder would be 2.5m wide, which is of sufficient width to be used as an additional lane for evacuating traffic if needed.

The proposed alignment of the Windsor Flood Evacuation Route is shown in Figure 14.3 of the Environmental Impact Statement (EIS). This has been included as Appendix A of the report.

## 2.2 Key Features

Key features of the proposal include:

- three bridge structures, namely a 1040m long structure over South Creek, and a 40m long bridge and 25m bridge;
- an extension of Day Street, Windsor involving a vertical reinforced soil wall on the western side and vegetated 5:1 batters on the eastern side;
- embankments up to 7.5m in height, with 5:1 batter and 3m wide berms with reinforces soil walls on top between Day Street Windsor and the three bridges;
- full height reinforced walls between Mulgrave Road and Groves Avenue at a maximum height of 5m;
- a 7.5m wide service road between Mulgrave Road and Hudson Place providing access to properties on Railway Road, North and Hudson Place; and
- a level crossing east of Groves Avenue, to provide access to Railway Road South in times of flooding.

## 2.3 Other Design Features

Other design features of the proposal include:

- provision of two 3.2m wide traffic lanes, a 2.5m wide eastbound shoulder and a 1.5m wide westbound shoulder along the Flood Evacuation Route;

- lane capacity of 600 vehicles per hour and design speed of 80km per hour;
- provision of a 800mm high traffic/wave barrier;
- erection of a 1200mm high cyclist rail;
- South Creek bridge to have 40m spans and a minimum centreline height of 18m AHD;
- provision of four traffic lanes at Forbes Street, Windsor, a 0.6m median and 1.5m shared cyclist/pedestrian pathways on both sides of the road;
- opening Forbes Street at Macquarie Street to allow traffic movements to and from the route;
- properties on northern side of Forbes Street to be restricted to left in/left out access only;
- extension of Day Street, Windsor southwards forming a T-intersection with the evacuation route at Forbes Street; and
- provision of a connection ramp to Mulgrave Road, Mulgrave from the proposal.

## 2.4 Property Acquisition

The proposal would require the full or partial acquisition of 24 properties including commercial/industrial, residential and publicly owned properties. Partial property acquisition of land owned by Council and privately owned grazing land on the floodplain is proposed. One grazing property will be severed by the proposal. The Roads and Traffic Authority (RTA) will, therefore, negotiate with the land owner to ascertain if acquisition of the severed parcel of land is required.

The proposal will require partial acquisition of land at the 'Trevallyn' and from the Roman Catholic Cemetary on the corner of Macquarie Street and Richmond Road. Both these properties are items of heritage significance on Schedule 1 of the *Hawkesbury Local Environmental Plan (LEP) 1989*. These works will therefore be subject to a Development Application to Council in accordance with the provisions of Part 4 of the *Environmental Planning and Assessment Act (EP&A Act) 1979*.

The proposal will necessitate the total acquisition of a property on the corner of Railway Road and Mulgrave Road and the partial acquisition of frontages of commercial properties on Railway Road North. The RTA may acquire whole properties if the effects of roadwork on the remainder of the property warrants total acquisition.

All property acquisitions identified at the final design stage would be undertaken in accordance with the provisions of the *Land Acquisition (Just Terms Compensation) Act 1991*. The procedures followed for the acquisition of land are set out in the Roads and Traffic Authority's *Land Acquisition Policy Statement*.

## 2.5 Construction Issues

The RTA will be responsible for the overall coordination and project management for the delivery of the proposal. The detailed design and documentation for construction would be undertaken by a consultant. The proposal would be implemented by a contractor through a tendering process. The RTA would be responsible for overseeing the implementation of the project and would undertake periodic inspections, monitoring and auditing during construction, to ensure compliance with the Conditions of Approval, the requirements of the EIS and any other legislative requirements.

Implementation of the proposal is expected to commence in 2003 and will take approximately three years to complete. Construction hours would be limited to 7.00am to 6.00pm Monday to Friday, and 7.00am to 5.00pm Saturdays, with less noisy activities occurring between 7.00am to 8.00am and

1.00pm to 5.00pm. No work would take place on Sundays or public holidays without prior advice to adjacent neighbours. Some night work is proposed in order to reduce impacts on existing roads. Any work undertaken outside the defined construction hours would be in accordance with the RTA's Environmental Noise Management Manual (*Practice Note VII – Roadworks outside Normal Working Hours*).

Construction facilities will include site compound and office, plant and equipment storage area, stockpile sites and waste management and storage areas. These would be located on part of the road corridor or adjacent to it. A bridge construction site compound would be established on the approach embankment at the eastern side of the bridge over South Creek. Access to the site will be along the main arterial road network and local roads.

There will be approximately 30 full time personnel at the peak of construction.

# 3 JUSTIFICATION, ALTERNATIVES CONSIDERED AND MAJOR BENEFITS AND ADVERSE IMPACTS IDENTIFIED IN THE EIS

*This section discusses the project need and justification as described in the EIS and outlines the alternatives considered and the potential adverse and beneficial impacts of the proposal as identified in the EIS. This section does not necessarily reflect the views of the Department. The Department's assessment of issues associated with the proposal is contained in Sections 5 and 6.*

## 3.1 Justification and Need for the Proposal

The impacts of flooding in the Hawkesbury-Nepean Valley means that effective flood evacuation routes are required to protect and evacuate the population. Studies by the State Emergency Services (SES) indicate that existing flood evacuation routes serving the Windsor region do not provide adequate time or capacity to evacuate the population. A new high-level crossing is, therefore, proposed to provide an opportunity for the population to evacuate to safety in the timeframe available.

Without the proposed evacuation route, the SES would need to adopt a response strategy to service a population trapped by flooding. This strategy would include resupply and/or rescue, which would be very resource and labour intensive. There would also be a potential loss of life.

Windsor Road is an important strategic link in the arterial road network serving north-west Sydney. There is a current strategy in place to upgrade Windsor Road. Windsor Road is currently experiencing a poor level of service, especially between Pitt Town Road and Macquarie Street. The intersections at Macquarie Street/Richmond Road and Macquarie Street/Windsor Road are performing at unsatisfactory levels. Deficiences in the existing network will be exacerbated if traffic volumes continue to increase. In addition to flood evacuation, the enhancement of the existing arterial road network by increasing its capacity is, therefore, a secondary objective of the proposal.

The key objectives of the proposal are:

- to further the objectives and initiatives contained in the Hawkesbury-Nepean Floodplain Management Strategy (HNFMS) (and related strategies and policies) through the development of a flood evacuation route involving a high-level road crossing of South Creek;

- to maximise opportunities to improve the performance of the arterial road network in the study area including consideration of the needs of all road users and the sustainability of any such improvements; and

- to ensure that areas of sensitivity in the surrounding biophysical and socio-economic environments are protected and where possible enhanced through construction and operation of the proposal.

## 3.2 Consequences of Not Proceeding

The consequences of not proceeding with the proposed Windsor Flood Evacuation Route would include:

- in the event of a major flood, residents would continue to use the current evacuation route along George Street, Richmond Road and The Northern Road. George Street is closed by flooding at 15.2 AHD which would thereby effectively stop evacuation and isolate the township. The Interim Regional Road Upgrade Plan, which arose from the HNFMS, estimated that up to 6600 people (3160 vehicles) would be isolated in the Windsor, Richmond and Bligh Park;

- there would be limited infrastructure and services available and potential loss of life to people isolated by rising floodwaters; and

- Windsor Road would be four lanes between Parramatta and Groves Avenue, Mulgrave and two lanes between Groves Avenue and Windsor. The existing localised deficiencies and poor traffic conditions would continue to exist and would be exacerbated by increased future traffic volumes.

## 3.3 Alternatives Considered

The need for a high-level crossing route over South Creek resulted from recommendations in the HNFMS. An option of a high level crossing over South Creek was investigated as a suitable flood evacuation route for Windsor. A maximum height of 17.3m AHD contour line for the high level crossing was pinpointed, resulting from the surrounding highest ground level in the area. In order to develop a range of feasible route options, key environmental and social characteristics of the area bounded by the 17.3m AHD contour line were investigated.

A preliminary assessment of six options was undertaken during the initial stages of the investigation. Four route options north of the railway line providing flood evacuation and augmentation of the existing arterial system were examined. Two routes to the south of the railway line serving flood evacuation and the local road system were also considered.

In May 2000, the Roads and Traffic Authority (RTA) consulted with the community and other stakeholders, and undertook a Value Management Study, to shortlist two routes for further evaluation. Two options were thereby identified: the northern option (Option 1) providing flood evacuation and arterial road functions; and the southern option (Option 2) providing flood evacuation and connection to the local road network. Further consultation and specialist studies investigating flooding, flora and fauna, social/business, heritage, landscape and visual impacts, air quality, noise and vibration issues were undertaken. A second VMS was also undertaken in October 2000. Based on the findings of these studies, the northern option was identified as the preferred option. The reasons for the selection of the northern option were:

- Option 1 had a better performance, particularly in terms of the arterial road network under the multi-criteria analysis;
- wide community support from business and local residents;
- road user economic analysis indicates a positive return for Option 1; and
- less adverse impact on the surrounding community and stakeholders than Option 2.

Further studies resulted in refinement of this option. Key refinements include:

- modification to the South Creek Bridge to avoid direct impact on the Freshwater Wetland Community;
- modification to the alignment and configuration of the Day Street extension across the Trevallyn property; and

- provision of access to properties in Railway Road North and Hudson Place by means of a local service road.

## 3.4 Major Benefits and Adverse Impacts Identified in the EIS

### 3.4.1 Major Benefits

The major benefits of the proposed Windsor Flood Evacuation Route, as stated by the RTA, are discussed in Section 3.1 and 3.2 of this report. The main advantage of the proposal is the provision of a new flood evacuation route for residents of Windsor and South Windsor in the event of a major flood. The proposal would provide additional time and capacity for the evacuation of residents in these areas in keeping with the SES emergency response plans. It will also raise flood awareness amongst the community.

The secondary benefit of the proposal is the improvement of the arterial road network, in line with the Government's strategy to upgrade the Windsor Road corridor. The proposal will improve accessibility between the north, west, and south of Windsor. It will result in a substantial reduction in traffic on Windsor Road and Macquarie Street through Windsor.

There will be a reduction in traffic noise for a number of localised streets, namely Windsor Road and Day Street. Traffic noise levels at the Hawkesbury District Hospital will also be reduced.

### 3.4.2 Adverse Impacts

Construction

Adverse impacts resulting from the construction of the flood evacuation route would include:

- altered access arrangements for properties including those located on Railway Road North between Groves Avenue and Mulgrave Road;
- total or partial acquisition of 24 properties impacted by the proposal;
- short term impacts on air quality;
- modifications to non-indigenous sites of heritage significance including 'Trevallyn' homestead, and the Roman Catholic Cemetery;
- potential impact on four sites of Potential Archaeological Deposits (PADs);
- short term increases in noise during construction particularly in the vicinity of Forbes Street and Mulgrave; and
- impacts on flora and fauna as a result of clearing along the road alignment.

Operation

Negative impacts arising from the operation of the new route include increased traffic volumes on roads connecting the evacuation route including Groves Avenue, Mulgrave, and Forbes Street, Windsor. These roads and their respective intersections with Windsor Road and Macquarie Street will have increased traffic volumes and altered turning movements. There will be associated adverse increases in the noise levels and restricted access for properties along these roads, particularly Forbes Street.

The proposal will constitute a large and imposing structure in the rural landscape, resulting in substantial changes to the outlook from locations including Mileham Street and Trevallyn. Views over

the floodplain from properties to the west of Mulgrave Road, from Windsor Road and from the Blacktown to Richmond Rail Line will also be substantially altered.

# 4 SUMMARY OF REPRESENTATIONS

## 4.1 Representations Made in Relation to the EIS

The Environmental Impact Statement (EIS) was exhibited between 29 August 2002 to 4 October 2002. Fifteen representations were received in response to the public exhibition of the EIS from the following groups:

- State government departments/agencies 4
- Infrastructure providers 1
- Private organisations/individuals 10

Fourteen of the submissions supported the proposal generally, however, concerns were raised about a variety of issues resulting from the proposal. One submission objected to proposal, suggesting it was not needed and the location was inappropriate.

## 4.2 Identification of Key Issues from EIS Representations

In its Representations Report, the Roads and Traffic Authority (RTA) included a summary of issues raised into 19 major categories. The Department has examined the specific concerns raised in each of these categories. It notes that there are few discernible differences between a number of issues listed under various sub-heading. Accordingly, the Department has undertaken a supplementary assessment of representations to ensure that all issues are thoroughly addressed in the environmental assessment.

A wide variety of issues have been raised in these representations, including:

- design changes to ameliorate amenity loss;
- restricted access into various properties;
- noise levels resulting from construction and operation of the proposal;
- impact of potential acid sulfate soils;
- water quality and capacity of water quality ponds;
- property loss; and
- route selection.

These are discussed below.

<u>Design</u>

Two submissions raised concerns about particular aspects of the design. One submission requested a modification to the underpass for the Mitre 10 business, the provision of a flood access way, construction of a new driveway at Mileham Street and the erection of a security fence around these sites (this property will be split by the proposal). A submission from a local resident requested a minor readjustment of the route at Mulgrave, to prevent the planned acquisition of this property.

Broader design issues were raised in four submissions including visual impacts of the proposal, request for more lanes to cater for future development, and provision of wave barriers.

Access and Parking

Issues of limited access and parking loss for specific properties were noted in two private submissions. The Mushroom Growers Association were concerned about restricted access and loss of on-street parking from Forbes Street. Funding for a new driveway onto Macquarie Street and redesign of the on-site parking area was therefore requested. Concern was also raised about restricted access into the heritage property of Trevallyn.

State Rail and the Railway Infrastructure Alliance were concerned that the proposal would restrict access to Mulgrave Station during construction and operation. Sign posted pedestrian and cycle links to this station were requested. Both submissions emphasised the need to retain the existing parking capacity in the area. Provision of additional parking may also be required. State Rail was concerned about restricted access to Windsor Station resulting from the upgrade of the Macquarie Street and Richmond Road intersection.

Noise and vibration

Two private submissions raised concerns about the noise impacts of the proposal at Forbes Street and for a farming property located on South Creek. The Environmental Protection Authority (EPA) also raised issues about noise and vibration. Additional noise testing would be required to adequately assess the impact of construction and operation. Transportation noise resulting from the construction was highlighted. The EPA noted that an open community consultation program would be required to manage construction noise impacts.

Acid Sulfate Soils

Three private submissions and a submission by the EPA noted that testing for and impact of potential acid sulfate soils in the region should be investigated further.

Water Quality

Three submissions raised concerns about pollution run-off from the evacuation route, the volume capacity of the water quality ponds, and the water quality discharged from these ponds. The issue of on-going responsibility for these ponds was also noted. The EPA noted that the impact of construction on the surface and subsurface water quality would have investigated.

Property loss

Two submissions raised concerns about loss of grazing land resulting from the proposal. Issues noted included property depreciation and effect on livestock and land resulting from the proposal. Concern was also raised about damage to grazing land during construction.

Route selection

Two submissions proposed modifications to the route. One submission suggested that a continuous, direct evacuation road onto Windsor Road would be more appropriate. The other submission suggested that the proposal be relocated beside the railway line to cater for Bligh Park and Richmond. This submission also suggests that the Day Street section of the proposal was not necessary.

Additional issues raised by the following government agencies and infrastructure providers include:

- State Rail was concerned about loss of visual security at Mulgrave Station due to the large size of the structure and disruption to rail services during construction. The Railway Infrastructure Alliance was concerned about increased access onto the railway lines facilitated by the construction and operation of the proposal. They were also concerned about damage to the railway resulting from construction and the ongoing responsibility for the railway crossing;

- the EPA noted that details of environmental protection measures were largely left to the Environmental Management Plans. During construction, dust suppression techniques should be installed and feasible water-re-use processes utilised. The impact of transportation of spoil should be investigated further. Additional and improved studies on induced traffic, air quality for induced traffic scenarios and economic analysis should be undertaken;

- the National Parks and Wildlife Service (NPWS) requested that additional details on the impact on Aboriginal heritage sites be provided. The NPWS also indicated that eight-part test should be undertaken for the Free-Tail Bat; and

- the Department of Land and Water Conservation (DLWC) were concerned about the location and impacts of bridges piers on South Creek. A 50m wide riparian zone was recommended around South Creek and wetlands identified under Sydney Regional Environmental Plan 20 – Hawkesbury Nepean River (SREP 20)[1].

Individual private submissions also noted the following specific issues:

- need for the flood evacuation route;
- impact of litter onto neighbouring properties;
- provision of compensation for properties adversely impacted by the proposal;
- impact on the heritage property of Trevallyn;
- coordination of the landscaping program and ongoing responsibility for it;
- coordination of the future development of South Creek floodplain; and
- control of future development within the region.

[1] Sydney Regional Environmental Plan 20 was gazetted 7.11.97. SREP 20 integrates planning with catchment management to protect the river system. The plan applies to all parts of the catchment in the Sydney Region (15 local government areas), except for land covered by Sydney REP No. 11 - Penrith Lakes Scheme. The REP is supported by an Action Plan, which includes actions necessary to improve existing conditions.

# 5 ASSESSMENT OF KEY ISSUES RELATING TO THE MODIFIED PROPOSAL

*This section of the Report provides the Department's assessment of the key environmental impacts of the modified proposal based on an examination of the EIS, issues raised in representations during the exhibition period and the Proponent's response to these issues in its Representations Report and during further consultation with the Department. The Department's assessment of the other environmental issues addressed in Section 6 of this Report.*

*The Proponent has also provided the Department with an assessment of all issues raised in representations in the Representations Report. This assessment has been reviewed by the Department and where required, further assessment has been undertaken and discussed. It is therefore important that this section be read in conjunction with the Proponent's Representations Report to understand how all issues raised in representations have been addressed.*

## 5.1 Strategic Justification

### 5.1.1 Background

The Hawkesbury-Nepean catchment area covers approximately 22,000km$^2$, including the urbanised areas of Windsor, McGraths Hill, Richmond and Pitt Town. The catchment area is subject to serious flooding, including extensive and deep ponding of floodwater. Rapidly rising floodwaters have the potential to cut arterial roads that provide access to and from the townships. The potential isolation, as well as inundation of these towns, results in a major challenge for emergency services planning.

Flooding in the Hawkesbury-Nepean catchment area is substantially hazardous for the population. A 1 in 20 year flood will result in disruption to roads, rail and electrical services and the evacuation of low lying rural areas. A 1 in 200 year flood would require the evacuation of an estimated 50,000 thousand people, with dwellings housing approximately 6000 people destroyed. A Probable Maximum Flood (PMF) would reach approximately 24 to 26m AHD requiring the evacuation of approximately 6,000 with dwellings housing approximately 30,000 people destroyed.

Such flooding would substantially impact upon Windsor. A 1 in 5 year flood would reach levels of 11.1m AHD and cut Windsor Road. A 1 in 10 year flood would reach levels of 12.3m AHD and cut the Blacktown to Richmond Railway Line. During a 1 in 50 year flood peak, flood levels would reach 15.6m AHD, cutting George Street, Windsor which would thereby isolate the township. A 1 in 100 level would reach 17.3m AHD. A PMF level would inundate much of the town. The highest recorded flood level since non-indigenous settlement was in 1867 when flood waters reached a height 19.2m AHD.

Existing emergency flood procedures are based upon road evacuation of the affected population. Windsor and South Windsor currently evacuate along George Street, Richmond Road and The Northern Road. Separate evacuation routes for Richmond and Bligh Park merge with Windsor traffic at The Northern Road. In the event of a major flood, State Emergency Service (SES) studies indicate there is insufficient time to evacuate the population. Road evacuation along George Street, Windsor would be cut at flood levels of 15.2m AHD, isolating an estimated 2750 people (1400 vehicles) of Windsor and South Windsor (from an estimated population of 6923). An estimated 6600 people (3160 vehicles) from the broader region of Windsor, Richmond and Bligh Park would be isolated.

The Hawkesbury Nepean Flood Management Strategy (HNFMS) was adopted in 1998 to identify processes to overcome these flood evacuation issues. The HNFMS identified preliminary road improvements and a long term infrastructure program to increase the road capacity and time available for evacuation in a severe flood. A separate evacuation route for Windsor and South Windsor was identified as part of the strategy. The route over South Creek would be 17.3m AHD in height, and would remain open up to the 1 in 100 year flood level. Richmond and Bligh Park residents would continue to utilise their existing flood evacuation routes with increased capacity along The Northern Road.

The proposed Windsor Flood Evacuation Route would have two lanes. The westbound lane would be utilised by emergency services and the eastbound lane by evacuating traffic. Space along the road shoulder would be provided for breakdown traffic and an additional lane where necessary. There would be an estimate lane capacity of 600 vehicles per hour based upon adverse conditions including poor visibility.

The SES has developed 'time-lines of emergency response to a flood evacuation', comparing flood scenarios using the existing road infrastructure and the proposed Windsor Flood Evacuation Route. The time-lines indicated that the proposed route will increase the evacuation time available for Windsor and South Windsor by 8.1 hours, from a deficit of 4.5 hours to an excess time period of 3.6 hours. The reduction of traffic along The Northern Road will improve the evacuation times of Richmond from a deficit of 5.4 hours to a deficit of 1.6 hours and for Bligh Park and Windsor Downs from a deficit of 3.4 hours to a deficit of 0.4 hours.

### 5.1.2 Key Issues Raised

The following issues were identified:

- appropriate height for the flood evacuation route;
- whether the proposal was an isolated response to flood management; and
- whether alternative evacuation routes could be used.

### 5.1.3 Consideration of Key Issues

As discussed above, the current road system and designated flood evacuation routes, do not provide adequate time to evacuate the population of the region, including Windsor, Bligh Park and Richmond. In the event of a flood, large sectors of the population would be isolated. Windsor could eventually be inundated, depending on the height of flood waters.

The height of the route was largely defined by the highest practical ground level in the area of 17.3m AHD. A proposed evacuation route at this height would enable road evacuation from Windsor up to peak levels of a 1 in 100 year flood. The Department recognises that higher peak flood levels have been recorded in this area. Building a higher bridge, however, would be inappropriate due to the height of surrounding land. The SES 'time-line of emergency response to a flood evacuation' indicates that there will be adequate time to evacuate the current population of Windsor and South Windsor utilising the proposed Windsor Flood Evacuation Route (with an excess time period of 3.6 hours). The height and lane capacity is therefore supported by the Department.

The Department recognises that this current proposal is part of a coordinated system for flood evacuation in the region. The HNFMS was prepared in 1997 to identify strategies to overcome the time deficit for evacuation. It identified short term road upgrades, as well as a broader system of

flood evacuation routes for the at-risk communities in the Hawkesbury-Nepean Valley. The following evacuation routes were identified in the Environmental Impact Statement (EIS):

- the proposed South Creek Flood Evacuation Route servicing residents of Windsor and South Windsor;
- Thornley Street, Blacktown Road, Llandilo Road and Northern Road servicing residents of Bligh Park and South Windsor;
- Castlereagh Road and Londonderry Road to service Richmond;
- Windsor Road servicing McGraths Hill; and
- Old Stock Route/ Old Pitt Town Road servicing Pitt Town.

As noted above, the proposed Windsor Flood Evacuation Route will separate the traffic flows of Windsor and South Windsor from evacuating traffic of the other regional centres and thereby improve the overall capacity of the flood evacuation routes in the area. There remains a deficit of time to evacuate Richmond and Bligh Park.

A computer model was developed as part of a SES Flood Management Study that evaluated that vehicle carrying capacity of the flood evacuation routes. The study indicated that time deficits may be overcome through organised traffic management processes. The SES has expressed doubt over the application of such traffic management, especially during a flood crisis. The Department notes, however, that investigation of traffic management processes and capacity increases must continue to occur.

The Department recognises that there remains a shortage of time to evacuate the regional centres including Richmond and Bligh Park. The proposed Windsor Flood Evacuation Route, however, will substantially improve the overall capacity for flood evacuation within the Windsor and Richmond area and is therefore supported.

Concern was raised by a resident that alternative evacuation routes such as an evacuation road between Bligh Park and Blacktown Road have not been considered. The Roads and Traffic Authority (RTA) has stated that the Thornley Street section of the evacuation route was constructed to link Bligh Park to Richmond Road. This section is a gated route which would only be opened for flood evacuation purposes to avoid low spots along George Street. This section has been constructed at a basic standard that would not be suitable for daily use.

The population discussed in this assessment are based upon 1999 population estimates, adjusted from the 1996 census figures. The regional evacuation route upgrading program, outlined under the HNFMS, targets the evacuation of population from existing urban areas. The provision of evacuation route capacity for future urban growth is not a factor. This issue is discussed in greater detail under Section 5.2 'Future Development' of this report.

## 5.2 Future Development

### 5.2.1 Background

The HNFMS targets the provision of evacuation routes for the existing population of the region. The likelihood for future urban growth is not a consideration of this strategy. The proposed Windsor Flood Evacuation Route has, therefore, been designed to evacuate the estimated population of Windsor and South Windsor for 1999 (based upon 1996 census data). The estimated population for these two

settlements was 6923 people (3286 vehicles). As noted in Section 5.1, there are associated evacuation time savings for Richmond and Bligh Park residents who would continue to evacuate along The Northern Road Route. These time savings are based upon the 1999 population estimates. The estimated total population for Richmond, Bligh Park, Windsor and South Windsor was 23 882 in 1999.

The EIS does not identify any new subdivisions or development which would alter the population estimates provided. It does not discuss potential population increases resulting from in-fill development. Potential changes in the level of car ownership were not factored into the evacuation time studies.

### 5.2.2 Key Issues Raised

The following issues were identified:

- concern that the proposal will facilitate further development in the area, thereby compromising the capacity of the flood evacuation routes.

### 5.2.3 Additional Investigations

North Bligh Park is listed on the Metropolitan Development Program (MDP) as a potential new subdivision. Subdivision of North Bligh Park for the development of 600 dwellings has been proposed as part of the MDP, however, no land use capability studies have been completed to support this number. Council would be responsible for this subdivision. The SES has advised the Department that they will not support the development of North Bligh Park whilst there is insufficient capacity to evacuate the population. Approval from the Department would be required prior to this subdivision proceeding. In the past, the Department has refused to rezone the land from rural to residential because of the difficulties with flooding. The Department is aware that Hawkesbury City Council (HCC) is currently investigating opportunities to develop North Bligh Park.

The Department notes that HCC are currently investigating four scenarios for urban development at Pitt Town, involving a maximum subdivision for 750 dwellings. This will not impact upon the proposed Windsor Flood Evacuation Route.

### 5.2.4 Consideration of Key Issues

Future urban growth in the Hawkesbury-Nepean region is dealt with by the relevant Local Government Area (LGA) in accordance with the NSW Floodplain Management Manual. This process is to be assisted by Department of Land and Water Conservation (DLWC) who are completing a strategy entitled 'Regional Floodplain Management Strategy for the Hawkesbury-Nepean Valley'.

It is important that any future subdivision of North Bligh Park does not compromise the proposed Windsor Flood Evacuation Route project by reducing its capacity to evacuate the current population of Windsor and South Windsor. It is also important that this potential subdivision will not reduce the capacity of evacuation routes for Bligh Park and Richmond that will be achieved as a result of the proposal.

The SES has raised concerns that future subdivisions may compromise the capacity of the existing and proposed flood evacuation routes in the region. The SES report entitled 'Emergency Risk Management for Hawkesbury-Nepean Flooding', June 2002, states the following:

*'It is of paramount importance that pressure to increase the urban population numbers does not see essential safety factors that may have been achieved at great monetary cost, being converted into additional population growth, increasing flood risk and lowering public safety standard'.*

The SES timeline studies indicate that the proposed Windsor Flood Evacuation Route will provide adequate time and capacity to enable the full evacuation of the population of Windsor and South Windsor (as estimated in 1999). Whilst the evacuation capacity for Richmond and Bligh Park shall also improve, there will continue to be a deficit of time to complete an evacuation of these areas. The proposed Windsor Flood Evacuation Route must therefore not become a catalyst for future development in the Windsor and Richmond regions. The Department recommends that any future subdivisions on the floodplain must provide additional evacuation routes of a capacity that would fully cater for the additional population. Any zoning changes will require the approval of the Department.

A hydraulic study was undertaken to evaluate the impact of increased development on flood areas and, thereby, on the effectiveness of the proposed Windsor Flood Evacuation Route. The study concluded that the hydraulic performance of the proposed bridge would not be affected by an increase in development within the South Creek catchment. This is because the peak flows experienced at the proposed alignments are dominated by the Hawkesbury River backwater flooding. Any increase in development would be insignificant in relative terms and would therefore have an indiscernible effect on flood levels.

## 5.3 Urban Design and Landscaping

### 5.3.1 Background

This current section will outline the basic components of the flood evacuation route and the urban design and landscaping measures proposed, to integrate the proposal across the South Creek floodplain and within the established areas of Mulgrave and Windsor. It should be noted that a detailed description and assessment of the urban design measures at Forbes Street and Mileham Street/Day Street intersection are provided separately in Sections 5.9 and 5.10 of this report.

The South Creek floodplain is part of the South Creek Riverine Scenic Quality Area that was evaluated under the Hawkesbury-Nepean Scenic Quality Study (HNSQS) and listed under the Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (SREP 20). The floodplain is a low lying land, which includes South Creek, wetlands and grazing lands. The low and featureless nature of the landscape means that structures located upon it are fairly conspicuous. The key feature of the floodplain is water, with the creek, wetlands and farm dams forming important elements.

Views of the South Creek floodplain are available from Windsor Road looking southwards, from the Blacktown to Richmond Railway looking northwards, and from ridges of the Windsor and Mulgrave townships. There are prominent views over the floodplain available from Mulgrave Road, Hawkesbury Hospital, Mileham Street and the heritage property of Trevallyn.

The proposed Windsor Flood Evacuation Route involves an elevated two-lane road approximately 2.6km in length, over the South Creek floodplain between Windsor and Mulgrave. The structure would consist of two main elements: embankments with pre-cast concrete face panels supported on the berm of a conventional compacted earth embankment; and bridges. The minimum centreline height of the structure is 17.3m AHD (18.0m AHD for the bridge). As the floodplain is located at an

approximate level of 5m AHD, the proposed Windsor Flood Evacuation Route would constitute a large and imposing structure across the rural floodplain.

The Proposal would include the following key features:

- three bridge structures, namely a 1040m long structure over South Creek, and a 40m long bridge and 25m bridge;
- an extension of Day Street, Windsor involving a vertical reinforced soil wall on the western side and vegetated 5:1 batters on the eastern side;
- embankments up to 7.5m in height, with 5:1 batter and 3m wide berms with reinforces soil walls on top in sections between Day Street Windsor and the three bridges;
- full height reinforced walls between Mulgrave Road and Groves Avenue; and
- 7.5m wide service road between Mulgrave Road and Hudson Place providing access to properties on Railway Road, North and Hudson Place.

The Proponent proposes the following design elements to reduce the impact of the structure across the floodplain:

- use dark warm grey colours for the structural components to visually blend the structure into the landscape;
- introduce long spans across the floodplain to reinforce the horizontality of the structure;
- introduce features that will visually mitigated the structure in the broader landscape setting, including:
  - buttresses to articulate the retaining wall and mimic the spacing of the bridge piers;
  - articulate the face of the columns to reduce their scale;
  - differentiate the colour and texture of the components of the bridge and retaining structures to emphasise the horizontality of the structure and reduce its apparent height;
  - introduce gentle battering at key locations to better integrate the structure and walls into the adjoining landscape;
- create masses and voids that relate to the adjoining landscape patterns to offset the dominant linear form;
- create a vegetation backdrop in front of the structure to interrupt its continuity and reduce its scale in the overall landscape;
- expose the retaining structure to maximise the interplay between vegetated areas and the structure; and
- introduce planting to reinforce the indigenous riverine character of South Creek;

### 5.3.2 Key Issues Raised

The following issues were identified:

- integration of the preferred alignment into the existing topography of the floodplain; and
- methods to minimise the impacts of the bridge construction on the floodplain.

### 5.3.3 Additional Investigations

The Department commissioned an independent urban designer, the Urban Design Advisory Service (UDAS) to provide comments on the overall bridge/embankment design concept. The report

(referred to as the UDAS Report) noted the proposal was required to be substantially elevated above the natural ground surface for the majority of its length. It would therefore form a major new element across the low lying ground level of the study area. It was, therefore, important that the structural design complement the existing landscape. As the bridge is elevated at a minimum height of 18m AHD, the form of the road deck would be especially important.

The review and recommendations presented in the UDAS Report are discussed below. The report has been included as Appendix B of this report.

### 5.3.4 Consideration of Key Issues

As noted in Section 3.3 of this report, six alignment options were investigated during the development of the proposal. The preferred design option presented in the EIS and the Representations Report was selected following a process of community consultation, Value Management Workshops and selective specialist studies.

The UDAS Report indicates that Option E and F are favoured on urban design grounds. Both these options are located south of the Blacktown-Richmond Railway Line. These options would integrate more effectively with the existing topography as they would be located along the ridge lines. Less bridge construction would therefore be required. It would be less damaging to the natural floodplain and a less expensive option to build. The preferred option presented in the EIS is longer and creates landscape pockets which are not desired for a wetland and grazing area. Further more, the longer construction zone is not favoured within an ecologically sensitive environment.

The Department agrees that the options south of the railway line would have been preferred on urban design grounds as the higher topography and shorter road length would make the proposal less imposing on the flood plain. The process of route selection, however, must consider a wide variety of issues including urban design, ecology and traffic impacts. The Department believes that the Proponent has adequately demonstrated that a thorough route selection process was undertaken. The option presented in the EIS and the Representations Report has been demonstrated to be the most beneficial option.

It is, therefore, important that methods to ameliorate the impact of the preferred option are evaluated. The route will consist of three bridge structures and embankments up to 7. 5m in height, with 5:1 batter and 3m wide berms and reinforced soil walls on top. Sections of the proposal will include vegetated vertical soil walls. The EIS proposes to minimise the impact of the bridge construction through the provision of riparian vegetation around the bridge, batters that blend with the topography and design of the system to enhance the views and reduce the visual bulk by twisting the road alignment.

The UDAS Report does not support these measures and presents alternative design processes which would minimise the impact of the proposal and create a sustainable development. The measures include:

- designing a bridge structure system with a straight alignment and minimum contact to the ground. The proposal should aim for the use of maximum span with minimum possible pier sizes;
- minimising the number of piers and adjust the pier locations per ground conditions (with careful consideration of the position of piers in sensitive areas);
- avoiding embankments, batters and artificial elements within the floodplain to let the existing

ecological system flow under the bridge. Embankments at abutments on both sides of the bridge should be retained; and

- reduce the size of the road deck without changing the road level in order to create a horizontal thin line. This could be achieved by reducing the height of the beams and possibly using upturns as wave barriers.

As a result of the recommendations of the UDAS Report, the Proponent investigated opportunities to provide a straight road alignment across the floodplain. Comments on this were received from National Parks and Wildlife Service (NPWS) and DLWC. The straight alignment would be required to go through a SREP 20 wetland. The Department agrees that there is insufficient evidence to indicate that a straight alignment would have less adverse ecological or urban design impacts than the proposal. This is discussed in Section 6.1 of this report.

The UDAS Report recommends that the contact of the proposal on the floodplain be minimised by increasing the extent of bridge structure and bridge span. The RTA estimates that, the provision of a bridge structure of 40m span along the length of the proposal would cost an addition $8 million. Increasing the span of the bridge over South Creek to 50m will cost an additional $2 million. The RTA does not, therefore, support the sole provision of a bridge structure due to the additional costs of construction.

The Department believes that the proposed Windsor Flood Evacuation Route will constitute a large and imposing structure across the floodplain. The design of long embankments will substantially alter the topography of the region, effectively slicing the floodplain in half, and substantially blocking view lines along South Creek. The Department, therefore, recognises there may be some major benefits in reducing the length of embankment along the proposed Windsor Flood Evacuation Route. Greater lengths of bridge structure may provide connected viewpoints over the extended floodplain region.

The Department recognises that cost will inhibit the provision of a bridge along the entire length of the proposal. Methods to offset the visual dominance of the proposal from primary viewing points including Hawkesbury Hospital, Mileham Street, and Mulgrave Road, should be considered. Recommended Condition of Approval No. 26 requires that the Proponent investigate the provision of bridge structures at key areas of the alignment and measures to ameliorate the visual impacts of the proposal.

## 5.4 Noise and Vibration

### 5.4.1 Background

An assessment of the noise and vibration impacts was undertaken for the construction and operation stages of the proposal. The key steps in the assessment were as follows:

- measurement of existing noise environment at receivers potentially affected by the proposal;
- establishment of project operational and construction noise assessment goals;
- prediction and assessment of future road traffic noise levels from the proposal;
- prediction and assessment of noise and vibration from construction activities; and
- consideration and recommendations to mitigate operational and construction noise levels.

Construction Noise

The EIS indicates activities, including earthworks, rock breaking and pile driving, would generate significant noise impacts and concludes that both the short and long term construction noise goals would be exceeded at the nearest residences from construction activities. While vibration levels from rock breakers and compacters are considered unlikely to exceed the 5 mm/s structural damage limit at residences. The EIS concludes that construction noise impacts would be mitigated by the preparation of a Construction Noise and Vibration Management Sub Plan which would consider:

- adherence to the EPA's recommended standard construction hours, where practical;
- selection of plant and equipment on acoustic performance;
- the erection of noise barriers prior to road construction where reasonable and feasible;
- monitoring construction noise and vibration to ensure that best practice is implemented;
- preparation of dilapidation reports on sensitive structures within 30 metres of any rock breaking, piling or ground compaction; and,
- implementation of an information program to ensure that affected residents are notified of construction time frames.

Operational Noise

The EIS indicates that existing ambient noise levels in the study area are characterised by road traffic noise. The EIS adopts the following criteria for the proposal:

- New arterial road corridor:
  - $L_{Aeq15\ hour}$ 55 dB(A) (7:00 am to 10:00 pm); and,
  - $L_{Aeq9\ hour}$ 50 dB(A) (10:00 pm to 7:00 am).
  - Where criteria are already exceeded the new road should be designed so as not to increase existing noise levels by more than 0.5 dB.

- New Collector Road:
  - $L_{Aeq1\ hour}$ 60 dB(A) (7:00 am to 10:00 pm); and,
  - $L_{Aeq1\ hour}$ 55 dB(A) (10:00 pm to 7:00 am).
  - Where criteria are already exceeded the new road should be designed so as not to increase existing noise levels by more than 0.5 dB.

- Hospital:
  - Internal, $L_{Aeq1\ hour}$ 35 dB(A).
  - Where criteria are already exceeded the new road should be designed so as not to increase existing noise levels by more than 0.5 dB.

The EIS states that the predicted noise levels in the:

- Mulgrave area, particularly the residences on Railway Road North, exceeded the 55 dB(A) LAeq(15hours) and the 50 dB(A) LAeq(9hours) baseline noise criteria by 2 to 11 dB(A) and 1 to 10 dB(A), respectively;
- Forbes Street area exceeded the 55 dB(A) LAeq(15hours) and the 50 dB(A) LAeq(9hours) baseline noise criteria by 12 to 15 dB(A) and 11 to 14 dB(A), respectively. The allowance criteria are exceeded by 3 to 8 dB(A);

- Day Street area exceeded the daytime 60 dB(A) LAeq(1hours) and the night time 55 dB(A) LAeq(1hours) baseline noise criteria by 2 to 8 dB(A) and 1 to 16 dB(A), respectively. However, predictions are between 1 and 2 dB(A) lower than existing levels due to reduced projected traffic along Day Street.

Traffic noise levels at receivers along Day Street, Mileham Street and Hawkesbury District Hospital are predicted to decrease by between 1 to 2 dB as a result of reduced traffic. Additionally traffic noise levels will be reduced at Macquarie Street and Windsor Road between Pitt Town Road and McGrath Hill as a result of reduced traffic.

A range of mitigation measures were considered for all affected residences including: noise barriers; treatment of individual dwellings (eg. double glazing); future planning and noise reducing road surfaces.

The EIS indicates that the erection of roadside barriers would not necessarily be reasonable and feasible at Forbes Street due to the close proximity of the houses to the road curb. Acoustic treatment of houses, which would normally be an alternative for such situations, may not be practical since a number of houses are of a light weight construction (ie. fibro construction). As noise mitigations appeared to be impractical, a property value guarantee has been offered by the RTA to respond to community concerns in Forbes Street. Section 5.9 discusses the impacts of the proposal at Forbes Street.

Noise barriers were considered a reasonable and feasible option to mitigate noise at affected residential receivers at Mulgrave (approximately 3 to 6 metre barriers). As noise levels were reduced as a result of the project in Day Street, no noise mitigation was considered.

Quieter road surfaces such as open graded asphalt were not considered in the EIS due to the ongoing maintenance requirements which were considered impractical for this project.

The RTA has committed to investigated final noise mitigation options during the final road design and select final noise mitigation options consistent with the RTA's Environmental Noise Management manual and consultation with the effected community.

### 5.4.2 Key Issues Raised

Two private submissions raised concerns about the noise impacts of the proposal at Forbes Street and for a farming property located on South Creek. The Environmental Protection Authority (EPA) raised issues about operational and construction noise and vibration. The EPA noted that an open community consultation program would be required to manage construction noise impacts. The Department raised concerns about the significant noise impacts at Forbes Street and the rear of houses along Mileham Street overlooking the new section of Day Street. A noise mitigation cost effectiveness analysis according to the RTA's Environmental Noise Management Manual had not been undertaken.

### 5.4.3 Additional Investigations

The Representations Report includes an assessment of the operational road noise impacts at the rear of properties located along Mileham Street, overlooking the new Day Street road. The assessment concluded that the predicted noise levels at the rear of the Mileham Street properties facing Day Street would be 59 dB(A) Leq(15 hours) which exceeds the 55 dB(A) dB(A) Leq(15

hours) criteria by 4 dB. It was also stated that a 2 metre high noise barrier along the western side of the Day Street extension would reduce the noise levels to within the goal.

### 5.4.4 Consideration of Key Issues

Construction Noise Impacts

The Department supports the RTA's commitment to adhere to the EPA's recommended standard construction hours. This is stipulated under Recommended Condition of Approval No. 56.

The EIS indicates that construction noise levels would be significant and would not meet construction noise goals. The Department recommends that the following additional mitigation measures be implemented by the RTA:

- use of portable enclosures around mobile and fixed plant where noise impacts are likely to be unacceptable;
- use of residential class mufflers for plant and equipment;
- use of dampened tips on rock breakers;
- scheduling of respite periods for rock hammering, sheet piling and other activities which result in impulsive or tonal noise generation;
- selection of plant and equipment based on noise emission levels;
- regular inspection of fixed plant to ensure that noise emissions do not deteriorate over time;
- use of spotters, closed circuit television monitors and 'smart' reversing alarms in place of traditional reversing alarms; and
- prohibiting public address systems.

Prohibition of public address systems is not advisable for site safety requirements, but it is recommended that these systems be used only within standard construction hours and directed away from residences. This requirement is reflected in Recommended Condition of Approval No. 58. The scheduling of respite periods for activities which result in impulsive or tonal noise generation is required by Recommended Condition of Approval No. 59. The Department also recommends that the Proponent develop construction noise goals based on the construction period exceeding 26 weeks in duration. This requirement is specified in Recommended Condition of Approval No. 57.

Given the likely construction noise goal exceedances, a precautionary approach to construction noise management is appropriate. The Department notes that the assessment included in the EIS is conceptual only and would need to be finalised during detailed design. It is therefore recommended that the Proponent prepare a detailed Construction Noise and Vibration Management Sub Plan. This Sub Plan, required by Recommended Condition of Approval No. 55, would detail proposed construction activities and processes (including noise impacts from road haulage and traffic diversions), assess the associated noise impacts and detail and commit to specific noise mitigation measures, respite periods and notification and consultation protocols.

To ensure that construction noise impacts are effectively managed, the Department, through the Construction Noise and Vibration Management Sub Plan, recommends the Proponent monitor construction noise impacts and, where exceedances are noted, implement additional mitigation measures to the satisfaction of the Director-General in consultation with the EPA. The Department also recommends that where practicable and in consultation with HCC and affected landowners, the Proponent erect operational noise mitigation measures prior to the commencement of construction.

This would assist in reducing construction noise impacts and is specified in Recommended Conditions of Approval No. 66 and 67.

Night-Time Works

The EIS indicates that some construction work may be undertaken outside standard construction hours with notification of exposed residents, provided that unreasonable disturbance or nuisance does not occur. No details of works to be undertaken outside hours are provided. The Department considers that only those works that would result in significant adverse impacts if constructed during standard hours should be carried out in the evening and/or at night. To this end, the Proponent would be required to include a justification as to why any proposed night-time works are required in the Construction Noise and Vibration Management Sub Plan. The Department recommends that scheduling of work outside the standards hours should consider minimisation of noise impacts.

Construction Vibration

While vibration levels from rock breakers and compacters are considered unlikely to exceed the 3 mm/s structural damage limits at residences, the EIS notes that this limit may be exceeded within 20 metres of piling operations. The EIS recommends the preparation of dilapidation surveys on residences within 30 metres of rock breaking, piling and/or ground compaction activities. The Department notes that the vibration assessment included in the EIS is conceptual only. To this end, the Department's Recommended Condition of Approval No. 30 requires that dilapidation surveys be completed on all structures within 50 metres of construction activities resulting in vibration.

The Department's Recommended Condition of Approval No. 62 sets limits for construction vibration to ensure that the potential for structural damage and unacceptable human exposure is minimised. The Department also recommends that vibratory compacters are not used closer than 30 metres from residential buildings. This requirement is specified in Recommended Condition of Approval No. 64. The Proponent would be required to monitor vibration levels during construction in accordance with the Construction Noise and Vibration Management Sub Plan. The Proponent would also be required to prepare a management procedure to deal with vibration complaints. Should exceedances of the limits be noted, the Proponent would also be required to develop appropriate amelioration measures to manage future impacts.

Operational Noise

*Criteria*

As discussed above, the EIS broadly adopts the road noise criteria presented in the ECRTN. The Proponent would be required to clearly identify the applicable criteria as part of the Operational Noise Management Report recommended in Condition of Approval No. 66. In cases where current background noise levels exceed the relevant criteria and strategic and project specific mitigation measures have been shown not to be feasible and reasonable, a 0.5 dBA increase in existing noise levels would be acceptable.

*Noise Impacts and Management*

The RTA did not conduct a Cost Effectiveness Report to prioritise noise mitigation options as per RTA's Practice Note iv "Selecting and designing feasible and reasonable treatment options for road traffic noise from new and redeveloped roads affecting residential land uses" ENMM, as requested by

the Department. The Department, therefore, recommends that such an analysis be conducted for all areas along the proposed route (including Forbes Street, rear of Day Street and Mulgrave) as part of the Operational Noise Management Report, to more accurately determine noise mitigation options, including road surfaces and target barrier heights. This analysis, required by recommended Condition of Approval No. 66, should also consider the inclusion of Perspex panels within noise barriers to reduce visual and overshadowing impacts. The weighting applied to visual impacts and noise mitigation would be determined in close consultation with affected residents.

The EIS concludes that alternative noise attenuation measures, such as acoustic treatment of individual dwellings, would be considered during detailed design where road noise criteria are exceeded.

The Department considers that a number of alternative design options exist, in particular the realignments of the road at Forbes Street and Day Street, that could reduce noise impacts. In spite of this, a number of residences could still experience significant exceedances of the relevant criteria and increases relative to the existing noise environment. Given the magnitude of predicted exceedances, the Department considers that the Proponent should install all necessary noise mitigation measures to ensure that the predicted road traffic noise levels do not exceed the relevant criteria. Recommended Condition of Approval No. 67 requires that the mitigation developed through the Operational Noise Management Report be installed to the satisfaction of the Director General.

The Department's Recommended Condition of Approval No.68 requires the Proponent to undertake operational noises monitoring to ensure that noise affected residences are effectively ameliorated against road noise impacts. Should monitoring indicate that traffic noise levels on the proposal and surrounding streets are higher than the criteria identified in the Operational Noise Management Report, the Proponent would be required to implement further mitigation measures in consultation with affected landowners. These measures may include additional noise barriers and acoustic treatment of buildings.

## 5.5 Traffic Impacts

### 5.5.1 Background

The proposed Windsor Flood Evacuation Route would affect the road network performance for the Windsor area. An assessment of the traffic impacts for the construction and operation stages of the proposal was undertaken as part of the EIS.

The primary objective of the proposal is to provide a flood evacuation route for residents of Windsor and South Windsor and secondary to provide improvements to the performance of the arterial road network in the area, particularly along Windsor Road. This section of the report reviews the secondary function of the proposal. Section 5.1 of this report examines at the primary objective of the proposal, namely the capacity of the proposed Windsor Flood Evacuation Route.

The EIS indicates that existing traffic conditions within the Windsor area are poor, with volumes in excess of 30,000 vehicles per day (vpd) on the existing arterial network, of two lane roads with multiple signalised intersections. The principle route through the area is along Windsor Road and Macquarie Street. Congestion on this route causes queues and delays at a number of locations.

The proposed Windsor Flood Evacuation Route would result in a substantial decrease of traffic on the main Windsor Road and Macquarie Street route through Windsor. Approximately 40 to 45 percent of the total traffic on this route would transfer to the new arterial road, providing significant relief from existing peak hour congestion and queuing on key intersections. Several intersections, in particular, would experience greatly improved performance due to reduction in through and turning traffic volumes.

The major intersection to benefit from the proposal would be the Pitt Town Road and Macquarie Street intersections with Windsor Road. These intersections would experience a reduction in delays and vehicle queuing. In this regard, a significantly better level of service (LOS) would be achieved over the current situation.

The EIS identified a number of negative impacts arising from the proposal. Negative impacts would arise from increased traffic movements on, currently local, roads connecting the new route to the existing road network, namely:

- Groves Avenue;
- Mulgrave Street; and
- Forbes Street.

These roads and their intersections with Windsor Road and Macquarie Street would be impacted by increased traffic movements and changed turning movements. This, in turn, has created a need for major intersection adjustments the connection points to provide adequate capacity and satisfactory intersection performance to 2016 and beyond.

Travel time between the intersections of Groves Street and Windsor Road, and Richmond Road and Macquarie and Forbes Streets would be substantially decreased. Peak travel time along the proposal between these two intersections would take approximately 4-5 minutes, compared with approximately 10 minutes along the existing arterial route. Travel time along Windsor Road would also reduce by approximately 1-2 minutes due to reduced congestion.

### 5.5.2 Key Issues Raised

Three private submissions questioned the configuration of intersections joining the evacuation route to the existing road network. Issues of limited access and parking loss for specific properties were also noted in two private submissions. State Rail and the Railway Infrastructure Alliance were concerned that the proposal would restrict access to Mulgrave Station during construction and operation. These issues are dealt with in Sections 5.9, 5.10 and 6.7 of this report.

The Department raised concerns about the operation of the Macquarie Street/ Richmond Road/Forbes Street intersection and the configuration of the intersection between Day Street (extension) and the proposed Windsor Flood Evacuation Route (right turn).

The EPA presented concerns about the impacts of spoil transportation and the possibility of induced traffic impacts at the operational stage of the project.

### 5.5.3 Consideration of Key Issues

<u>Construction Traffic Impacts</u>

Construction of the proposed Windsor Flood Evacuation Route would potentially impact the existing road network. The majority of the impacts would be at the access points to the construction work sites at either end of the proposal at Forbes Street, Windsor and Mulgrave Road, Mulgrave. The transportation of spoil is the most significant construction traffic impact from the proposal. The RTA estimates that there would be approximately 30 to 60 truck movements per day for the transportation of spoil.

The RTA has committed that construction traffic movements along the local road network would be timed, where possible, to coincide with off-peak hours, so as to minimise the impacts on peak hour traffic movements The RTA recognises that there will be potential traffic disruptions due to construction of the proposed Windsor Flood Evacuation Route. It has, therefore, committed to develop a detailed Construction Traffic Management Plan. The commitment in the EIS and Representations report is reflected in recommended Condition of Approval No. 39.

Operational Traffic Impacts

It is proposed to upgrade the Richmond Road and Macquarie Street intersection as a result of the proposed Windsor Flood Evacuation Route. The intersection will be altered and Forbes Street will be reinstated as the southern branch of the intersection. In order to improve the intersection performance, right turn movements from Forbes Street to Macquarie Street would be restricted. The RTA has indicted in the EIS and Representations Report that the overall intersection generally performs well (between LOS of B to C), apart from the right hand turn movements into Forbes Street, Macquarie Street (South) and Richmond Road which are predicted to operate at a level of service of C or D in the peak periods in 2016. This is considered adequate.

Access to the commercial area of Windsor would be retained along Windsor Road, with improved travel times. Alternative access to Windsor from the proposal would also be available via the Day Street extension and via a right turn movement from Richmond Road onto George Street. The right hand turn from the proposal to Day Street has been predicted to operate at a good level of service (LOS of A) during the morning and afternoon peak periods in 2016.

Induced Traffic

When capacity of a road network is increased additional traffic that would otherwise not have used the old road network may result, such traffic is referred to as induced traffic. Principally, induced traffic can result in mode shifts from public transport to car, retiming of trips to peak periods and additional trips that would otherwise not have been undertaken.

The potential for a road to cause induced traffic is a function of the location of the proposal within the road network, the level of competition from other transport modes and predicted travel time changes. A quantitative assessment of the potential for the proposal to induce traffic was conducted and is discussed in the EIS and Representations report. The RTA concluded that the proposed flood evacuation route would have a limited opportunity to induced traffic demand. As part of Recommended Condition of Approval No. 21, RTA are required to have strategies in place to manage operational traffic impacts which would include induced traffic demands.

## 5.6 Water Quality

### 5.6.1 Background

The proposal is located within the Hawkesbury-Nepean River catchment and crosses South Creek. The proposal traverses a floodplain area that includes a number of freshwater wetlands and farm dams. The EIS notes there is potential for water quality impacts during construction as a result of sediment laden runoff entering waterways. A number of soils in the study area are subject to erosion. The construction of bridge piers would be in close proximity to banks of South Creek. Spills or leakage of fuels are also possible during construction.

The EIS describes erosion and sedimentation control measures to be implemented during construction to minimise impacts on water quality, including:

- phasing construction work so that land disturbances are confined to areas of manageable size;
- prevent runoff flowing over disturbed areas;
- sediment fencing/straw bales;
- temporary storage, dissipaters and level spreaders;
- sediment filters;
- filter barriers;
- progressive revegetation; and
- minimising surface disturbances, especially near creek lines.

A construction stage water quality monitoring program would be implemented. The details of these measures would be finalised in a Soil and Water Management Sub Plan, incorporating Erosion and Sedimentation Control Plans.

During operation, there is potential for pollutants to impact on water quality. The EIS indicates that a range of water quality protection measures would be incorporated to protect South Creek during operation. These measures comprise gross pollutant traps and water quality ponds to treat all run off and act as spill containment measures.

### 5.6.2 Key Issues Raised

The EPA noted that South Creek is under considerable pressure from the surrounding catchment, so every effort must be made to ensure the proposal does not increase turbidity, suspended sediments and nutrient concentrations in local waterways.

Three submissions raised concerns about pollution run-off from the evacuation route during operation, the volume capacity of the water quality ponds, and the water quality discharged from these ponds. The issue of on-going responsibility for these ponds was also noted. The Department requested additional information on water quality control and spill containment during operation.

### 5.6.3 Additional Investigations

The Representations Report included additional detail on the proposed water quality/spill control containment ponds, which would contain a spill event of up to 20,000 litres. No additional construction water quality investigations have been undertaken.

### 5.6.4 Consideration of Key Issues

<u>Construction</u>

Given the sensitivity of the floodplain and water systems, and proximity to South Creek, there is potential for significant erosion and sediment control issues during construction. To ensure that erosion and sedimentation controls are effectively implemented, the Department recommends that these facilities are constructed to meet the following criteria:

- sites to be located greater than 50 metres from the South Creek bank and outside the identified riparian zone;
- sites not be constructed over water or sewer pipelines unless otherwise agreed to by Sydney Water Corporation (SWC);
- if land is leased to enable construction of a temporary sediment basin, it is restored following construction to a level equal or better than the original condition;
- sedimentation basins on private land to be fenced to minimise safety risks;
- all controls are to be designed and constructed in accordance with the Department of Housing's Guideline *Managing Urban Stormwater – Soils and Construction*; and
- potential for saline affectation is not to be increased.

These requirements are specified in Recommended Condition of Approval No. 79.

The Department's Recommended Condition of Approval No. 78 requires the Proponent to ensure that appropriate erosion and sedimentation controls are in place prior to the commencement of any works with potential to cause soil erosion or generate sediment and prior to any stockpiling works.

During construction it is also recommended that an appropriately qualified soil conservationist undertake regular inspections of temporary and permanent erosion and sedimentation control devices to ensure that the most effective controls are being implemented and maintained. This requirement is specified in Recommended Condition of Approval No. 81.

Bridge Design

Crossing of the South Creek has been identified as requiring special management during construction and to ensure that, once completed, the bridge does not interfere with water flow. It is also important that dry land connectivity is maintained for fauna.

Recommended Condition of Approval No. 29 requires the detailed design of the South Creek bridge crossing to be developed in consultation with NSW Fisheries and the DLWC. Construction methodology and design of the crossing of South Creek would consider erosion and sediment control, bridge/pier design, scour protection, dry land connectivity and rehabilitation.

Operation

The Representations Report notes that spill containment basins would also treat road runoff from the proposal. The proposed water quality/spill control containment ponds would be designed according to the RTA's *Design Philosophy on Combined Sediment and Accidental Spill Basins*. This design would contain a spill event of up to 20,000 litres. Recommended Condition of Approval No. 83 notes this design requirement and also the RTA's *Code of Practice for Water Management – Road Development and Management*.

The Department notes that water quality/spill control containment ponds would not be located within 50 metres of the top if the South Creek banks. The location, design and maintenance of water

quality/spill control containment ponds would be detailed in the Operational Environmental Management Plan.

The Department notes that the effectiveness of water quality, erosion and sedimentation measures is dependent on diligent monitoring and maintenance of control structures and concludes that the Recommended Conditions of Approval, if effectively implemented, would minimise the likely water quality impacts associated with the proposal.

## 5.7 Flora and Fauna

### 5.7.1 Background

The proposal transects a floodplain which has been largely cleared as a result of long-term agricultural activities. There are a number of freshwater wetlands in the area, including two SREP 20 wetlands, and a number of farm dams. The EIS identified four broad vegetation communities in the study area that would be disturbed:

- 11.2 ha of pasture/disturbed cleared/disturbed land;
- 0.5 ha of Shale Gravel Transition Forest (endangered under the *Threatened Species Conservation Act,, 1995, TSC Act*) occurring along Railway Road and adjacent to the proposed service road;
- 0.3 ha of Alluvial Woodland/River Flat Forest (endangered under the TSC Act), which is highly disturbed in the study area; and
- 0.7 ha of farm dams.

Sydney Freshwater Wetlands occurs around the margins of various farm dams, water bodies and the SREP 20 wetland south of the proposed route. The proposal will traverse the major vegetation corridor formed by this riparian vegetation along South Creek. The EIS concludes that the proposal would not compromise the riparian corridor.

There is potential habitat for the following threatened fauna species in the area: Freckled Duck, *Sticonetta naevosa*; Cumberland Land Snail, *Meridolum corneovirens*; and Large-footed Myotis, *Myotis adversus*. No threatened species, listed under the TSC Act, were recorded along the proposed route. One threatened plant species, *Grevillia juniperina*, was recorded in the study area on Railway Road South, however, the EIS states that this species would not be impacted by the proposal.

The EIS notes that potential habitat for the Freckled Duck would be indirectly impacted due to the shading effects of the bridge structure and possible loss of aquatic habitat.

Assessments undertaken under Section 5A of the EP&A Act for threatened species and ecological communities indicated that the proposal would not have a significant effect and therefore a Species Impact Statement was not required.

The EIS proposed a range of measures to mitigate the impact of the proposal on vegetation and fauna within the study area. These include:

- a Flora and Fauna Management Plan;
- retention of native trees and riparian vegetation where possible and minimisation of clearing;

- strict controls, including temporary fencing, to ensure disturbance to vegetation occurs only within the road construction corridor;
- search for fauna in trees and understorey prior to clearing;
- fencing and pier design that retains provision for fauna movement;
- appropriate construction and design of the crossing of South Creek;
- the implementation of erosion, sedimentation and water quality controls as part of a Soil and Water Management Plan;
- a Weed Management Plan;
- revegetation works, and a Revegetation Plan, particularly for the riparian vegetation along South Creek;
- revegetation works that are consistent with ongoing works being undertaken by Landcare groups, DLWC and Hawkesbury Council; and
- ongoing monitoring and maintenance of revegetation works.

### 5.7.2 Key Issues Raised

The Department requested that additional information on rehabilitation efforts be provided, specifically on collection of local native seed, propagation of seedlings, ongoing maintenance and monitoring of rehabilitation, the removal of duck nest boxes, and opportunities for involvement of local conservation groups.

The Department raised additional concerns regarding the control of spills during operation of the proposal. Any spills would have the potential to seriously affect the local riparian flora and fauna.

One representation noted that the proposed Flora and Fauna Management Plan should be prepared in consultation with DLWC and in accordance with DLWC's Draft Guidelines for the Preparation of a Vegetation Management Plan.

The adequacy of the ecological assessment in the EIS was questioned in four representations. A number of specific issues were raised including:

- consideration of "clearing of native vegetation" in the Section 5A tests;
- clarity over the clearing of riparian vegetation on the banks of South Creek;
- the impacts on fauna due to relocation of two existing water bodies;
- dry land connectivity for fauna;
- inclusion of a Section 5A test for the Eastern Freetail Bat;
- the occurrence of habitat for the Black-tailed Godwit; and
- that compensatory (or offset) principles have not been applied for the loss of endangered ecological communities (0.5 ha of Shale Gravel Transition Forest and 0.3 ha of Alluvial Woodland/River Flat Forest).

### 5.7.3 Additional Investigations

The Representations Report includes additional information updating the Section 5A tests for the Shale Gravel Transition Forest and Alluvial Woodland/River Flat Forest, with a particular focus on "clearing of native vegetation". The conclusion of the revised Section 5A test was that the proposal would not have a significant impact on these endangered ecological communities.

A Section 5A test for the Eastern Freetail Bat was also included in the Representations Report. This assessment concluded that, due to a lack of breeding and sheltering habitat, the proposal is unlikely to have a significant impact on this species.

The Representations Report states that there is no suitable habitat available for the Black-tailed Godwit in the area surrounding the proposal and that a Section 5A test was not considered necessary.

The Representations Report states that the impact on fauna due to the relocation of water bodies would be minimal given the large number of water bodies in the area. In terms of fauna connectivity, the Representations Report notes that fauna movements would be provided at the bridge structure. The slope and extent of embankments could be refined to ensure connectivity.

Indirect impacts may occur due to shading. The Representations Report provides additional information on the design of the bridge over South Creek that would minimise shading impacts.

The Representations Report makes a commitment to continued negotiations with NPWS in recovery planning for endangered ecological communities.

### 5.7.4 Consideration of Key Issues

Construction

The Department considers that the loss of 12.7 ha of vegetated land/fauna habitat, 11.2 of which comprises pasture/disturbed land, is acceptable, given that the proposal aims to minimise clearing of important vegetation and habitat as much as practicable. The Department notes that the vegetation of two farm dams would be affected, however, there would be no direct clearing around SREP 20 wetlands.

The EIS and Representations Report are unclear on the exact areas to be cleared. To ensure that the impacts of the proposal are limited to those stated in the EIS, the Department recommends Condition of Approval No. 46, which limits clearing of significant vegetation. Significant vegetation includes Shale/Gravel Transition Forest, and riparian vegetation such as the Alluvial Woodland, and vegetation surrounding farm dams. Clearing of vegetation surrounding farm dams would be permissible, however, no clearing of the Freshwater Wetlands community would be permitted.

The Department and NPWS remain concerned about the extent of cleared riparian vegetation along South Creek. The riparian vegetation along South Creek is critical to the health and function of the creek and wider catchment. Recommended Condition of Approval No. 47 aims to further protect this vegetation.

Mitigation measures to minimise the impact of the proposal on fauna described in the EIS and Representations Report include:

- checking work areas (including tree hollows) for fauna before clearing. Any fauna found would be relocated to suitable nearby habitat;
- not disturbing animals during their breeding season;
- minimising the area of habitat to be cleared; and,
- provision of revegetated habitat including dry land connectivity for fauna movements at South Creek.

The Department considers that these mitigation measures should be detailed in the Flora and Fauna Management Plan, which is required by Recommended Condition of Approval No. 44. Additionally, Recommended Condition of Approval No. 29 requires that detailed design of the South Creek bridge considers dry land connectivity.

The proposal may impact flora and fauna due to potential water quality impacts. Measures to ensure such an impact is avoided are described in Section 5.6 'Water Quality'.

Revegetation

The Department commends the RTA's proposed revegetation initiatives to complement other revegetation works being undertaken by DLWC and others along South Creek. Landcare is undertaking revegetation work with the community and landowners. Revegetation work has also been undertaken by Hawkesbury Council and DLWC. The Department also notes that SREP 20 is supported by an Action Plan, which includes actions necessary to improve existing riparian conditions. To ensure effective coordination of revegetation works, Recommended Condition of Approval No. 45 requires that the Revegetation Plan be prepared in consultation with NPWS, Hawkesbury Council, local Landcare/community groups, DLWC and other relevant government agencies.The revegetation works are to be undertaken by a suitably qualified professional and include retention of native tree species where possible, on-site seed collection and transplanting of native species, weed management, use of chopped/mulched native vegetation that would be cleared, and ongoing monitoring and maintenance.

Under recommended Condition of Approval No. 45(k), the Proponent is required to detail measures to be implemented to compensate for the clearance of endangered ecological communities, consistent with the principles developed by NPWS.

Operation

During operation of the proposal, impacts on flora and fauna would be minimal.

The EIS notes that potential habitat for the Freckled Duck would be indirectly impacted due to shading effects from the bridge structure and possible loss of aquatic habitat. The Representations Report provides additional information on the design of the bridge over South Creek that minimise shading impacts.

Water quality may potentially be affected due to spills of hazardous material during operation. Control of spills is discussed in Section 5.6 Water Quality.

## 5.8 Pedestrian and Cycle Facilities

### 5.8.1 Background

Existing bicycle routes are provided on road shoulders, shared road space and dedicated shared cycle-pedestrians paths within the Windsor area, including along Mulgrave Road, Windsor Road, Macquarie Street and Richmond Road. The proposed Flood Evacuation Route will include provision for cyclists along the shoulders of the elevated route. A shared pedestrian and cycle pathway separated from the road will be provided along both sides of Forbes Street. Cycle access to the

proposed service road at Railway Road North between Mulgrave Road and Groves Avenue will also be provided. The EIS states that these cycle facilities will enhance the existing system of bicycle routes and provide an additional, more direct route between Mulgrave and the intersection of Macquarie Street and Richmond Road.

The proposal does not include a pedestrian walkway along the flood evacuation route. The EIS states that these facilities were not required due to low demand and safety considerations. Appropriate signage would be erected to restrict pedestrian usage of the facility. Pedestrian access to Mulgrave would continue to be available via the shared pedestrian/cycleway on Windsor Road.

The EIS states that the industrial nature of Mulgrave means that the number of cyclists and pedestrians utilising the facility would be low.

### 5.8.2 Key Issues Raised

The following issues were identified:

- the EPA was concerned about the failure to provide a pedestrian walkway along the route. The EPA supported the provision of a walkway at grade or within an easement below the route and indicated that further justification for the exclusion was needed; and
- the Australian Mushroom Growers Association (AMGA) located on the corner of Macquarie and Forbes Street requested that a sealed pedestrian way be provided between their office and Mileham Street.

### 5.8.3 Consideration of Key Issues

The Proponent estimates the additional cost of a pedestrian walkway would be $5 million. Given there is an existing pedestrian route along Windsor Road and there is limited pedestrian traffic between the Windsor and Mulgrave, the provision of the walkway is not considered cost effective.

The RTA has noted that an alternative pedestrian/cycleway already exists between Mulgrave and Windsor via Windsor Road. This route is to be upgraded as part of the Parramatta to Windsor Shared Use Path. As part of this strategy, a 3.0m wide shared off-road pathway will be provided between Mulgrave and Windsor. This pathway is scheduled to be completed by the end of 2003.

A review of the Mulgrave areas suggests that Windsor High School would be a primary generator of pedestrian traffic between Windsor and Mulgrave. The industrial nature of Mulgrave, however, suggests other generating activities in the region are limited.

The Department, therefore, accepts that the provision of a pedestrian walkway along the evacuation route may not be cost effective, especially as the RTA is currently upgrading an alternative route. Furthermore, it is considered that a ground level pathway such as that located beside Windsor Road would provide better safety and sight lines for users.

Recommended Condition of Approval No. 35 stipulates that the alternative shared pedestrian/cycleway must be completed prior to the opening of the Flood Evacuation Route. The RTA is to provide signage and maps to encourage its usage.

Recommended Condition of Approval No. 36 requires that signage be erected at both ends of the flood evacuation route to restrict pedestrian usage. The adequacy of this signage is to be review and modified as appropriate after 12 months of operation.

A shared bike and pedestrian pathway is also to be provided along Forbes Street between Mileham and Macquarie Streets. This pathway will provide adequate access to the offices of the Australian Mushroom Growers Association.

## 5.9 Forbes Street

### 5.9.1 Background

Forbes Street Windsor is a local road running perpendicular to Mileham Street and Macquarie Street. The street is currently blocked at the intersection of Macquarie Street and Richmond Road and at its eastern end. It has low-scale development consisting of residential dwellings between Mileham and Macquarie Streets and a Mitre 10 hardware located at its eastern end. The traffic levels along Forbes Street are very low.

Forbes Street would form an important link in the proposed Windsor Flood Evacuation Route as part of the upgrade of the arterial road network in the region. It would be transformed from a residential cul-de-sac to a through route for traffic to and from the Macquarie Street and Richmond Road intersection. There would be four lanes of traffic within the existing road reserve along Forbes Street. A median strip would be located along its length to stop through traffic across Mileham Street.

The proposal would substantially increase the traffic levels along Forbes Street and alter traffic movements. The NETANAL traffic model of the Sydney region was used to analysis the existing traffic network operations and thereby determine the expected traffic patterns. The NETANAL traffic model estimates that daily traffic levels along Forbes Street would be 12930 vehicles per day in 2006 and 13990 per day in 2016, as a result of the proposal.

The proposal would result in the amplification of the intersection at Richmond Road and Macquarie Street. The traffic signals would be altered and Forbes Street reinstated as part of the intersection. Right turn movements from Forbes Street to Macquarie Street would be restricted to assist with intersection performance. Alternative access to Windsor would be provided via the Day Street extension and via a right turn movement from Richmond Road onto George Street.

The increase traffic volumes resulting from the proposal would restrict access into properties located on Forbes Street. Dwellings on the northern side of the street would retain existing access arrangement but would be restricted to left in/left out access only. Driveways for dwellings on the southern side of the street would need to be regraded due to the change in the crossfall. They too would be restricted to a left in/left only access only. There would be no on-street parking.

Noise levels along Forbes Street would increase substantially as a result of increased traffic movement. An assessment of the traffic noise generated by the proposal indicated that the day time noise levels along Forbes Street would exceed the 55dB(A) LAeq,15 hr baseline assessment goal by 12-15 dB(A). Night time noise levels would exceed the 50dB(A) LAeq, 9 hr baseline assessment goal by 11-14dB(A). The noise assessment study indicated that average noise levels on Forbes Street already exceed these baseline goals. The study found, however, that the allowance assessment goals would also be exceeded by 3-8dB(A) as a result of the proposal.

The EIS stated that there were limited opportunities to ameliorate the noise generated by the proposal. Installation of noise barriers would be inappropriate due to access, security and urban design issues. Individual treatment of properties would not feasible on weatherboard structures or the two heritage properties located on the street. The EIS stated that final noise control treatments would be assessed during the detailed design stage.

The proposal would visually impact upon Forbes Street. Forbes Street would be elevated to the east of Mileham Street with vertical retaining walls approximately two metres high. The proposed Windsor Flood Evacuation Route would be level with the northern side of Forbes Street between Mileham and Macquarie Streets. It is proposed to provide a shared pedestrian and cycleway on both sides of Forbes Street in this area.

### 5.9.2 Key Issues Raised

The following issues were identified:

- increased noise and restricted access for properties along Forbes Street; and
- access and manoeuvring on the Australian Mushroom Growers Association and Mitre 10 site.

### 5.9.3 Additional Investigations

Following concerns raised by Department in regards to the impacts of the proposal on Forbes Street, the RTA examined two alternative design options. Both options involved the acquisition and demolition of residential properties on the southern side of Forbes Street. A map and the preliminary study on the options are included in the Appendices C and D.

Option A involved the provision of an additional lane of the northern side of Forbes Street. The additional lane would allow vehicles to leave the main traffic stream and decelerate prior to entering driveways or turning onto Mileham Street. Option A would also allow an increased median width for the provision of landscaping and urban design measures.

The RTA study noted that Option A provided an advantage over the EIS proposal in terms of ease of access to residences on the northern side of Forbes Street. It also provided greater opportunities for landscaping on the wider median strip and footpaths. Option A, however, did not reduce the noise impacts of the proposal as there were no additional opportunities to install noise barriers.

Option B also involved the provision of an additional lane on the northern side of Forbes Street. This service lane would be separated from the main route of the proposal by a median. Vehicles wishing to enter the service lane would be required to make a left turn from the western end of Forbes Street, close to the Macquarie Street intersection. Installation of noise barriers and landscaping along the median separating the service road were considered. A wider median separating east and west bound traffic would also allow for additional landscaping.

Option B was not considered appropriate due to poor performance in regard to road safety and traffic management issues. The entry to the service road would be located on Forbes Street close to the intersection with Macquarie Street. Vehicles would need to decelerate prior to entry, thereby increasing the likelihood of rear end impacts and reducing the safety of through traffic. The study also raised concern that the manoeuvring of service vehicles through this entryway may obstruct both through lanes. The site views of vehicles turning left from Mileham Street to Forbes Street would be

restricted by the mounding and walling in the median area separating the service road from the route. The potential for traffic accidents would thereby increase.

The study investigated the effectiveness of noise barriers along the median between the service road and the proposed Windsor Flood Evacuation Route. Site inspections suggested that the proposed barriers would not provide shielding from noise from the south-eastern and north-western portions of Forbes Street. The study also stated that the barrier would result in secondary impacts such as loss of views and loss of prevailing breezes. The provision of noise barriers was therefore not supported.

Option B provided advantages over the EIS proposal in terms of the opportunity for landscaping and urban design measure on the medians and along the wider footpaths.

### 5.9.4 Consideration of Key Issues

As noted earlier, the proposed Windsor Flood Evacuation Route would result in substantial increases to the volume of traffic along Forbes Street. This would result in substantial increases in the noise levels, above the noise criteria goals set by the EPA. The proposal would also result in restricted access in and out of Forbes Street properties.

The Department agrees that there are limited methods available to ameliorate the impacts for the surrounding residential developments in Forbes Street. As noted in the EIS, the height of noise barriers would need to be in excess of six to eight (6-8) metres to satisfy the baseline noise assessment goals. The limited setback of dwellings, as well as safety, visual, access and overshadowing issues mean this is not feasible. Individual treatment of properties would generally be limited due the weatherboard construction and heritage significance of a number of dwellings on the street.

In view of the likely effects of noise and limited access for residences along Forbes Street, the RTA has offered a Property Value Guarantee. Under the Property Value Guarantee, the RTA will purchase any property in Forbes Street on the request of the owner. The property will be purchased at the current market value, as if the Windsor Flood Evacuation Route did not exist. The RTA will also provide stamp duty, legal fees and various other allowances associated with moving. The procedure would be available from the date of Approval until one year after commencement of operation of the proposal.

The Department is concerned that the Property Value Guarantee only provides a short term solution for existing land owners along Forbes Street. There may be longer term, adverse social impacts for people continuing to reside on Forbes Street. The Department has concerns that the noise levels generated by the current proposal would not be acceptable for future residents.

As discussed earlier, the RTA has investigated two alternative options to ameliorate the issues of noise and access. Both options involved the acquisition of properties along the southern side of Forbes Street. Option A involved the provision of an extra lane along the northern side of Forbes Street. Whilst this option improves access, it does not reduce the substantial noise impacts of the proposal. It is therefore not supported by the Department.

Option B involved the provision of a separate service road along the northern side of Forbes Street with the provision of noise barriers. The RTA study indicated that the provision of a separate service road at the intersection of Macquarie Street and Richmond Road could be dangerous and result in a greater likelihood of rear end accidents. It was also suggested that noise barriers would have

limited effectiveness. The Department recognises there are major constraints associated with this option most notably on grounds of traffic safety. Further investigations of alternative intersection alignments and entry way locations should be undertaken before eliminating this option altogether. Formal noise assessment should also be undertaken to measure the effectiveness of associated noise barriers.

The Department recognises that any changes to the Forbes Street alignment may result in substantial localised impacts, including the potential demolition of properties on the southern side of Forbes Street. Further investigation of design options should therefore not proceed without consultation with the affected properties.

Due to the serious amenity impacts upon Forbes Street, the Department believes that further investigation of design and amelioration options must be undertaken. The Department, therefore, recommends that the RTA investigate and report on alternative intersection alignments and the resulting impacts for Forbes Street between Day and Macquarie Street, prior to proceeding with construction. Design investigation would be conducted in consultation with the affected community and Hawkesbury Council. This is outlined under recommended Condition of Approval No.23.

Individual concerns about access and parking at the Australian Mushroom Growers Association and Mitre 10 sites were raised in the submissions. The RTA has noted that these issues will be addressed as part of the property realignment process. The Department has observed that large vehicles currently service the Mitre 10 site. Recommended Condition of Approval No. 43 will therefore require the Proponent to construct an underpass linking the two Mitre 10 sites for typical traffic use.

## 5.10 Mileham Street

### 5.10.1 Background

Day Street, Windsor is a local road between Macquarie Street and the eastern end of Mileham Street. The street currently provides access to Hawkesbury District Hospital. Mileham Street, Windsor is a local road which runs parallel to Macquarie Street, between Day Street and Rifle Road. Residential properties are located along the western side of Mileham Street. The eastern side of Mileham Street is zoned for industrial development, however, there are two residential properties located towards the intersection with Day Street. Day Street to the south of Mileham Street currently consists of an unformed road.

Day and Mileham Streets currently carries a low volume of traffic. Anecdotal evidence, however, suggests that the route is a 'rat run' to Macquarie Street and provides access to the industrial area south east of Forbes Street.

The Day Street and Mileham Street intersection will form a critical meeting point for new work and the existing street and town structure. Day Street is to be extended south of Mileham Street and will form an integral part of the proposed Windsor Flood Evacuation Route. It will be built at 17.3m A with vertical reinforced retaining walls of 6m in height on the western side and vegetated 4:1 batters on the eastern side. To achieve the 17.3m AHD, the intersection of Day and Mileham Streets will be approximately 2.35m higher than the existing intersection.

The proposal will result in substantial changes to the outlook and access for properties around the intersection of Mileham and Day Streets. Views of the floodplain from the two residential properties on the eastern side of Mileham Street will be blocked by the six metre high structure located along their rear boundaries.

The EIS notes that access into residential properties in Mileham Street would remain unchanged. Subsequent studies, however, indicate that access into properties on the western side of the Mileham Street and Day Street intersection will need to be regraded to accommodate the 2.35m height difference between the road and land level. The outlook from these properties will be substantially restricted.

The NETANAL traffic model of the Sydney region was used to analysis the existing traffic network operations and thereby determine the expected traffic patterns. Under the NETANAL traffic model, daily traffic levels of 2502 vehicles along Day Street extension are predicted in 2006. Daily traffic levels along the northern section of Mileham Street are predicted to decline from an estimated 8729 vehicles without the proposal, to approximately 4615 with the proposal. The volume of traffic along Mileham Street will be reduced due to a median strip along Forbes Street restricting through traffic.

Road traffic noise levels at residences along Day Street are predicted to decrease by 1-2dB(A) due to traffic reduction on Macquarie, Mileham and Day Streets. No noise assessment was undertaken for properties located on the western side of Mileham Street. The Day Street extension will result in increased noise levels at the two residential properties located on the eastern side of Mileham Street. The predicted LAeq, 15hr road traffic noise level in the backyards of these residences is predicted to be 59dB(A). This will exceed the assessment goal of 55dB(A) LAeq, 15hr for a new road development by 4dB(A).

### 5.10.2 Key Issues Raised

The following issues were identified:

- blocking of views of residences located on the eastern side of Mileham Street;
- height of proposed Windsor Flood Evacuation Route above existing ground level at Mileham Street; and
- concern of traffic levels along Day Street.

### 5.10.3 Additional Investigations

The Department commissioned an independent urban designer to review the visual impact and road structure at Mileham and Day Street. This UDAS Report identified the following key issues:

- the proposed Day Street extension will result in noise and visual impacts for properties located on the eastern side of Mileham Street;
- the proposed road height at the intersection of Mileham and Day Streets would be approximately 2.35m higher than the existing level of land. This level difference would negatively impact the established urban form including footpaths, driveways, building access and appearance; and
- access and egress into properties at the intersection of Mileham and Day Street would be restricted.

These issues and recommendations of the UDAS Report are discussed below.

The RTA provided proposed driveway profiles for properties located at the western side of the intersection of Day and Mileham Street. The profiles indicated that the maximum driveway grade required as a result of the proposal was 17.081 per cent.

The RTA submitted cross sections of possible landscaping in the rear backyards for properties on the eastern side of Mileham Street. These are included as Appendix E of the Report.

### 5.10.4 Consideration of Key Issues

The Day Street extension would result in substantial changes from the outlook from residential properties on the eastern side of Mileham Street. Views of the floodplain would be blocked by the retaining wall resulting in fairly confined and limited open space for these properties. Views into the backyards of these properties would also available from vehicles travelling along this section of the proposal.

The possible landscaping features presented by the RTA would partially offset the visual dominance of the retaining wall. The UDAS Report noted, however, that integrating the elevated structure into the surrounding environment would be difficult. The following methods to ameliorate the impacts of the Day Street extension were recommended:

- relocating the Day Street extension 20 metres from the rear eastern boundaries of Mileham Street (ie within the Trevallyn property);
- provision of a buffer of trees between the Day Street extension and rear property boundaries;
- provision of a bridge structure to minimise visual impact; and
- provision of transparent noise barriers along the western side of the Day Street extension to reduce the acoustic and visual impacts for Mileham Street properties.

The Department agrees that relocation of the Day Street extension would substantially improve the outlook for the two Mileham Street properties. There are a number of competing issues, however, that must be investigated before relocation of the Day Street extension can be considered. The proposed alignment and design of the Day Street extension, including the landscape embankments, were selected to minimise the impact of the proposal on the heritage significance of Trevallyn and its operation as a grazing property. Further investigation into relocating and redesign of the Day Street alignment should not be undertaken without an associated study investigating the impacts on the heritage significance of Trevallyn. Consultation with the affected communities must also be undertaken.

The 2.35m difference in the height between the proposed Windsor Flood Evacuation Route and the existing ground level at the Mileham Street and Day Street intersection, will negatively detract from the established urban environment, restricting access and outlook from the subject properties and the connectivity between footpaths and the road system. To overcome these problems, the independent UDAS Report recommended that existing access levels into properties at on the western side of the intersection be retained. The following design changes were recommended to achieve this:

- in order to retain existing access levels for properties on the corner of Day and Mileham Streets, the proposed Windsor Flood Evacuation Route should be reached by a ramp starting from the existing Day Street alignment. This will become an independent intersection from the existing road and footpath system and will cause no problems to the existing built form and landscaping. The 17.403 AHD height of the route will be retained.

The Department agrees that the proposal may detract from the connectivity and visual appearance of the Day Street and Mileham Street intersection. Further investigations into the alignment and location of the intersection should therefore be investigated. As noted above, additional investigations in regard to the relocation of the Day Street alignment must also be undertaken.

Recommended Condition of Approval No. 24 therefore requires that the Proponent investigate intersection design and alignment alternative at the intersection of Mileham Street, Day Street and the proposed Day Street extension.

Traffic levels along Mileham Street and the existing section of Day Street are predicted to decrease as a result of the proposal, improving the noise levels for properties located along these alignments. Noise levels for residential properties backing onto the Day Street Extension will be increased. The assessment in the Representations Report indicates that adequate noise amelioration can be provided to mitigate against this. Refer to Section 5.4 Noise and Vibration for further details.

# 6 Consideration of Other Issues

*This section of the Report provides the Department's assessment of the other environmental impacts of the modified proposal based on an examination of the EIS, issues raised in representations during the exhibition period and the Proponent's response to these issues in its Representations Report and during further consultation with the Department. The Department's assessment of the key environmental issues and site specific impacts is addressed in Section 5 of this Report.*

*The Proponent has also provided the Department with an assessment of all issues raised in representations in the Representations Report. This assessment has been reviewed by the Department and where required further assessment as been undertaken and discussed. It is therefore important that this Section be read in conjunction with the Proponent's Representations Report to understand how all issues raised in representations have been addressed.*

## 6.1 Route Selection

### 6.1.1 Background

As discussed in Section 3.3 of the report, the need for a high-level crossing over South Creek resulted from recommendations in the Hawkesbury-Nepean Floodplain Management Strategy (HNFMS). The height of 17.3m AHD was defined by the height of surrounding ground levels.

The route selection process involved the assessment of six route options: four options to north of the railway line and two options to the south. These options were subsequently refined to two potential routes. As a result of consultation with the community and specialist studies investigating issues including flora and fauna, traffic, landscape and visual impacts, a preferred option north railway line was identified.

The route options investigated were all located within an area covered by Sydney Regional Environmental Plan 20 Hawkesbury-Nepean River (No. 2 1997) (SREP 20). The aim of the plan is to 'protect the environment of the Hawkesbury-Nepean River system by ensuring the impacts of future land uses are considered in an environmental context'. To achieve this, SREP 20 contains requirements (and National Parks and Wildlife Service [NPWS] concurrence) for development consent from Council for works carried out within mapped wetlands.

The alignment of the preferred option was shaped to avoid the SREP 20 wetland and any possible adverse environmental impacts on the wetlands during the construction and operational phases of the proposal.

### 6.1.2 Key Issues Raised

The following issues were identified:

- ecological impacts of an alternative straight alignment for the proposed Windsor Flood Evacuation Route.

### 6.1.3 Additional Investigations

The Department commissioned the Urban Design Advisory Service (UDAS) to review the overall design of the bridge and embankment structure over the floodplain. The UDAS Report recommended that the visual impacts of the structure may be lessened and more effectively integrated within the floodplain environment by providing a straight alignment within minimal contact to the ground.

The NPWS subsequently advised the Department that they had no objection to the provision of a straight road alignment across the SREP 20 wetland. The NPWS indicated that the SREP 20 wetland was of low value. The provision of a straight alignment may reduce the direct impact of the proposal on Potential Archeological Deposits (PADs) of indigenous heritage.

The Department of Land and Water Conservation (DLWC) submitted a preliminary report on the significance of the Fairey Road Wetland No. 144 as identified under SREP 20. It is a 3.5 hectare freshwater wetland of open/dense herb swamp which is noted as having value for its vegetation. It is one of several significant wetlands in the area.

The DLWC was concerned that a straight alignment would involve a skewed crossing of South Creek. The pier spacing required would be significantly greater than for a normal crossing and would result in adverse flood and river bank impacts. The road alignment would limit rainfall under the bridge and result in overshadowing that would alter vegetation growth.

The RTA undertook a strategic assessment of the straight alignment. The Strategic Cost Estimate for the straight alignment was estimated at $68.5 million in June 2002. This would cost approximately $4.5 million than the alignment as presented in the EIS.

### 6.1.4 Consideration of Key Issues

No formal ecological study has been undertaken to assess the impact of a road route through the SREP 20 wetland. The Department must therefore rely on the preliminary comments of the relevant government agencies. As noted above, there are a number of different interpretations about the significance of the SREP 20 wetland and the impacts of the straight alighment.

The UDAS Report recommended a straight road alignment to minimise the impact of bridge construction and reduce the visual impact of the proposal. It states that this design change would provide greater 'sustainable development, which is the basic of good design philosophy. The UDAS Report, however, does not elaborate as to how changes to the alignment will promote sustainability.

The NPWS state that the SREP 20 wetland is of limited significance and that changes to the alignment would thereby have limited adverse ecological impact. Further more, changes to the alignment may lessen the impact on the four PADs. Alternatively, the DLWC states that wetland is noted under SREP 20 for its vegetation. Changes to the alignment may adversely alter the wetland ecology and the river bank system of South Creek.

As there is no formal study of the significance of this wetland or impact of a road route, it is difficult for the Department to provide a comprehensive assessment of an alternative alignment. At this stage, the UDAS Report and comments provided by the government agencies have not provided adequate evidence to indicate that a straight alignment would lessen the ecological impact of the proposal. Furthermore, the modified alignment would cost an additional $4.5 million.

As the ecological impacts of the curved alignment presented in the EIS and the Representations Report have been assessed as acceptable, the Department does not support any further change to the alignment.

## 6.2 Indigenous Heritage

### 6.2.1 Background

An assessment of the impacts of the proposal on indigenous heritage values was undertaken as part of the EIS. The assessment included a search of NPWS Register of Aboriginal sites, field survey, evaluation of impacts of the proposal, and an outline of possible mitigation measures. Input from the Deerubbin Local Aboriginal Land Council (LALC) and Darug Tribal Corporation were also sought.

The assessment indicated that the floodplain was unlikely to contain evidence of indigenous activity due to disturbances from flooding. There was, however, a high potential for sites of indigenous heritage on the elevated areas above the floodplain. Lack of surface visibility during the field survey restricted opportunities for such site identification. The assessment recommended that archaeological sub-surface testing be undertaken at the elevated locations to ascertain whether significant Aboriginal sites occur which are affected by the development.

While no sites of indigenous heritage were identified during the assessment, four PADs were identified which would be affected by the construction of the proposal. The EIS indicated that the impact on these PADs was likely to be minor due to existing land use. Sub-surface testing of the PADs, however, would be undertaken prior to construction to determine whether material of indigenous cultural heritage significance is present. Representatives of the Deerubbin LALC and the Darug Tribal Corporation would be consulted as part of the sub-surface testing.

Outcomes of the sub-surface testing may require a Salvage Excavation or Collection or Monitoring or Consent to Destroy permit under the National Parks and Wildlife Act 1974. Mitigation measures would also be instigated during construction, including the cessation of work and notification of the relevant authorities on the identification of items of potential Aboriginal heritage significance and training workers of their responsibilities toward heritage items.

### 6.2.2 Key Issues Raised

Section 90 of the National Parks and Wildlife Act 1974 requires the consent of the Director-General of NPWS to destroy an Aboriginal relic or place. The NPWS requested that additional information be provided to determine the potential Aboriginal heritage impacts of this proposal, including:

- maps indicating the location of the two proposed routes;
- explanation of the criteria used to determine that the creek bank and floodplain were of low archaeological potential;
- demonstration that the Aboriginal heritage values and potential impacts were considered in the development of the preferred route alignment; and
- written correspondence from the relevant Aboriginal community groups of their involvement in the heritage.

### 6.2.3 Consideration of Key Issues

Maps of two alternative routes and the identified PADs were provided in the Representations Report. The Proponent indicated that indigenous heritage was considered in the selection of the preferred option. The Department considers that the selection process was adequate.

The indigenous heritage report notes that there is a high potential for sites of indigenous heritage on the elevated areas above the floodplain, most notably at the four PADs, identified in the initial assessment. The NPWS has indicated that further geotechnical and other detailed investigations may be required to determine whether any Aboriginal objects are present in the area. To ensure that items of indigenous heritage are not overlooked or adversely impacted by the proposal, the Department recommends that the proponent undertake subsurface investigations of the four PADs. The Proponent is to submit the report to the Department outlining the findings of the subsurface testing, methods to mitigate impacts of the proposal on any sites of indigenous heritage and evidence that the findings of subsurface testing are to be incorporated into the development of the detailed design. The report is to be prepared to the satisfaction of the Director-General in consultation with the NPWS, as outlined in recommended Conditions of Approval No. 89-90.

The EIS notes that there was input to the assessment from Deerubbin LALC and the Darug Tribal Corporation. No written confirmation of this consultation, however, has been provided. To ensure ongoing input and participation of the local indigenous groups, the applicant will be required to involve representatives from the Deerubbin LALC, Darug Tribal Corporation and the Darug Custodian Aboriginal Corporation in the sub-surface investigations of the PADS.

If an item of potential indigenous heritage significance is identified during construction works, the Proponent will be required to cease work in this vicinity and contact the relevant authorities. This is outlined under the Recommended Condition of Approval No. 91.

## 6.3 Non-Indigenous Heritage

### 6.3.1 Background

A non-indigenous heritage assessment was undertaken as part of the EIS. The study involved a search of relevant heritage databases and a field survey of the area traversed by the proposal. A total of eight non-indigenous heritage sites were found. Six (6) of these were on existing registers and two (2) were identified during field surveys.

The proposal will impact upon directly impact upon the following two heritage items listed under the Hawkesbury Local Environmental Plan (LEP).

<u>Trevallyn Homestead and associated structures</u>

The Trevallyn Homestead is listed as an item of heritage significance under the Hawkesbury LEP. It is also listed as an indicative place on the Register of the National State. It is not listed on the State Heritage Register.

The Trevallyn Homestead is a Georgian farmhouse built in 1857. The property includes a post and rail fence on the site's western (front) boundary which is to be removed as part of the proposal. The

property is considered significant as a substantial farmhouse of the 19th century and an indication of Windsor's strong agricultural past.

The Day Street extension will result in an alteration of Trevallyn's western boundary which may detract from its heritage significance. As the item is listed under the Hawkesbury LEP, approval to remove the post and rail fence and alter the property boundary will require development consent of Council under Part 4 of the *Environmental Planning and Assessment Act, 1979 (EP&A Act)*.

The EIS notes that that vistas to and from Trevallyn will be restricted as a result of the proposal. The heritage study indicates this would have minor adverse impact on the heritage significance of the property.

Headstone 1 and 2 and Windsor Roman Catholic Cemetery

The Windsor Roman Catholic Cemetery is listed as an item of local and state heritage significance under the Hawkesbury LEP, as it is one of the earliest Roman Catholic cemeteries in Australia.

The cemetery contains two headstones to be relocated due to the widening of Macquarie Street. Headstone 1 is a sandstone headstone dating from 1833. Headstone 2 is a sandstone headstone with indecipherable etching due to age. As the items are listed under the Hawkesbury LEP, approval to remove and relocate these headstones will require development consent of Council under Part 4 of the EP&A Act.

The EIS notes that the widening of Macquarie Street and the removal and relocation of these headstones will have detrimental impact on the significance of the cemetery. The cemetery's current design and layout within an urban setting will be compromised.

The EIS states that the will be limited impact on the heritage significance of the following items:

- no. 12 and 16 Forbes Street listed as heritage items under the Hawkesbury LEP and no. 15 Forbes Street identified during the field survey.

- no. 8-10 Mileham Street listed as a heritage item under the Hawkesbury LEP. It is the original brick Windsor Station built in the 1860s, relocated to Mileham Street in 1883;

- Mulgrave Railway Station Precinct including the Mulgrave Railway Station and Stationmaster's residence listed as significant heritage items under the Hawkesbury LEP.

The former Corner Store at Mulgrave was identified during the survey. It will be demolished as part of the proposal.

### 6.3.2 Key Issues Raised

One representation raised concern about the impact of the proposed development on the heritage property of Trevallyn. The representation noted that the proposal will block views to and from the property and may thereby detract from its heritage significance.

### 6.3.3 Consideration of Key Issues

Impact of Trevallyn

The EIS states that the proposed Windsor Flood Evacuation Route will have a minor adverse impact on the heritage significance of 'Trevallyn' due to the reduction of open vistas from the property. The EIS notes that while these landscape associations are important, the construction of the elevated road would not adversely affect the heritage significance of the site to the extent that the proposal should not proceed.

Whilst the proposal will substantially alter the landscape and outlook in the proximity of Trevallyn, it has been designed to sustain the agricultural nature and landscape of the region. Vegetated 4:1 batters, for instance, are to be provided on the Trevallyn side of the proposal to allow ongoing use for agricultural purposes. The Department concurs with the findings of the EIS in that the impact would not adversely affect the primary significant of the site embodied in the main building and associated structures.

The proposal will also result in the alteration to the western boundary including the removal of the post and rail fence. As noted above this section of the proposal is subject to Development Consent under Part 4 of the EPA&A.

Impact on the Windsor Roman Catholic Cemetery

As noted above, the proposal will result in the relocation of two headstones. As the cemetery is listed as a heritage item under the Hawkesbury LEP, this section of the proposal is subject development consent from Council under Part 4 of the EP&A Act.

Impact on other items of heritage significance

The Department agrees that the proposal will not directly impact the three properties in Forbes Street if the road alignment remains unchanged. The indirect amenity impacts of restricted access and increased noise levels are discussed separately in Sections 5.9 of the report.

The proposal will not directly impact 8-10 Mileham Street, though it will limit views of the floodplain from the property. As the significance of this item is embodied in the building structure, this is considered acceptable.

The proposal will result in fragmentation of the Mulgrave Station Precinct and the demolition of the Former Corner Store located in the region. As the Corner Store has been assessed as having negligible heritage significance, the Department approves its demolition. Recommended Condition of Approval No. 88 requires that a qualified heritage consultant undertake a photographic and archival recording of the building prior to its demolition. As the Mulgrave Station Precinct is of low heritage significance, its fragmentation is also considered acceptable.

If an item of potential heritage significance is identified during construction works, the Proponent will be required to cease work in its vicinity and contact relevant authorities. This is outlined under the Recommended Condition of Approval No. 91.

## 6.4 Property Acquisition

### 6.4.1 Background

The EIS states that the proposal will result in total acquisition of two properties and partial acquisition of twenty two properties. A residence on the corner of Mulgrave Road and Railway Road North (the Former Corner Store) will be demolished as part of the proposal. The EIS also notes that no. 9 Railway Road North will be totally acquired as part of the proposal.

The EIS states that two additional properties along Railway Road North will be substantially affected by the proposal. The property owners have indicated that partial acquisition of their land will render their current operations unviable. The EIS states that the RTA may acquire the whole of a property if the effects of roadwork on the residue are considered to warrant total acquisition.

Partial acquisition of the following properties will also be required:

- the Trevallyn property on its western boundary;
- three rural grazing properties located on the South Creek floodplain. It is noted that one property will be severed by this flood evacuation route;
- McGraths Hill STP and effluent reuse scheme;
- the Roman Catholic Cemetery;
- Council land adjacent to Richmond Road; and
- other commercial properties along Railway Road North.

The EIS notes that the land acquisition will not affect the viability of these properties. One grazing property on the flood plain will be severed by proposed flood evacuation route. Negotiations with the land owner would be undertaken to determine if acquisition of the severed parcel of land was desired.

In accordance with the *Roads Act 1993,* the RTA is authorised to acquire land for the purposes of road construction. All property acquisitions will be undertaken in accordance with the RTA's *Land Acquisition Policy* and the *Land Acquisition (Just Terms Compensation) Act 1991*. In determining a payment consideration of unaffected market value, severance, disturbance and solatium must be considered.

### 6.4.2 Key Issues Raised

The following issues were identified:

- the owner of the Trevallyn property was opposed to the partial acquisition along the property's western boundary. The submission noted that large sections of the property have been acquired by various government departments in the past; and
- the resident of no. 9 Railway Road North, Mulgrave, indicated that he was not concerned by the proximity of the service road to his house and would prefer the RTA not acquire his house.

### 6.4.3 Additional Investigations

The EIS noted that there were limited methods to ameliorate noise and access issues for properties along the boundary of the flood evacuation route at Forbes Street. The RTA has therefore sought to overcome these issues by offering a Property Value Guarantee to residents located along this

boundary. This program is outlined in a separate document entitled 'RTA, Windsor Flood Evacuation Route Property Guarantee Procedure, August 2002'.

The Property Value Guarantee is offered to owners of land which have a common boundary with the new route along Forbes Street. Owners of eligible properties may request the RTA to make an offer to purchase the property at current market value, as if the Windsor Flood Evacuation Route did not exist. Under the procedure, the RTA will include the additional allowances to the market value:

- stamp duty as calculated for the purchase of a replacement property in NSW of the equivalent value of the property sold to the Authority;
- legal fess of $2,750 including GST;
- removal allowance of $3850 including GST;
- survey fees of $440 including GST;
- building/pest report of $385 including GST;
- disbursements of $250.

Unlike the payment offered to properties that are acquired under the *Land Acquisition (Just Terms Compensation) Act 1991,* cost of severance, disturbance and solatium are not considered in this payment.

The procedure will commence once the RTA makes a determination to proceed following approval by the Minister and will be available from the date of approval, through the construction period and up to one year after commencement of the operation of the proposed Windsor Flood Evacuation Route.

### 6.4.4 Consideration of Key Issues

Concern was raised about the impact on Trevallyn and the fact that much land had already been lost due to a process of land acquisition by various government departments. The RTA proposes that vegetated fill batters at a gradient of 4:1 will be constructed on the Trevallyn side of the proposal, in order to maximise the available grazing land for this property. Assessment of the Day Street Extension part of the Proposal indicates that it will result in adverse impacts on the outlook and connectivity of other properties in Mileham and Day Streets. Recommended Condition 24 of the approval requires the Proponent to undertake further investigation of the alignment and design of the Day Street Extension. This will include examination of the impacts on the heritage significance and operation of the Trevallyn property. This is discussed in Section 5.10 of the report.

The Representation Report indicates that further options to minimise property impacts on no. 9 Railway Road North would be investigated during the detailed design stage. The Department is concerned that the amenity of this property will be greatly reduced by the construction of the flood evacuation route and associated service road. The RTA has indicated that further options for this property will be investigated during detailed design to minimise the impact in the short term of no. 9 Railway Road North. The RTA will also consider total acquisition of the above property within 12 months of the proposal opening. This is considered acceptable by the Department.

As noted above, properties on Forbes Street will be offered a property value guarantee. The Department agrees that the existing property owners should be offered the choice of compensation for their amenity loss. At the same time, the Department is concerned the property value guarantee only offers a short term solution. This is issue is discussed in Section 5.9 of the report.

## 6.5 Air Quality

### 6.5.1 Background

Construction

The EIS notes that around 500kg of dust per 10 hour day would be generated from earthworks associated with construction. This amount would be generated from operation of equipment and wind erosion assuming an exposed area of 200m by 30m (6000m$^2$). The total dust generated could be much higher on a hot, dry, windy day and/or if a greater area were exposed. Standard mitigation measures are described in the EIS, including minimising exposed ground, road watering, ceasing work during extreme wind conditions, management of topsoil stockpiles and covering material transported by construction vehicles. The EIS concludes that these measures would be detailed in a Dust Management Sub Plan.

Opportunities to reduce greenhouse gas emissions are identified in the EIS, such as use of energy efficient fuels, minimisation of clearing, life cycle analysis, and preparation of a Waste Avoidance Plan.

Operation

The EIS indicates that the current local air quality with respect to ozone, nitrogen oxides, sulphur dioxide, carbon monoxide and particulate matter are well below their respective air quality goals.

The EIS includes modelling of a series of possible roadway developments that are combined with the expected hourly traffic flow and compared with ambient air quality goals recommended by the EPA. Predicted increases due to vehicle emissions remain well below EPA recommended goals. The EIS indicates that improvements in air quality along Windsor Road between Macquarie Street and Pitt Town Road, Macquarie Street and Day Street would result from construction of the proposed Windsor Flood Evacuation Route. This would be attributable to reduced traffic volumes.

The EIS provides a quantitative estimate of greenhouse emissions associated with the proposal showing small overall savings in greenhouse emissions compared with a "do-nothing" case.

The EIS notes that the RTA would continue to engage in strategies outlined in their *Greenhouse Reduction Plan*. The EIS indicates that the RTA would also contribute to:

- RTA programs that encourage better vehicle maintenance and fuel economy;
- the National Greenhouse Response Strategy;
- the State's vehicle emissions enforcement resources; and,
- the early implementation of more stringent Australian Design Rules.

### 6.5.2 Issues Raised

EPA raised concerns with regard to operational and construction air quality impacts. Particularly EPA was concerned with the adequacy of dust mitigation measures and that the operational air quality modelling did not consider induced traffic.

The EPA suggested that the proposal was not consistent with the objectives of the State Government's *Action for Air*. Concerns regarding increased vehicle kilometres travelled are discussed in Section 5.4 of this report.

### 6.5.3 Consideration of Issues

Dust Management

The Department notes that the potential exists for short-term impacts to occur as a result of dust generation during construction. The Department generally concurs with the mitigation measures outlined in the EIS. Notwithstanding, it is noted that the assessment included in the EIS assumed that only 6000m$^2$ of ground surface would be exposed at any time. It is therefore recommended that the Proponent implement a progressive revegetation strategy during construction, with the goal of minimising exposed surfaces to 6000m$^2$. Progressive revegetation would also work to reduce the erosion and sediment issues and the visual impacts.

The Department also recommends the implementation of the following mitigation measures:

- covering of construction vehicles;
- use of wheel washes to minimise tracking of dirt and mud on public roads;
- use of water sprays and tankers to minimise the amount of dust generated, especially on hot, dry, windy days;
- limiting truck speeds on internal haul roads.

The Department notes that the effectiveness of the mitigation measures outlined in the EIS is dependent on diligent monitoring and maintenance. To this end, the Department recommends the preparation of a detailed Dust Management Sub Plan to set in place appropriate management procedures. As part of this Sub Plan, the Proponent would be required to prepare a reactive dust management procedure to be implemented if dust emissions exceed the relevant criteria.

These requirements are specified in Recommended Conditions of Approval Nos. 69 to 72.

Greenhouse

The Department commends the RTA's commitment to greenhouse gas reduction strategies described in the EIS, including:

- enhancing the States vehicle emissions enforcement resources;
- implementing more stringent Australian Design Rules for exhaust emissions;
- encouraging cleaner fuel sources; and
- promoting the reduction of greenhouse emissions.

Careful management will be required to ensure that the greenhouse minimisation strategies are effectively implemented during construction. To this end, the Department recommends that the Proponent:

- develop assessment criteria to be used in the formal construction tender process to encourage the use of alternative, cleaner fuels during construction;
- adopt energy efficient work practises; and,
- purchases green power for at least 50% of construction electrical requirements.

These requirements are specified in Recommended Conditions of Approval Nos. 73 and 74.

Operational Air Quality Impacts

In response to EPA concerns that induced traffic was not modelled in the EIS, the Proponent stated that the potential of induced traffic from the project was negligible and that would be within the margin of accuracy of the original modelling.

The Department notes that, based on modelling contained in the EIS working papers, the predicted levels of pollutants resulting from the operation of the proposal would be below the relevant air quality goals, and accordingly concludes that no significant adverse effects are expected to occur.

## 6.6 Soils

### 6.6.1 Background

The study area is dominated by the generally flat floodplain of South Creek. The soil comprises alluvial silty and sandy clays, and is noted for high erosion potential. The soil landscape of study area is subject to common stream bank and sheet erosion.

In the study area, Acid Sulphate Soils (ASS) are likely to be confined to the Quaternary Deposits adjacent to South Creek. The EIS notes that soil sampling confirmed the possibility of Potential Acid Sulphate Soils (PASS) in isolated locations. The EIS considers that a detailed Acid Sulphate Soils Management Plan should be prepared. The use of protective coatings on piles driven in areas of ASS is recommended in the EIS.

The EIS noted no known sites of contaminated soil from EPA databases or site inspections, however, an analysis of soils for contamination would be undertaken and management strategies would be developed as part of a Soil and Water Management Plan, if required.

The EIS describes erosion and sedimentation control measures to be implemented during construction to protect soils, including:

- use of imported fill for embankments;
- scour protection;
- establishment of vegetation on batter slopes;
- use of erosion mats to prevent erosion from wind generated wave action; and
- control measures to protect water quality, as discussed in Section 5.6.

The details of these measures would be finalised in a Soil and Water Management Sub Plan, incorporating Erosion and Sedimentation Control Plans.

### 6.6.2 Key Issues Raised

Two representations noted concerns regarding ASS. One representation noted that assessment of ASS should be carried out early in the construction process and should include monitoring strategies. The second representation questioned if ASS would affect the integrity of the bridge structure.

### 6.6.3 Consideration of Key Issues

Whilst the likelihood of ASS and PASS soils is low, recommended Condition of Approval No. 76 requires the Proponent to prepare a Acid Sulfate Soil Management Sub Plan. Completion of the Plan including contingency strategies, would be required prior to construction. Compliance with the Acid Sulphate Soils Manual (ASSMC, 1998) would ensure that appropriate sampling and monitoring occurred. The Department notes that the use of protective coatings on piles driven in areas of ASS would reduce risks of disturbing ASS and PASS during construction of the bridge structure.

Similarly, while contaminated soils are unlikely to be discovered, the Department supports the proposed analysis of soils for contamination that would be detailed in the Soil and Water Management Plan as required by recommended Condition of Approval No. 77.

The Department is satisfied that potential erosion and sedimentation impacts would be adequately controlled through the strategies required by the proposed Soil and Water Management Plan and Erosion and Sedimentation Control Plans. These would be required by recommended Conditions of Approval No. 77-79.

## 6.7 Public Transport

### 6.7.1 Background

The Hawkesbury Local Government Area has a higher level of car ownership than the broader Sydney region. Correspondingly, there is a low level of public transport usage in the area. Intra-regional public transport is dominated by buses, operated by Westbus and Hawkesbury Valley Bus and Coach Services. A single electrified rail line links Richmond and Blacktown with stations at Windsor and Mulgrave.

The EIS suggests that the proposal will have limited impact on the public transport services in the area. It is unlikely that new bus services will be provided along the proposed Windsor Flood Evacuation Route as this will bypass the Windsor Town Centre. Improved traffic conditions along Macquarie Street and Windsor Road, however, may provide journey time savings for local bus services south of Windsor.

The Proposal will not directly impact the rail service. The route may, however, improve access to Mulgrave Station. The EIS notes that there may be scope to enhance the commuter carpark at Mulgrave Station to encourage greater usage of the rail system.

### 6.7.2 Key Issues Raised

The following issues were identified:

- impact of construction on public transport;
- impact of proposal on access and facilities, such as parking, at Mulgrave Station; and
- encouragement of public transport usage.

### 6.7.3 Consideration of Key Issues

Construction

Access to Mulgrave Station would be retained at all times during construction. The RTA does not expect there will be significant disruption to rail activities during construction. To ensure that disruptions are minimised, impacting constructing will coincide with track maintenance. Consultation will be undertaken between RTA, Rail Infrastructure Alliance (RIA) and StateRail to minimise disruption for station users during construction. The Department considers that these processes will adequately address inconvenience resulting from construction.

Operation

As the proposal will provide a major arterial route in northwest Sydney, it is important that the key objectives in *Action for Transport 2010* are addressed. These objectives include reducing car dependency and increasing public transport usage. Whilst the Department recognises that there are limited opportunities to augment public transport services under the current proposal, the protection and enhancement of the existing public transport system must be considered.

The proposal will result in improved access to Mulgrave Station, especially from car users from the South Windsor to Richmond region. In the Representations Report, the RTA provides a commitment to work with the railway organisations to enhance the commuter parking facilities and general amenity of the Mulgrave Station Precinct. The Representations Reports outlines the following key commitments:

- *'The RTA would work with the railway organisations to facilitate redevelopment and enhancement of commuter car parking facilities and the general amenity in the Mulgrave Station Precinct;*

- *The RTA would work with the railway organisations to integrate the Proposal with the existing public transport facilities through appropriate signage, ensuring accessibility and examining opportunities to improve commuter facilities in the Mulgrave Station Precinct.'*

The Department considers that an upgrade and augmentation of this station is an important way to promote public transport and commends the RTA for their willingness to work with public transport providers to achieve this aim. Recommended Condition of Approval No. 27 therefore requires that the RTA to work with State Rail and the Rail Infrastructure Alliance to enhance the commuter parking facilities and amenity of the Mulgrave Station Precinct. An urban design strategy is to be developed as part of this process, outlining processes that will be undertaken to improve the amenity of the precinct for users, addressing issues including safety and accessibility.

The Department agrees that there are limited opportunities to increase bus services. The RTA has agreed to consult with local bus operators and Hawkesbury Council regarding the future use of the route by local bus services. This is considered adequate by the Department.

# 7 CONCLUSIONS AND RECOMMENDATIONS

The Roads and Traffic Authority (RTA) proposes to construct a flood evacuation route for Windsor between Day Street, Windsor and Railway Road South, Mulgrave, as part of the implementation of the Hawkesbury-Nepean Floodplain Management Strategy (HNFMS). The proposal will also provide an arterial road link between Richmond Road, Windsor and Windsor Road, Mulgrave as part of the Windsor Road Upgrade Program. The proposal would consist of a two-lane road of approximately 2.6km in length. It would have a minimum centreline height of 17.3m AHD. It would include three bridge structures, embankments and reinforced walls.

Studies by the Stated Emergency Services (SES) indicate that the existing flood evacuation routes serving the Windsor region do not provide adequate time or capacity to evacuate the population, in the event of a severe flood. The proposed Windsor Flood Evacuation Route has therefore been developed to provide greater opportunity for the population of Windsor and the surrounding regional towns to evacuate within the timeframe available. The proposal has also been developed to enhance this existing arterial network as part of the Windsor Road Upgrade Program.

Fourteen (14) representations were received in response to the Environmental Impact Statement (EIS). The key issues raised in the representations to the EIS were:

- design changes to ameliorate amenity loss;
- restricted access into various properties;
- noise levels resulting from construction and operation of the proposal;
- impact of potential acid sulphate soils;
- water quality and capacity of water quality ponds;
- property loss; and
- route selection.

The RTA prepared a Representations Report to respond to issues raised during the consultation period for the EIS. The RTA sought the approval of the Minister on 1 January 2003.

The Department recognises that the proposal would substantially improve the opportunities to evacuate Windsor, South Windsor and the surrounding townships in the event of severe flooding. Further more, it would increase the capacity and improve travel times of the local arterial road network.

The Department has undertaken an assessment of the likely impacts of the proposal and has identified key areas where comprehensive mitigation measures would need to be implemented to ensure adverse impacts are mitigated to an acceptable level. In particular, mitigation strategies relating to noise, water quality and flora and fauna would be developed beyond processes outlined in the EIS to ensure that the level of impact would be acceptable.

The proposal will substantially impact upon properties bordering Forbes, Mileham and Day Streets Windsor. The Department has recommended that further investigations into the alignment and design of the proposal along these streets be undertaken, in order to limit the adverse impacts of noise, access and outlook on these properties. Due to the imposing size of the proposal, the Department has also recommended that the Proponent investigate methods to effectively integrate the proposal across the floodplain environment.

The Department has also undertaken an assessment of other likely environmental impacts of the proposal including future development, traffic, indigenous and non-indigenous heritage, air quality, soils and public transport. The Department's review has indicated that, provided all comprehensive mitigation measures are implemented, the impacts of the proposal would be acceptable.

The Department also recommends that the Proponent prepare comprehensive Environmental Management Plans (EMP) for the construction and operation of the proposal which embody the mitigation measures contained in the EIS, Representations Report and the recommended Conditions of Approval for the proposal. The key elements of the recommended Conditions of Approval include:

- preparation and implementation of comprehensive Construction and Operational EMPs;
- the preparation of detailed Sub Plans as part of the EMPs for:
    - traffic management;
    - flora and Fauna;
    - noise and vibration;
    - dust;
    - acid sulfate soils;
    - soil and water quality;
    - flooding and drainage;
    - ground water;
    - non-indigenous heritage;
    - soil and fill;
    - waste management and reuse; and
    - hazards and risk management.

The Department's assessment has concluded that, provided the Recommended Conditions of Approval contained in Section 8 of this Report are adopted, the proposal could be approved by the Minister for Planning.

# 8 RECOMMENDED CONDITIONS OF APPROVAL

*This Section provides the Department's recommended conditions of approval for the project under Section 115B(2) of the EP&A Act. These are based on the Department's assessment of the EIS, the representations made to the Department and supplementary information and advice provided.*

*It is noted that the EIS and Representations Report contain extensive information on procedures and mitigation strategies to be implemented to ameliorate impacts of the proposal. The recommended conditions of approval should therefore be implemented in conjunction with those procedures and mitigation measures specified in the EIS and the Representations Report. Where there is an inconsistency with the recommendations in the EIS or Representations Report, the recommended conditions will prevail.*

**Preface**

These conditions include a reference to the following: the Director-General of the Department of Planning (The Director-General); the National Parks and Wildlife Service (NPWS); and the Department of Land and Water Conservation (DLWC).

These agencies are currently in the process of being reorganised. Some functions of these agencies will change and some responsibilities may be transferred to other agencies. This could affect some of the responsibilities identified in these conditions where they relate to the Director-General, the NPWS, and the DLWC. These conditions should be read in the context of these changes and implemented accordingly.

The following acronyms and abbreviations are used in this section:

**Glossary and Abbreviations**

| | |
|---|---|
| ANZECC | Australian and New Zealand Environment Conservation Council |
| ARI | Average Recurrence Interval |
| CLG | Community Liaison Group(s) |
| CMS | Construction Method Statements |
| Construction | Commencement of any physical works under this Approval |
| Department, the | Department of Planning |
| Director-General, the | Director-General of the Department of Planning or delegate |
| Director-General's Report | the report of the Director-General of the Department of Planning entitled 'Proposed Windsor Flood Evacuation Route,' March 2003 |
| DLWC | Department of Land and Water Conservation, NSW |
| EIS | *Windsor Flood Evacuation Route South Creek Environmental Impact Statement* prepared for the RTA by Connell Wagner, dated August 2002 |
| EMP | Environmental Management Plan |
| EMR | Environmental Management Representative |
| EP& A Act | *Environmental Planning and Assessment Act 1979* |
| EPA | NSW Environment Protection Authority |
| HCC | Hawkesbury City Council |
| ICLR | Independent Community Liaison Representative |
| $L_{Aeq}$ 9hour | Equivalent continuous (constant) sound level over a 9 hour period from 10pm to 7am |
| $L_{Aeq}$ 15 hour | Equivalent continuous (constant) sound level over a 15 hour period from 7am to 10pm |

| | |
|---|---|
| LAeq (15 mins) | Equivalent sound pressure level over a 15 minute interval |
| LA1(1 minute) | Sound pressure level exceeded for 1 per cent of the time measured over a 1 minute interval |
| LA10 (15 mins) | Sound pressure level exceeded for 10 per cent of the time over a 15 minute period |
| Minister, the | Minister for Planning |
| NPWS | National Parks and Wildlife Service, NSW |
| OEMP | Operational Environmental Management Plan |
| Proponent | Roads and Traffic Authority |
| Publicly available | Made available at the display centre on request |
| Reasonable and feasible | Consideration of best practice taking into account (as applicable): Benefit of proposed measures, technological and associated operational application in the NSW/Australian context. 'Feasible' relates to engineering considerations and what is practical to build. 'Reasonable' relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and nature and extent of potential improvements. |
| Representations Report | *'Windsor Road Upgrade South Creek flood evacuation route Representations Report'* prepared by RTA Operations for the RTA, dated December 2002 |
| RTA | Roads and Traffic Authority |
| Sensitive Noise Receivers | Institutions including schools, hospitals, nursing homes and places of worship. |
| Substantial Construction | Does not include survey, acquisitions, fencing, test drilling/test excavations, building/road dilapidation surveys, minor surveys, minor clearing except where endangered ecological communities or threatened flora or fauna species would be impacted, establishment of site compounds in generally cleared, highly disturbed or non environmentally sensitive areas, minor access roads, minor adjustments to services/utilities and other minimal environmental/community impact activities. |

## General

1. The project shall be carried out in consistent with:

   (a) the project contained in the Environmental Impact Statement (EIS) and as modified by the Representations Report;
   (b) all identified Sub Plans, safeguards and mitigation measures identified in the EIS and Representations Report;
   (c) the Director-General's Report; and,
   (d) the Conditions of Approval granted by the Minister.

   In the event of any inconsistency with the project as described in the documents referred to above, the Conditions of Approval granted by the Minister shall prevail.

   These Conditions do not relieve the Proponent of the obligation to obtain all other approvals and licences from all relevant authorities required under any other Act. Without affecting the generality of the foregoing, the Proponent shall comply with the terms and conditions of such approvals and licences.

   It shall be the ultimate responsibility of the Proponent to ensure compliance with all Conditions of Approval granted by the Minister.

## Compliance

*General*

2. The Proponent shall comply with, or ensure compliance with, all requirements of the Director-General in respect of the implementation of any measures arising from the conditions of this Approval. The Proponent shall bring to the attention of the Director-General any matter that may require further investigation and the issuing of instructions from the Director-General. The Proponent shall ensure that these instructions are implemented to the satisfaction of the Director-General within such time that the Director-General may specify.

3. Where in any Condition of Approval any action cannot be done without the Proponent first having prepared any document or having obtained any approval (the "Pre-Condition"), that action may be done for a particular worksite, stage or preliminary works (the "Work") if the "Pre-Condition" has been satisfied for that Work.

*Pre-Construction Compliance Report*

4. At least one month prior to commencement of substantial construction (or within such period as otherwise agreed by the Director-General), the Proponent shall submit a report detailing how all conditions to be addressed prior to substantial construction have been complied with. The project must not commence until the Proponent has been advised in writing that the Director-General has approved the Pre-Construction Compliance *Report*.

   This Report shall provide the following information as a minimum:

   (a) details demonstrating how the activities leading up to substantial construction have been addressed. Amongst other matters, these activities shall include:
      (i) nomination and approval of Environmental Management Representative;
      (ii) site surveying (assuming no clearance or site works are required),
      (iii) establishment of the complaints management system and Community Involvement Plan required under this approval;
      (iv) advertisement of activities;
      (v) design and safety investigations, flora and fauna management, urban design and landscaping, noise and vibration management, dust management, soil and water management and traffic and spoil management requirements;
      (vi) EMP preparation;
      (vii) communications with Department of Planning and other relevant agencies; and,
      (viii) compliance with all relevant Conditions of Approval.
   (b) a timeframe indicating when each of the conditions was complied with. This may include dates of submissions of the various studies and/or approval dates;
   (c) conditions placed on any approvals or licences issued by other agencies and actions taken (or proposed) to satisfy the requirements of approvals and/or studies; and,
   (d) a plan indicating how the conditions which apply to the construction stage will be satisfied.

| |
|---|
| *Note:*<br>*If construction is undertaken in discrete stages then a Pre-Construction Compliance Report will need to be prepared in accordance with Condition 4 for each stage* |

*Pre-Operation Compliance Report*

5. At least one month (or within such period as otherwise agreed by the Director-General) prior to commencement of operation of any part of the project, the Proponent shall submit a *Compliance Report* for approval of the Director-General. This report shall detail how all conditions that apply prior to commencement of operation have been complied with. The report shall provide the following information as a minimum:

   (a) details demonstrating how each condition was satisfied during construction;
   (b) a timeframe indicating when each condition was complied with. This may include dates of submissions of the various studies and/or requirements of various relevant conditions, approval dates, completion of any necessary works etc;
   (c) summaries of major issues raised through the ongoing community consultation process and how these issues were addressed;
   (d) summaries of major environmental issues, how they were managed, and lessons learned;
   (e) Conditions placed on any approvals or licences issued by other agencies and action taken (or proposed) to satisfy the requirements of approvals and/or studies; and,
   (f) a plan indicating how the Conditions which apply during the operation stage will be satisfied.

> *Note:*
> *The Director-General shall provide a response within 1 month of receiving the Pre-Construction Compliance Report required by Condition 4 or the Pre-Operation Compliance Report required by Condition 5. The Director-General may request additional information if the report is considered incomplete. In such cases, the time between the date on which the Proponent receives the request, and the date on which the additional information is provided to the Director-General, shall not be taken into account in the 1 month period. The Director-General shall make any requests for additional information within 2 weeks of receipt of the Pre-Construction Compliance Report or the Pre-Operation Compliance Report from the Proponent.*

**Project Commencement**

6. The Proponent shall notify the Director-General and all relevant authorities in writing at least 1 week prior to commencement of construction and operation. For the purposes of assessing compliance with these Conditions, the Proponent shall explicitly identity a date for construction and a date for substantial construction.

**Dispute Resolution**

7. The Proponent shall endeavour, as far as possible, to resolve any dispute between relevant public authorities arising out of the implementation of the Conditions of this Approval. Should this not be possible, the matter shall be referred firstly to the chief executives/director generals of the agencies involved. If the matter cannot be resolved at that level, then it shall be referred to the Minister for resolution. The Minister's determination of the disagreement shall be final and binding on all parties.

**Complaints Management System**

8. The Proponent shall implement a system (supported by adequate resources) prior to the commencement of construction which ensures all complaints received during construction are

recorded and managed as expeditiously as possible. Minimum requirements of the Complaints Management System include:

(i) a 24 hour, toll free telephone number listed with a telephone company and publicised. This telephone number shall enable any member of the public to reach a person who can arrange appropriate responses to the complaint(s) being made;
(ii) adequate resourcing including human resources, communication and transport etc.;
(iii) an appropriate person(s) to receive, log, track and respond to complaints within the specified timeframe. The name and contact details of the nominated person(s) shall be provided to HCC, relevant authorities and the Director-General upon appointment or upon any changes to that appointment;
(iv) details of all complaints received during construction are to be recorded and at least a verbal response, unless the complainant agrees otherwise, on what action is proposed to be undertaken is required within (2) two hours during any night-time works and 24 hours during standard hours or non-construction times;
(v) a process for the provision of a more detailed response to the complainant within 10 days, if additional information exists (over and above that provided in the initial response);
(vi) appropriate management structures to allow effective resolution of complaints; and,
(vii) a mediation system to ensure that all complaints are satisfactorily addressed to the greatest extent practicable. Where external or independent mediation is required, the mediator is to be approved by the Director-General.

Information on all complaints received, including the means by which they were addressed and whether resolution was reached with or without mediation shall be included in the regular Environmental Monitoring Reports and shall be made available upon request.

**Publicising Activities**

9. Prior to the commencement of construction, and at regular intervals as specified in the Community Involvement Plan, the Proponent shall publicise in relevant local newspapers, the nature of the works proposed for the forthcoming period, the areas in which these works are proposed to occur, the hours of operation and a contact telephone number.

The Proponent shall ensure that the local community and businesses are kept informed (by appropriate means such as: newsletters, leaflets, newspaper advertisements, community noticeboards, etc.) of the progress of the project, including any traffic disruptions and controls, construction of temporary detours and work required outside the nominated working hours, in particular noisy works, prior to such works being undertaken.

10. The proponent shall publicise the project on its internet site. The internet site shall be maintained until 12 months after opening of the project to traffic. This internet site shall contain three (3) monthly updates of work progress, consultation activities and a planned work schedule, including but not limited to:

(a) a description of relevant approval authorities and their areas of responsibility;
(b) a list of reports and plans that are publicly available under this Approval and the executive summaries of those reports;
(c) minutes of community liaison group meetings;
(d) contact names and phone numbers of the project communications staff; and,
(e) the 24 hour toll-free complaints contact telephone number.

Updates of work progress, construction activities and planned work schedules shall be provided more frequently where significant changes in noise impacts are expected.

**Communication and Consultation**

*Community Involvement Plan*

11. The Director-General may waive the specific requirements for consultation as specified in Conditions 12 through 15 for preliminary works provided that the Director-General is satisfied that appropriate community consultation has been undertaken and subject to the approval of a specific Consultation Plan for the preliminary works.

12. The Proponent shall prepare a Community Involvement Plan for the construction period to be set in place prior to commencement of construction. The Community Involvement Plan shall set out the community communications and consultation procedures and protocols for the project, which shall comply with the obligations under the approval from the Minister, other approvals, licences and permits. The Plan shall also include but not be limited to:

    (a) details of the communication protocols and procedures and consultation team appointed to manage and implement the Plan during the construction period including qualifications and experience;
    (b) details of the role of the Independent Community Liaison Representative (ICLR) and demonstration of how the independence of this representative will be maintained;
    (c) a crisis and issues management plan identifying the range of consultation activities to be undertaken to minimise community reaction to construction activities;
    (d) the maintenance and updating of the established stakeholder database including:
        (i) identification of the local community likely to be affected by the project;
        (ii) identification of residences, businesses and other sensitive land uses; and,
        (iii) the specific communication needs of this community (i.e. language translation, disabled access etc);
    (e) procedures for the establishment and functioning of the Community Liaison Group in accordance with Condition No. 13;
    (f) procedures for informing users of the affected road network of planned traffic arrangements including temporary traffic switches;
    (g) procedures for informing the local community of planned investigation and construction activities;
    (h) provisions for dealing with complaints (particularly night time) and response requirements as specified in Condition No. 8. This should include the respective protocols for the EMR, ICLR, Contractors, and any other relevant stakeholders in handling complaints and independent dispute resolution;
    (i) provision for the Proponent's attendance and participation in all groups and public meetings forming part of the Community Involvement Plan; and
    (j) the provision of training for all employees and sub-contractors on the requirements of the Community Involvement Plan.

*Community Liaison Group*

13. One Community Liaison Group (CLG) shall be formed prior to the commencement of substantial construction. The purpose of the CLG is to discuss project issues and methods for minimising

impacts on the local community during construction and implementation of the project. The CLG shall include the EMR, representatives from the RTA, representative from the contractor(s), the ICLR, relevant local community groups, community representatives and HCC unless otherwise agreed by the Director-General.

The Proponent shall:

(a) consider the Guidelines for the Establishment of the CLG (see Attachment 1);
(b) nominate a Chair to be approved by the Director-General;
(c) allow the CLG to make comments and recommendations about the Construction EMP and monitor compliance with this approval and other matters relevant to construction. In the event of any dispute between the Group and the Proponent, the Proponent's decision shall be considered final so long as it is consistent with these Conditions;
(d) ensure that the CLG has access to the necessary plans and information;
(e) consider the recommendations and comments of the CLG and provide a response to the CLG and the Director-General; and,
(f) unless otherwise agreed to by the Director-General the CLG shall be maintained for at least 6 months after the opening the project to traffic.

The Proponent shall review the need, relevance, effectiveness and membership of the CLG at 6 monthly intervals or at other times agreed by the Director-General. Following this review and, if justified, the Proponent shall seek the approval of the Director-General to dissolve the CLG. The Proponent shall bear all costs associated with the establishment and ongoing function of the CLG.

*Independent Community Liaison Representative*

14. The Director-General shall approve the appointment of the person(s) nominated by the Proponent to serve as the Independent Community Liaison Representative (ICLR), at least one month prior to the commencement of construction. In considering the appointment the Director-General shall take into account the qualifications of the ICLR particularly their experience in facilitation, mediation and dispute resolution. The ICLR shall serve for the duration of construction.

The role of the ICLR will include but not be limited to:

(a) monitor and confirm that the Proponent meets all the communication and consultation obligations outlined in the approved Community Involvement Plan and as they arise during the course of the project;
(b) attend CLG meetings;
(c) be available for direct contact from the community during all hours that construction works are undertaken;
(d) draw to the attention of the EMR and the Proponent all community complaints and issues; and,
(e) assist the Proponent to mediate the resolution of disputes that can not be resolved by the EMR or the Proponent in consultation with the community.

The Proponent shall bear the cost of employing the ICLR.

*Display Centre*

15. A display shall be established no later than three (3) months prior to substantial construction and maintained at least until opening the project to traffic. The display shall be open between 9:00 am

and 5:00 pm Monday to Friday. Up-to-date photographs, diagrams, samples and other suitable material shall be provided at the display centre, covering at least:

(a) noise and retaining wall locations, details and finishes;
(b) landscape and urban design concepts, cross section treatments, perspective views and details; and,
(c) temporary works affecting businesses, residences, pedestrians and public transport users.

A dedicated personal computer at which members of the public can access the project internet site shall be provided at the display. A contact phone number for additional construction information from project personnel should be provided.

**Environmental Management**

*Environmental Management Representative*

16. Prior to the commencement of construction, the Director-General shall approve the appointment of the person nominated by the Proponent to serve as the Environmental Management Representative (EMR). In considering the appointment, the Director- General shall take into account:

(a) the qualifications and experience of the EMR including demonstration of general compliance with AS/NZS ISO 14012:1996 *Guidelines for Environmental Auditing : Qualification Criteria for Environmental Auditors*;
(b) the role and responsibility of the EMR; and
(c) the authority and independence of the EMR including details of the Proponent's internal reporting structure.

The EMR shall have responsibility for:

(i) considering and advising the Proponent on matters specified in the conditions of approval and compliance with such;
(ii) certifying the environmental/community impacts as minor for all activities defined by the Proponent as not constituting substantial construction;
(iii) endorsing the Construction EMP in accordance with Condition 18;
(iv) reviewing and approving the Proponent's induction and training program for all persons involved in the construction activities and monitor implementation;
(v) periodically monitoring the Proponent's environmental activities to evaluate the implementation, effectiveness and level of compliance of on-site construction activities with the Construction EMP and associated plans and procedures, including carrying out site inspections at least fortnightly;
(vi) reporting monthly to the Director-General;
(vii) recording and providing a written report to the Proponent of non-conformances with the Construction EMP and require the Proponent to undertake mitigation measures to avoid or minimise any adverse impacts on the environment or report required changes to the Construction EMP;
(viii) directing the Proponent to stop work immediately, if in the view of the EMR an unacceptable impact on the environment is likely to occur, or require other reasonable steps such as the authorisation of hold points to be taken to avoid or minimise any adverse impacts;
(ix) reviewing corrective and preventative actions to ensure the implementation of

recommendations made from the audits and site inspections;
(x) reviewing minor revisions to the Construction EMP;
(xi) providing reports to the Department on matters relevant to the carrying out of the EMR role as necessary including notifying the Director-General of any stop work notices; and,
(xii) endorsing the Operational Monitoring and Maintenance System in accordance with Condition 21.

The EMR shall immediately, and at the same time, advise the Proponent and the Director-General of any major issues resulting from the construction of the project that have not been dealt with expediently or adequately by the Proponent.

The EMR shall be available during construction activities at the site and be present on-site during any critical construction activities as identified in the Construction EMP.

*Environmental Management System*

17. The Proponent shall appoint construction head contractors that have a demonstrated capability and experience in the implementation of an Environmental Management System prepared in accordance with the AS/NZS ISO 14000 series or BS7750-1994 certified by an accredited certifier and/or has a proven environmental management performance record.

*Construction Environmental Management Plan*

18. Prior to the commencement of substantial construction, a Construction Environmental Management Plan (Construction EMP) shall be prepared, following consultation with the EPA, DLWC, HCC and where relevant utility/service providers. The Construction EMP shall be prepared in accordance with the Conditions of this Approval, all relevant Acts and Regulations and accepted best practice.

    The Construction EMP shall require approval by the Director-General prior to the commencement of substantial construction or within such time as otherwise agreed to by the Director-General. The Construction EMP shall be endorsed by the EMR as being in accordance with the Conditions of Approval and all undertakings made in the EIS and Representations Report prior to seeking approval of the Director-General.

    Where construction activities are undertaken in discrete stages, the Proponent may prepare a staging schedule to the satisfaction of the Director-General. Individual EMPs relating to specific stages of construction may then be prepared in accordance with the approved schedule.

    The Construction EMP shall:

    a) address construction activities associated with all key construction sites, including staging and timing of the proposed works;
    b) cover specific environmental management objectives and strategies for the main environmental system elements and include, but not be limited to: flora and fauna; noise and vibration; air quality; water; erosion and sedimentation; access and traffic; property acquisition and/or adjustments; heritage; groundwater; salinity; contaminated spoil, spoil stockpiling and disposal; waste/resource management; flooding and stormwater control; visual screening; landscaping and rehabilitation; hazards and risks; energy use, resource use and recycling; and utilities; and,
    c) address, but not be limited to:

i) identification of the statutory and other obligations which the Proponent is required to fulfil during project construction including all approvals and consultations/agreements required from other authorities and stakeholders and key legislation and policies which control the Proponent's construction of the project;
ii) construction activities and processes associated with the relevant construction site(s), including staging and timing of the proposed works;
iii) length (time) of construction;
iv) specific hours of operation for all key elements including off-site movements;
v) locational details of important elements such as: temporary noise barriers; sedimentation basins and facilities; detention basins and/or constructed wetlands; portable offices and amenities; truck, plant and materials storage; access locations; provision of site hoardings etc;
vi) definition of the role, responsibility, authority, accountability and reporting of personnel relevant to compliance with the EMP;
vii) measures to avoid and/or control the occurrence of environmental impacts;
viii) the role and responsibility of the EMR;
ix) monitoring, inspection and test plans for all activities and environmental qualities which are important to the environmental management of the project, including performance criteria, specific tests, protocols (eg. frequency and location) and procedures to follow;
x) environmental management instructions for all complex environmental control processes which do not follow common practice or where the absence of such instructions could be potentially detrimental to the environment;
xi) the construction sub plans required under this approval;
xii) steps the Proponent intends to take to ensure that all plans and procedures are being complied with;
xiii) consultation requirements with relevant government agencies; and
xiv) community consultation and notification strategy (including local community, relevant government agencies and HCC), and complaint handling procedures.

Specific requirements for some of the main environmental system elements referred to in (b) shall be as required under the conditions of this Approval and/or as required under any licence or approval.

The Construction EMP(s) shall be made publicly available.

*Note:*
*The Director-General shall provide a response to the Construction EMP within one (1) month of receipt of all relevant information from the Proponent assuming receipt of adequate and sufficient information. If a request is made by the Director-General for additional information, the period of time that elapses between the date on which the Proponent receives the request and the date on which the additional information is provided to the Director-General, shall not be taken into account in the one (1) month period referred to above.*
*The consultation period for government agencies should be a minimum of one (1) month after receipt of all relevant information unless otherwise agreed by the agency.*

**Environmental Monitoring – Construction**

19. The Proponent shall submit to the Director-General reports in respect of the environmental performance of the construction works and compliance with the Construction EMP and any other

relevant conditions of this approval. The Reports shall be prepared six months after the start of construction and thereafter at six monthly intervals or at other such periods as requested by the Director-General to ensure adequate environmental performance over the duration of the construction works.

The Reports shall be submitted no later than one month after the six month period to which they apply and are to be certified by the EMR to confirm that all EMP requirements and Approval conditions have been complied with.

The Report(s) shall include, but not be limited to, information on:

a) applications for consents, licences and approvals, and responses from relevant authorities;
b) implementation and effectiveness of environmental controls and conditions relating to the work undertaken;
c) identification of construction impact predictions made in the EIS and any supplementary studies and details of the extent to which actual impacts reflected the predictions;
d) details and analysis of results of environmental monitoring;
e) the number and details of any complaints, including a summary of main areas of complaint, action taken, response given and intended strategies to reduce complaints of a similar nature;
f) the plan to be adopted for the project to ensure continued compliance over the coming six month period; and,
g) any other matter relating to the compliance with the conditions of this approval or as requested by the Director-General.

The report(s) shall be provided to the EPA, DLWC and HCC, and any other relevant government agencies nominated by the Director-General. The report(s) shall also be made publicly available.

20. The Proponent shall ensure that it has an internal audit system and that internal audits are undertaken and endorsed by the EMR every three (3) months to ensure compliance with the EMP, the conditions of approval and all other relevant licences and approvals. Each audit must be completed within 6 weeks of the end of the 3 month period and be made available to the Director-General upon request.

**Operational Maintenance and Monitoring**

21. The Proponent shall ensure that systems for operational maintenance and monitoring are in place prior to the opening of the project to traffic. Those systems shall be subject to consultation with the EPA, DLWC, HCC and any other relevant government agency and approved by the Director-General. The systems shall be consistent with the Conditions of this Approval, all relevant Sub Plans, all relevant Acts and Regulations and accepted best practice management.

The systems shall be endorsed as being in accordance with the Conditions of Approval by the EMR prior to seeking approval of the Director-General.

The systems shall address at least the following:

(a) identification of the statutory and other obligations which the Proponent is required to fulfil, including all licences/approvals and consultations/agreements required from authorities and other stakeholders and key legislation and policies which control the Proponent's operation of the project;

(b) monitoring, inspection and test plans for all activities and environmental qualities which are important to the environmental performance of the project during its operation, including a description of potential site impacts, performance criteria, specific tests and monitoring requirements, protocols (eg. frequency and location) and procedures to follow;
(c) steps the Proponent intends to take to ensure compliance with all plans and procedures. For example, in the event of a spill, how the Proponent shall ensure that all material spilled is removed as soon as practicable and within at least 24 hours;
(d) consultation requirements, including relevant government agencies, the local community and Councils, and complaints handling procedures; and,
(e) strategies for managing the main environmental impacts including, but not limited to: noise; water quality; erosion and sedimentation; access and traffic; waste/resource management/removal/disposal; hydrology and flooding; visual screening, landscaping and rehabilitation; hazards and risks; and energy use, resource use and recycling.

Specific requirements for some of the main environmental system elements referred to in (e) shall be as detailed under the Conditions of this Approval and/or as required under any licence or approval. The arrangements shall be publicly available.

*Note:*
*The Director-General shall provide a response to the proposed operational maintenance and monitoring systems within one (1) month of receipt of all relevant information from the Proponent assuming receipt of adequate and sufficient information. If a request is made by the Director-General for additional information, the period of time that elapses between the date on which the Proponent receives the request and the date on which the additional information is provided to the Director-General, shall not be taken into account in the one (1) month period referred to above.*

**Environmental Impact Audit Report**

22. An Environmental Impact Audit Report shall be submitted to the Director-General, 12 months and 2 years from the project opening to traffic or as otherwise agreed to by the Director-General. The Environmental Impact Audit Report shall be prepared by an independent person(s) or organisation approved by the Director-General and paid for by the Proponent. The Report shall assess the key impact predictions made in the EIS and any supplementary studies and detail the extent to which actual impacts reflect the predictions. The Report shall provide details on actual versus predicted impacts for all key issues identified in the EIS. The suitability of implemented mitigation measures and safeguards shall also be assessed

The Report shall discuss results of consultation with the local community in terms of feedback/complaints and issues of concern raised in relation to the operational phase of the project. The Proponent shall comply with all reasonable requirements of the Director-General, in consultation with the EPA and other relevant authorities with respect to any reasonable measure arising from, or recommendations in, the Report.

The Report shall be made publicly available.

## Road Design

23. The Proponent shall investigate the intersection designs and alignment alternatives, with their resulting impacts, for Forbes Street between Day and Macquarie Street. Design investigation shall be conducted in consultation with the affected community and HCC. The report shall be submitted to the Director-General for approval within six months of the date of this Approval or otherwise agreed by the Director-General. The findings of the report are to be incorporated into the detailed design. The investigation shall include but not be limited to the following:

    (a) adjusting the alignment of Forbes Street ;
    (b) consider provision of a service road for Forbes Street;
    (c) the use of alternative noise treatments, if appropriate; and
    (d) alternatives to the proposed intersection at Forbes Street and Macquarie Street to improve safety and capacity characteristics.

    In assessing design alternatives the Proponent shall consider the recommendations of the Director Generals Report in relation to safety (including the findings of the Safety Audit required under Condition 28), noise impacts, visual impacts and access.

24. The proponent shall investigate the Day Street extension and the Mileham Street intersection alignment to reduce impacts on adjacent properties. The design investigation shall be conducted in consultation with the affected community and HCC. The findings of the report are to be incorporated into the detailed design. The report shall be submitted to the Director-General for approval within six months of the date of this Approval or as otherwise agreed by the Director-General.

    The investigation shall include but not be limited by the following:

    (a) moving the Day Street Extension;
    (b) a heritage study identifying the additional heritage impacts on Trevallyn; and
    (c) retaining connectivity of the footway, road and access to driveways within the established urban form.

    In assessing design alternatives, the Proponent shall consider recommendations of the Director-General's report in relation to access and visual impacts on the residential properties of Mileham Street.

25. An independent qualified urban designer shall be approved by the Director-General and funded by the RTA to assist with implementation of the finding of the urban design investigations required under Condition 26 and the assessment of urban design aspects of the final detailed design or if appropriate the tender proposals.

26. The Proponent shall investigate refinements to the urban design features of the Windsor Flood Evacuation Route prior to construction of the project. A report investigating alternative design options, including a preferred design, shall be submitted for approval to the Director-General six (6) months after approval or as otherwise agreed by the Director-General.

    The investigation shall include, but not be limited to the following:

    (a) design of structure that reduce contact with the ground surface;

(b) form, colour and texture of retaining walls and bridge structure;
(c) investigate the provision of bridge structures where appropriate, including primary locations over the flood plain; and
(d) investigate other design and/or landscape measures to ameliorate the visual impacts of the proposal.

In assessing design alternatives the Proponent shall consider the recommendations of the Director Generals Report in regard to minimising visual impacts of the structure across the flood plain.

*Note:*
*The objective of the investigation shall be to reduce the bulk and scale of the project and minimise visual impacts on surrounding urban areas.*

*The Director-General shall provide a response to the preferred urban design features within four (4) weeks of receipt of all relevant information from the Proponent assuming receipt of adequate and sufficient information. If a request is made by the Director-General for additional information, the period of time that elapses between the date on which the Proponent receives the request and the date on which the additional information is provided to the Director-General shall not be taken into account in the four (4) weeks period referred to. Any requests for additional information by the Director-General shall be made within one (1) week of receipt of all relevant information from the Proponent.*

27. The RTA is to work with State Rail Authority and Rail Infrastructure Corporation to develop a strategy to enhance the commuter parking facilities and amenity of Mulgrave Station Precinct. An urban design strategy is to be produced, outlining processes to improve the amenity of the Mulgrave Station Precinct. The design strategy must address issues including, but not limited to, safety and accessibility. The design strategy is to be completed within 1 year of opening the proposal to traffic or in a time period approved by the Director-General.

28. The Proponent shall undertake a Safety Audit to ensure compliance with RTA's *Road Design Guide* and Austroads' *Guide to Traffic Engineering Practice for the proposed design*.

29. Detailed design of the South Creek bridge crossing is to be undertaken in accordance with relevant policies of NSW Fisheries (Policy and Guidelines for Bridge, Roads, Causeways and Culverts and similar Structures 1999) and the DLWC (NSW State Rivers and Estuaries Policy). Construction methodology and design of the crossing of South Creek, which shall include erosion and sedimentation control, bridge/pier design, scour protection, dry land connectivity and rehabilitation, shall be developed in consultation with DLWC and NSW Fisheries.

## Property Impacts

*Pre-Construction*

30. Subject to landowner agreement, building condition surveys shall be conducted on all buildings/structures within 50 metres of construction activities that cause vibration. The surveys shall be completed prior to the commencement of construction works that may affect building condition. Surveys need not be completed where a geotechnical and vibration analysis endorsed by a qualified geotechnical engineer concludes that these structures will not be affected.

31. The owners of all properties to be surveyed, as identified in Condition 30, are to be advised at least fourteen days prior to the commencement of surveys of the scope and methodology of the survey and the process for making a claim regarding property damage. A copy of the survey shall be given to each affected owner at least three weeks prior to the commencement of construction. A register of all properties surveyed shall be maintained by the Proponent and provided to the Director-General upon request.

32. The Proponent shall consult on a regular basis with all directly affected landowners regarding any practical and cost-effective measures to minimise impacts which may be implemented prior to the commencement of construction affecting properties or within such time as agreed with the relevant landowner.

*Construction*

33. Any damage to buildings, structures, lawns, sheds, gardens, fencing, etc. as a result of any construction activity direct or indirect (including vibration and groundwater changes) shall be rectified at no cost to the owner(s).

**Pedestrians and Cyclists**

34. The Proponent shall provide or upgrade existing shared pedestrian and cycleway facilities between Mulgrave and Windsor. The pedestrian and cycleway network shall include a shared pedestrian/cycleway beside Windsor Road and shoulders along the proposed evacuation route for cyclists. The routes shall be constructed in accordance with Austroads *Guide to Traffic Engineering Practice – Bicycles* and must be completed before the Windsor Flood Evacuation Road is opened to traffic.

35. The Proponent shall undertake a community education plan to discourage pedestrian traffic using the Windsor Flood Evacuation Route and encourage the use of the pedestrian way along Windsor Road. The plan shall be developed in consultation with HCC, Windsor High School and the local community. The plan shall include but not be limited to:
    - Signage at Windsor High School;
    - Signage at Windsor Shopping centre; and
    - Pamphlets and maps of the routes.

    This program is to be undertaken prior to the opening of the Windsor Flood Evacuation Route.

36. The Proponent is to undertake appropriate steps, including the erection of signage at both ends of the Windsor Flood Evacuation Route, to restrict pedestrian usage of it. The adequacy of the signage and associated processes in restricting pedestrian access is to be reviewed and modified as appropriate after 12 months of operation of the Windsor Flood Evacuation Route.

**Construction Traffic**

*Pre-Construction*

37. A road dilapidation report shall be prepared for all non-arterial roads likely to be used by construction traffic prior to commencement of substantial construction and after construction is

complete. A copy of the reports shall be provided to HCC. Any damage resulting from the construction of the project, aside from that resulting from normal wear and tear, shall be repaired at the cost of the Proponent in consultation with HCC.

38. The Proponent shall consult HCC to develop management techniques for construction traffic on local roads, prior to the commencement of substantial construction. The Proponent shall monitor the use of local roads by construction heavy vehicle traffic in consultation with HCC and shall consult with HCC to develop measures to minimise and/or restrict use of local roads by heavy vehicle traffic if so required.

39. A detailed Construction Traffic Management Sub Plan shall be prepared as part of the Construction EMP in consultation with HCC where local roads are affected. The Sub Plan shall include, but not be limited to:

    (a) identifying measures to minimise impacts on existing traffic (including pedestrians, vehicles, cyclists and disabled persons) including the staging of construction works to minimise lane closures during peak periods and delay to traffic;
    (b) identifying access points for construction sites;
    (c) delineating truck ingress and egress routes, entry and exit locations and the nature of loads;
    (d) identifying temporary and interim traffic arrangements including intersection and property access;
    (e) the provision of barriers between working and trafficked areas;
    (f) preparation of response plan which sets out the proposed response to any traffic, construction or other incident; and
    (g) appropriate review and amendment mechanisms.

    This Sub Plan shall be fully integrated with the Spoil and Fill Management Sub Plan required under Condition 92.

*Construction Management*

40. The Proponent shall ensure that legal access to all properties is maintained during construction and following opening the project to traffic. The Proponent shall ensure that any legal access affected by the project is reinstated to an equivalent standard or that adequate compensation is negotiated with the relevant landowner(s).

41. The Proponent shall ensure that all businesses affected by altered traffic arrangements are consulted at least 10 days prior to affectation and shall endeavour where reasonable and feasible to maintain critical access at all times.

42. The Proponent shall investigate the provision of bus pick-up and drop-offs from a central location(s) for each shift and car-pooling mechanisms to minimise worker traffic generation and parking requirements during construction. The Proponent shall incorporate any recommendations from this investigation into the Construction Traffic Management Sub Plan required under Condition 39.

43. The Proponent shall construct an underpass for the two Mitre10 sites neighbouring Forbes Street. The aim of the underpass is to provide connectivity between the two sites for typical traffic using the site. The design of the underpass shall be developed in agreement with Mitre10.

## Flora and Fauna

### *Pre-Construction*

44. A detailed Flora and Fauna Management Sub Plan shall be prepared prior to substantial construction for construction and operation in consultation with the NPWS, HCC, DLWC and NSW Fisheries and incorporated in the EMP. The Plan shall be prepared to the satisfaction of the Director-General. The Plan shall clearly show how the mitigation measures identified in the EIS and the Representations Report will be implemented during construction and operation. The Plan shall be prepared by an appropriately qualified and experienced ecologist and clearly incorporate 'best practice' management of native flora and fauna. The Plan shall include, but not be limited to:

    (a) the characteristics and location of the terrestrial and aquatic flora and fauna communities in the vicinity of the project;
    (b) procedures and timing for the clearance of vegetation and use of soil for construction including identification of requirements for seed collection;
    (c) procedures for pre-clearing fauna surveys of trees and understorey;
    (d) detailed plans and maps of the construction footprint, areas to be cleared, important habitat areas, threatened species locations, and vegetation type and location;
    (e) requirements to fence off and appropriately sign areas containing significant vegetation prior to construction;
    (f) strategies for minimising vegetation clearance within the worksite where possible and complete protection of vegetated areas outside the worksite; and
    (g) a program and methodology for reporting on the effectiveness of terrestrial and aquatic flora and fauna management measures against performance goals.

45. The Flora and Fauna Management Sub Plan shall include a Revegetation Plan to be prepared prior to substantial construction in consultation with the NPWS, DLWC, HCC, NSW Fisheries and local Landcare/community groups. The Plan shall be prepared by a suitably qualified professional and shall be to the satisfaction of the Director-General. The Plan shall include, but not be limited to:

    (a) application of the Action Plan of the Hawkesbury-Nepean Environmental Planning Strategy and DLWCs Draft Guidelines for the Preparation of a Vegetation Management Plan;
    (b) design, location and construction of mitigation measures including where appropriate, nest boxes, salvaged trees containing hollows, glider and refuge poles, and any features associated with these mitigatory structures to encourage their use by fauna;
    (c) re-use of top soil, cleared vegetation and leaf mulch including weed eradication;
    (d) identification of native tree species to be retained where possible, particularly along South Creek;
    (e) procedures for on-site seed collection, transplanting of native species and replanting and rehabilitation of indigenous species, using materials that have been obtained from the site;
    (f) measures to use any surplus vegetation shall be identified including donation to community groups and distribution to the local community;
    (g) strategies for temporary and progressive revegetation which include measures to reduce air quality impacts;
    (h) a program for the active management and maintenance of all preserved, planted and rehabilitated vegetation (including aquatic vegetation) including watering regimes, fencing, replacement of vegetation that may have died and weed management;
    (i) integration with the Urban Design and Landscape Plan described in Condition 51;

(j) a program and methodology for reporting on the effectiveness of revegetation against performance goals; and
(k) details of the measures to be implemented to compensate for the clearance of endangered ecological communities, consistent with the principles developed by NPWS.

***Construction***

46. The Proponent shall ensure that no more than 1.5 hectares of significant vegetation communities/fauna habitat are cleared for construction as described in Table 12.2 of the EIS. Significant vegetation includes Alluvial Woodland, Shale/Gravel Transition Forest and vegetation surrounding farm dams. The Proponent shall ensure that no Freshwater Wetlands community is cleared. The final amount of clearing shall be verified by the EMR.

47. The Proponent shall ensure that the clearing of vegetation, where practicable, avoids riparian vegetation along South Creek as described in the EIS and Representations Report. Conserved riparian vegetation, replanted riparian vegetation and translocated riparian species shall be fenced off and marked with appropriate warning signage prior to construction commencing.

48. If, during the course of construction, the Proponent becomes aware of the presence of any threatened species which are likely to be significantly affected and are not recognised or addressed by this Approval, the Proponent shall stop any works that may impact on the threatened species and shall immediately consult with the Director-General and NPWS and/or NSW Fisheries as appropriate. Following this consultation, the Proponent shall meet all requirements as directed by the Director-General prior to recommencement of any works likely to affect any threatened species.

49. The clearing of vegetation shall be limited to areas that need to be used for construction of the project. Cleared vegetation must be re-used or recycled to the greatest extent practicable. No burning of cleared vegetation shall be permitted. Re-use options include removing millable logs, recovering fence posts, and mulching and chipping unusable vegetation waste for on-site use such as landscaping. All reasonable measures to use any surplus vegetation shall be undertaken including donation to community groups, distribution to the local community.

50. If permanent wetlands are constructed, macrophyte or water plant growth shall be undertaken within them, in accordance with the DLWC *Constructed Wetlands Manual*.

**Visual Impacts, Landscaping and Urban Design**

*Pre-Construction*

51. The Proponent shall prepare an Urban Design and Landscape Plan prior to the commencement of substantial construction in consultation with DLWC, HCC and the affected community and to the satisfaction of the Director-General. The Plan shall be prepared by a suitably qualified urban designer/landscape architect. The Plan shall present an integrated urban design concept for the project, applying all design principles established in the EIS and associated documents. The Plan shall identify the design and treatments for each element including but not limited to:

(a) location and identification of existing and proposed vegetation;
(b) outcomes as a result of Conditions –23-29;
(c) built elements including retaining walls, bridges and noise walls;
(d) underpasses considering lines of sight and the incorporation of appropriate lighting and

public art (e.g. art from school students);

(e) safety barriers, kerbs, paving, signage, medians, breakdown facilities and, if required, emergency phones;
(f) pedestrian and cycle elements including footpaths and paving, pedestrian crossings and fixtures (i.e. tree guards, seating, lighting, fencing and signage);
(g) landscape elements including proposed treatments, finishes and materials of exposed surfaces (including colour specifications and samples); and,
(h) lighting.

The Plan will also include:

(i) sections and perspective sketches;
(j) a schedule of species to be used in landscaping that includes the use of locally native species and specifies target survival rates for plantings;
(k) Weed Management Action Plan including but not limited to: scope of works, minimising physical disturbance, covering temporarily cleared surfaces with native vegetation mulch, re-vegetating cleared areas with local native plant species and regular removal of weeds and application of herbicide to newly establishing weed species;
(l) timing and staging of works, methodology, monitoring and maintenance;
(m) progressive landscape strategies incorporating other environmental controls such as erosion and sedimentation controls, dust mitigation, drainage; and,
(n) decommissioning of all construction stage structures that are not part of the operational project.

*Operation*

52. All landscaping works shall be monitored and maintained by a suitably qualified landscape specialist at the Proponent's expense for a period of not less than two years. The Proponent shall implement any required remediative measures to maintain landscaping works to a high standard. Any landscaping within the road reserve shall be maintained by the Proponent for the life of the project unless transferred to HCC through the road classification process.

*Specific Requirements*

53. No commercial advertising shall be permitted within the road reserve for the project during construction.

54. All lighting for the project shall be designed, installed and operated in accordance with the requirements of AS1158-Road Lighting and AS4282-Control of the Obtrusive Effects of Outdoor Lighting.

**Noise and Vibration**

*Construction*

*Construction Noise and Vibration Management Sub Plan*

55. A detailed Construction Noise and Vibration Management Sub Plan shall be prepared as part of the Construction EMP and shall be prepared prior to substantial construction in consultation with the EPA, HCC and CLG. The Plan shall be prepared to the satisfaction of the Director-General. The

Sub Plan shall provide details of noise and vibration controls to be undertaken during the construction. The Sub Plan shall include, but not be limited to:

(a) identification of each work area, site compound and construction depot;
(b) identification of the specific activities that will be carried out and associated noise sources for each work area, site compound and construction depot;
(c) identification of all potentially affected noise sensitive receivers including residences, schools, commercial premises and noise sensitive equipment;
(d) identification of the appropriate construction noise objective for the project with regard to the requirements of Condition No 57. This may require additional background noise monitoring;
(e) identification of appropriate construction vibration objectives with regard to the requirements of Condition No 62;
(f) determination of appropriate noise and vibration objectives for each identified noise sensitive receiver;
(g) assessment of potential noise and vibration from the proposed construction methods including noise from construction vehicles and noise impacts from traffic movements and required traffic diversions;
(h) detailed examination of all feasible noise mitigation measures including but not limited ;
    - maximising the offset distance between noisy plant items and nearby noise sensitive receivers;
    - avoiding using noisy plant simultaneously and/or close together, adjacent to sensitive receivers;
    - orienting equipment away from sensitive areas;
    - carrying out loading and unloading away from noise sensitive areas;
    - use of dampened tips on rock breakers;
    - use of portable enclosures around mobile and fixed plant where noise impacts are likely to be unacceptable;
    - using noise source controls to reduce noise from all plant and equipment including bulldozers, cranes, graders, excavators and trucks including the use of residential class mufflers. More examples of appropriate noise source controls are provided in Section 5 of the RTA Environmental Noise Management Manual;
    - selection of plant and equipment based on noise emission levels;
    - use of alternative construction methods;
    - temporary relocation of affected residents;
    - selecting site access points and roads as far as possible away from sensitive receivers; and
    - use of spotters, Closed Circuit Television Monitors and 'smart' reversing alarms in place of traditional reversing alarms.

(i) consideration of erecting operational stage noise mitigation measures prior to construction commencement;
(j) description of management methods and procedures that will be implemented to control noise and vibration during construction;
(k) description of specific noise mitigation treatments and time restrictions including respite periods, duration, and frequency;
(l) justification for any activities outside the normal hours specified in Condition No. 56;
(m) assessment and examination of potential feasible off-site mitigation measures for traffic noise (e.g. architectural treatments or off site barriers);
(n) construction timetabling, in particular works outside standard hours, to minimise noise impacts;

(o) a pro-active and reactive strategy for dealing with complaints including compliance with the construction noise and vibration objectives, particularly with regard to verbal and written responses specified in Condition No. 8;
(p) noise and vibration monitoring, reporting and response procedures;
(q) internal noise audit systems including recording of daily hours of construction, progressive impact assessments as the work proceeds, conducting informal checks by the EMR, providing active and continuous communication links to HCC, residents etc;
(r) procedures for notifying residents of construction activities that are likely to affect their noise and vibration amenity;
(s) additional noise mitigation measures as successfully negotiated with affected residents and other sensitive receptors;
(t) contingency plans to be implemented in the event of non-compliances and/or noise and vibration complaints; and,
(u) education of construction personnel about noise minimisation.

With respect to (h) above, the Proponent shall consider the use of a range of structural and non-structural measures during construction including barriers, acoustic treatment of residences, scheduling of construction activities to minimise impacts and temporary relocation of affected residents. The Proponent shall ensure that the mitigation measures referred to in the EIS and in these Conditions are incorporated into the Sub Plan.

*Construction Hours*

56. All construction activities, shall be restricted to the hours of 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays.

Works outside these hours that may be permitted include:

(a) any works which do not cause noise emissions to be audible at any nearby residential property;
(b) the delivery of materials which is required outside these hours as requested by Police or other authorities for safety reasons;
(c) emergency work to avoid the loss of lives, property and/or to prevent environmental harm; and
(d) any other work as approved through the Construction Noise and Vibration Management Sub Plan process.

In relation to (d) above, local residents should be informed of the timing and duration of approved works at least 48 hours prior to commencement.

*Construction Noise Guidelines*

57. The construction noise objective for the project shall be to manage noise from construction activities as measured by a $L_{A10\ (15minute)}$ descriptor to not exceed the background $L_{A90}$ noise level by more than 5dB(A) at any residence or other noise sensitive receiver. The Proponent shall ensure that all feasible noise mitigation and management measures are implemented with the aim to achieve the construction noise objective. Any potential activities that may cause noise emissions that exceed the objective shall be identified and managed in accordance with the Construction Noise and Vibration Management Sub Plan required by Condition 55.

For the purposes of the noise objective for this Condition, 5dB(A) must be added to the measured construction noise level if the noise from the activity is substantially tonal or impulsive in nature in

accordance with Chapter 4 of the *NSW Industrial Noise Policy*.

*Construction Noise Management*

58. The Proponent shall ensure that no public address systems are used at any construction sites outside standard working hours detailed in Condition No 59 unless otherwise specified in the Construction Noise and Vibration Management Sub Plan. Any public address system shall be designed to minimise noise spillage off-site by incorporating best practice features and equipment such as directional speakers, volume control with background noise adjustments and locating and pointing speakers away from sensitive receivers.

59. The Proponent shall ensure that rock breaking, rock hammering, sheet piling and any other similar works does not exceed the noise levels as specified in the Construction Noise and Vibration Management Sub Plan unless otherwise agreed by the Director-General. These works should only be scheduled between the following hours:

    (a) 8 am to 12 pm (noon), Monday to Saturday; and
    (b) 2 pm to 5 pm Monday to Friday.

60. To minimise noise impacts during construction, the Proponent shall consult with HCC and affected landowners and where feasible, erect operational noise mitigation measures prior to the commencement of construction.

61. The Proponent shall consult with affected educational institutions and minimise the impact of noise generating construction works in the vicinity of affected buildings. The Proponent shall ensure that high noise construction works are not timetabled during important events such as HSC examination periods, unless other arrangements acceptable to the affected institutions are made at no cost to the affected institutions.

*Vibration Criteria*

62. Vibration resulting from construction of the project shall be limited to:

    (a) for structural damage vibration - German Standard DIN 4150 Part 3 – Structural Vibration in Buildings. Effects on Structures; and,
    (b) for human exposure to vibration – the evaluation criteria presented in British Standard BS 6472-Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80 Hz) for low probability of adverse comment. These limits apply unless otherwise agreed by the Director-General in consultation with the EPA through the Construction Noise and Vibration Management Sub Plan.

*Vibration Management*

63. A management procedure shall be implemented to deal with vibration complaints. This shall be detailed in the Noise and Vibration Construction Management Sub Plan and in reference to Condition 8.

64. Vibratory compactors shall not be used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with Condition 62.

*Operational Noise Criteria*

65. The sound pressure level due to road noise emissions when measured at one metre from the façade of a residential building or, if vacant, at any residential boundary (existing, zoned or in a draft EPI at the time of this approval) or any other noise sensitive premises shall be designed to meet the operational noise criteria below, unless otherwise agreed by the Director General or through the Noise Management Report specified in Condition 66:

    (a) For new arterial road sections as defined by the Director-General:

        (a) $L_{Aeq15\ hour}$ 55 dB(A) (7:00 am to 10:00 pm); and,
        (ii) $L_{Aeq9\ hour}$ 50 dB(A) (10:00 pm to 7:00 am).

    (b) For new collect road sections as defined by the Director-General:

        (b) $L_{Aeq1\ hour}$ 60 dB(A) (7:00 am to 10:00 pm); and,
        (ii) $L_{Aeq1\ hour}$ 55 dB(A) (10:00 pm to 7:00 am).

*Operational Noise Management*

66. The Proponent shall provide an Operational Noise Management Report detailing an investigation of reasonable and feasible noise mitigation methods prior to substantial construction or otherwise agreed by the Director General. The report and investigation shall be conducted accordance with the NSW Government's *Environmental Criteria for Road Traffic Noise* and the RTA's *Environmental Noise Management Manual* and shall be to the satisfaction of the Director-General. The report and investigation shall include, but not be limited to:

    (a) clear identification of appropriate operational noise criteria in accordance with Condition 65**;**
    (b) predictions of noise levels at all affected residential, recreational, commercial and industrial land uses;
    (c) the location, type and timing of erection of permanent noise barriers and/or other noise mitigation measures demonstrating best practice;
    (d) specific physical and managerial measures for controlling noise;
    (e) reasonable and feasible noise mitigation measures. To assist in the decision of reasonable and feasible noise mitigation options for road traffic noise a Barrier Sensitivity Analysis shall be conducted and presented in the report in accordance with Practice Note IV of the RTA *Environmental Noise Management Manua*l for the entire project. The importance applied to visual impacts and noise mitigation along the project shall be determined in close consultation with the CLG and affected residents. Consideration should be given to the inclusion of Perspex panels within noise barriers to reduce visual and overshadowing impacts;
    (f) the urban design issues relating to noise control measures; and
    (g) noise monitoring, reporting and response procedures including monitoring on surrounding roads which experience significantly increased traffic volumes as a result of the project.

67. The Proponent shall install all reasonable and feasible noise mitigation measures as identified in Condition 66 to the satisfaction of the Director General. Mitigation measures shall be designed and implemented in consultation with affected land owners.

*Operational Noise Monitoring*

68. Monitoring of operational noise shall be undertaken in accordance with Practice Note VII of the RTA's *Environmental Noise Management Manual*. The Proponent shall, in consultation with the Director General, assess the adequacy of the traffic noise mitigation measures within 6 months to one year of opening the project considering the criteria specified in Condition 65 and the Operational Noise Management Report (Condition 66). Should the assessment indicate a clear trend in traffic noise levels on the project and surrounding roads which exceed noise design, the Proponent shall implement further reasonable and feasible mitigation measures in consultation with affected landowners and/or occupiers including consideration of inclusion of noise barriers and the acoustic treatment of buildings.

## Air Quality

69. A detailed Dust Management Sub Plan shall be prepared as part of the Construction EMP and shall be prepared prior to substantial construction. The Sub Plan shall provide details of all dust control measures to be implemented during the construction stage, including, but not be limited to:

    (a) identification of potential sources of dust;
    (b) dust management objectives in accordance with appropriate EPA guidelines
    (c) a monitoring program to assess compliance (by sampling and obtaining results by analysis) in accordance with Table 1;
    (d) details of mitigation measures to be implemented during periods of extreme climatic conditions where high level dust episodes are likely to occur;
    (e) establishment of a protocol for handling dust complaints in accordance with the complaints management system required by Condition 8;
    (f) a reactive dust management procedure detailing how and when operations are to be modified to minimise the potential for dust emissions, should emission levels exceed the criteria;
    (g) progressive revegetation strategy for exposed surfaces in accordance with Conditions 44 and 45; and,
    (h) a community consultation protocol.

**Table 1 – Ambient Dust Monitoring**

| Pollutant | Units of Measure | Frequency | Method[1] |
|---|---|---|---|
| Dust deposition rate | g/m$^2$/month | Continuous | AM-19 |
| Total Suspended Particulates (TSP) | $\mu$g/m$^3$ | 24 hr annual<br>1 day in 6 | AM-15 |
| Siting | - | - | AM-1 |

[1] – NSW EPA, 2001, Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales

*Construction*

70. Construction vehicles using public roads shall be maintained and covered to prevent any loss of load, whether in the form of dust, liquid or soils. Construction vehicles shall be maintained and wheel wash facilities or equivalent shall be constructed at exit points of all unsealed construction sites/compounds to minimise tracking any mud, dirt or other material onto any street which is opened and accessible to the public. In the event of any spillage, the Proponent is required to remove the spilt material within 24 hours.

71. The Proponent shall ensure that all plant and equipment at the site, or used in connection with the proposal, are:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

72. The Proponent shall ensure that any air pollution generated by the construction is assessed regularly, and activities are relocated, modified, and/or stopped as required to minimise air quality impacts occurring on any privately-owned land, and ensure that the visibility and safety of motorists using the surrounding public roads are not compromised.

**Greenhouse Gases**

*Construction Stage*

73. The Proponent shall promote the reduction of greenhouse gases by adopting energy efficient work practices including, but not limited to:

    (a) developing and implementing procedures to minimise energy waste;
    (b) conducting awareness programs as part of induction for all site personnel regarding energy conservation methods; and,
    (c) conducting regular energy audits during the project to identify and address energy wastage.

74. The EMR shall verify that no rainforest timbers are used in any construction activities.

*Sustainable Energy*

75. The Proponent shall ensure that green power is purchased for the supply of at least 50% of the electrical energy requirements for the construction of the project if available.

**Acid Sulfate Soils**

76. A detailed Acid Sulfate Soil Management Sub Plan shall be prepared prior to construction in consultation with DLWC, EPA and NSW Fisheries (if required) and incorporated in the EMP. The Proponent shall ensure tests are carried out in advance of excavation of high risk areas to test for the presence of acid sulfate soils. The Sub Plan shall include reference to the water quality monitoring program contained in the Soil and Water Quality Management Sub Plan. The ASS Sub Plan shall be prepared in accordance with the Acid Sulfate Soils Manual (ASSMC, 1998). As part of the ASS Sub Plan, a Contingency Plan to deal with the unexpected discovery of actual or potential acid sulfate soils shall be prepared.

**Water Quality, Erosion and Sediment Control**

***Construction***

***Soil and Water Quality Management Plan***

77. As part of the Construction EMP, a detailed Soil and Water Quality Management Sub Plan shall be prepared in consultation with the DLWC, EPA, NSW Fisheries and HCC. The Plan shall be prepared in accordance with the Department of Housing's guideline *Managing Urban Stormwater - Soils and Construction* 1998, the RTA's *Guidelines for the Control of Erosion and Sedimentation in*

*Roadworks* and where appropriate, DLWC's *Constructed Wetlands Manual*. The Plan shall be prepared prior to substantial construction. The Soil and Water Quality Management Sub Plan shall contain, but not be limited to:

(a) management of the cumulative impacts of the development on the quality and quantity of surface water, including stormwater in storage, sedimentation basins and flooding impacts;
(b) details a strategy for phasing of construction works so that land disturbances are confined to areas of a manageable size and kept to a minimum;
(c) Erosion and Sediment Control Plans for each phase of construction that provides site-specific management measures, including;
    - details of short and long-term measures to be employed to minimise soil erosion and the discharge of sediment to land and/or waters including the locations and capacities of sediment fencing/straw bales, temporary storage ponds, sediment filters, filter barriers and other controls;
    - a strategy for progressive revegetation and rehabilitation of disturbed areas of earth as rapidly as practicable after completion of earthworks;
(d) an analysis of potential areas of contaminated soils at the site and the disturbance of such soils in order to protect water quality;
(e) the potential for major flooding during construction to cause environmental impacts including water quality impacts;
(f) identification of all potential sources of water pollution and a detailed description of the remedial action to be taken or management systems to be implemented to minimise emissions of these pollutants from all sources within the subject site;
(g) detailed construction methodology and design of the crossing of South Creek, including erosion and sediment control, bridge/pier design and scour protection;
(h) detailed description of water quality monitoring to be undertaken during the pre-construction and construction stages of the project including base line monitoring, identification of locations where monitoring would be carried out and procedures for analysing the degree of contamination of potentially contaminated water;
(i) measures to handle, test, treat, re-use and dispose of stormwater, effluent and contaminated water and soil;
(j) procedures for the re-use, treatment and disposal of water from sedimentation basins and constructed wetlands;
(k) detailed description of water quality monitoring during pre-construction and construction stage of the project;
(l) measures for the use of water reclaimed or recycled on-site; and
(m) a program for reporting on the effectiveness of the operational and construction sedimentation and erosion control system against performance goals.

78. The Proponent shall ensure that all appropriate soil and erosion and sediment control works are in place prior to commencement of any works with potential to cause soil erosion or generate sediment. Erosion and sediment protection measures shall also be in place before the commencement of any stockpiling activity.

79. The Proponent shall only construct sedimentation and erosion controls under this Approval in locations that satisfy the following criteria:

(a) sedimentation basins to be located greater than 50 metres from the South Creek bank and outside the identified riparian zone;
(b) sedimentation basins shall not be constructed over water or sewer pipelines unless otherwise

agreed to by SWC and/or HCC;

(c) sedimentation basins are not to involve the utilisation or modification of any existing natural waterways;
(d) if land is leased to enable construction of a temporary sediment basin, it shall be restored following construction to a level equal or better than the original condition;
(e) sedimentation basins on private land shall be fenced to minimise safety risks;
(f) all controls are to be designed and constructed in accordance with the Department of Housing's Guideline *Managing Urban Stormwater – Soils and Construction*; and
(g) potential for saline affectation is not increased.

80. Permanent water quality/spill control measures for the operational phase of the project shall be installed and utilised as soon as possible after construction commencement.

81. During construction, an appropriately qualified soil conservationist shall be consulted regularly to undertake inspections of temporary and permanent erosion and sedimentation control devices to ensure that the most appropriate controls are being implemented and maintained in an efficient condition at all times and meet the requirements of any relevant approval or licence condition(s).

### *Operation Stage Control Measures*

82. Permanent water quality/spill control containment ponds will not be located within 50 metres from the top of the South Creek banks. All facilities including wetland filters, grass filter strips, gross pollutant traps and sedimentation basins shall be inspected regularly and maintained in a functional condition for the life of the project. Construction stage water quality structures shall be maintained for twelve months after construction or until revegetation has provided groundcover to at least 70% of the exposed ground surface (which ever is the shorter).

### *Spill Management*

83. The Proponent shall provide detention systems for containment of spills and materials arising from accidents to contain a spill event of up to 20,000 litres. The systems shall be consistent with the RTA's *Design Philosophy on Combined Sediment and Accidental Spill Basins* and *Code of Practice for Water Management – Road Development and Management*.

## Flooding and Hydrology

*Pre-Construction*

84. The Proponent shall develop a detailed Flooding and Drainage Management Sub-Plan for the project as part of the Construction EMP in consultation with the DLWC and HCC. The objective of the Sub-Plan shall be to not increase flood hazard (depth, velocities or duration of flooding) in any area. To meet this objective, the Sub-Plan shall include a flood planning level appropriate for construction activities commensurate with the flooding, social, economic and environmental characteristics of the area in accordance with measures identified in the NSW's Government's Floodplan Management Manual, January 2001.

85. The cross drainage system shall be designed to ensure that there are no adverse flooding or waterlogging impacts and shall be designed to convey the 1:500 ARI local flood waters in consultation with the DLWC and HCC.

**Groundwater**

86. A detailed Groundwater Management Sub Plan shall be prepared as part of the Construction EMP in consultation with the DLWC and EPA. The Sub Plan shall include:

    (a) identification of potential settlement impacts on the project and nearby structures;
    (b) a description of groundwater quality, including the potential for contamination; and,
    (c) groundwater inflow control, handling, treatment, and disposal.

**Heritage**

87. The Proponent shall prepare a Non-indigenous Heritage Management Sub Plan, in consultation with the Heritage Council and HCC as part of the Construction EMP. This Sub Plan shall include:

    (a) details of any licences and approvals required; and,
    (b) procedures to be implemented if previously unidentified items/areas are located during construction in accordance with Condition 91.

88. A photographic and archival recording of the Former Corner Store, Mulgrave, is to be undertaken by a qualified heritage consultant, prior to its demolition.

89. The proponent shall undertake sub-surface testing of the four potential archaeological deposits (PADs) traversing the site, as illustrated in Figure 17.1 of the EIS. Representatives from the Deerubbin Local Aboriginal Land Council, the Darug Tribal Corporation and the Darug Custodian Aboriginal Corporation are to be involved in these investigations. The Proponent shall ensure that these works are carried out in accordance with a valid permit obtained under the *National Parks and Wildlife Act 1974*.

90. The Proponent shall submit a report to the Department a maximum of six months after the date of Approval or as otherwise agreed to by the Director-General, outlining the findings of the sub-surface testing, methods to mitigate the impacts of the proposal on any sites of indigenous heritage and evidence that the findings of the subsurface testing are to be considered and incorporated into the development of the detailed design. The report shall be prepared in consultation with the Deerubbin Local Aboriginal Land Council, the Darug Tribal Corporation, the Darug Custodian Aboriginal Corporation and the NPWS and shall be to the satisfaction of the Director-General.

*Unexpected Items*

91. If during the course of construction the Proponent becomes aware of any heritage items or archaeological material, all work likely to affect the site(s) shall cease immediately and relevant authorities, including NPWS, NSW Heritage Council, the Deerubbin Local Aboriginal Land Council, the Darug Tribal Corporation and the Darug Custodian Aboriginal Corporation, shall be consulted to determine an appropriate course of action prior to the recommencement of work at that site. Appropriate supporting documentation would need to accompany any application for required permit/consent(s).

**Spoil and Fill Management**

92. The Proponent shall prepare a Spoil and Fill Management Sub Plan and incorporate this Sub Plan into the Construction EMP. This Sub Plan shall include:

    (a) likely source of imported fill;
    (b) how imported fill material will be handled, stockpiled and placed;
    (c) methods for managing temporary material stockpiles (of fill, topsoil, rock, etc.);
    (d) methods and processes to incorporate the reuse and recycling of all clean and treated cut material on the work site
    (e) methods for managing cut material that is not suitable for reuse on-site; and
    (f) a contingency plan to be implemented in the case of unanticipated discovery of contaminated material during construction.

    The Spoil and Fill Management Sub Plan shall be fully integrated with the Construction Stage Traffic Management Sub Plan required by Condition 39, the Waste Management and Re-use Sub Plan required by Condition 94, the Dust Management Sub Plan required by Condition 69 and the Soil and Water Management Sub Plan required by Condition 77.

93. All imported fill shall be re-cycled material unless otherwise agreed to by the Director-General.

**Waste Management and Re-use**

94. As part of the Construction EMP, a detailed Waste Management and Re-use Sub Plan shall be prepared. The Sub Plan shall specify specific waste management measures to be followed during the construction period by the construction contractor. It shall be consistent with the *Waste Avoidance and Resource Recovery Act 2001,* and the EPA's *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes*, and shall identify requirements for waste avoidance, reduction, reuse and recycling. The Sub Plan shall provide details of requirements for:

    (a) handling;
    (b) stockpiling;
    (c) disposal of wastes: specifically contaminated soil or water, concrete, demolition material, cleared vegetation, oils, grease, lubricants, sanitary wastes, timber, glass, metal, etc.; and
    (d) identifying any site for final disposal of any material and any remedial works required at the disposal site before accepting the material.

    This Sub Plan shall include but not be limited to:

(i) methods for management of all wastes generated by the project;
(ii) an outline of comprehensive plans of action for key waste streams;
(iii) implementation of the waste hierarchy, including the demand for water, by seeking to avoid waste generation as a priority, the reuse, recycling or reprocessing of waste and, as a last resort, disposal of waste;
(iv) arrangements for waste which cannot be re-used, recycled or reprocessed to be disposed of at a licensed waste disposal facility;
(v) procedures for separating excavation and demolition waste and for identifying destinations for the material;
(vi) the provision of rubbish skips at all construction sites and site compounds and their regular removal or emptying and installation of segregated bins for recyclable materials and provision for material to be reused or recycled wherever possible;
(vii) except where a sewer is available, the discharge of sewerage from site amenities to holding tanks for removal by tankers;
(viii) erecting signs within construction sites and site compounds encouraging employees to reduce, re-use, or recycle wherever possible;
(ix) the disposal of chemical, fuel and lubricant containers and solid and liquid wastes;
(x) appropriate induction and training of all employees and sub-contractors in the waste hierarchy and the requirements of this Waste Management and Re-use Sub Plan;
(xi) undertaking regular audits of waste management; and,
(xii) keeping of a waste management register of all significant waste collected from construction sites and site compounds for disposal, including amounts, date and time and details and locations of disposal.

As part of the Sub Plan, an Action Plan shall be prepared to promote the use of recycled materials, including construction and landscape materials. The Plan shall detail how the project gives consideration and support to the Government's *Waste Reduction and Purchasing Policy*. The Plan shall also include details on measures to implement energy conservation best practice.

95. Any waste material that is unable to be re-used, reprocessed or recycled shall be disposed at a landfill that can legally receive that waste.

**Utilities and Services**

96. The Proponent shall identify the services potentially affected by construction activities to determine requirements for diversion, protection and/or support. This shall be undertaken in consultation with the relevant service provider(s). Any alterations to utilities and services shall be carried out to the satisfaction of the relevant service provider(s), and unless otherwise agreed to, at no cost to the service/utility provider(s).

97. The Proponent shall ensure that disruption to services resulting from the project are minimised and shall be responsible for ensuring that affected local residents and businesses are advised prior to any service disruption.

## Hazards and Risks

98. As part of the Construction EMP and the Operation and Maintenance systems, required under Condition 21, the Proponent shall prepare and implement a Hazards and Risk Management Sub Plan. This Sub Plan shall include, but not be limited to the following:

    (a) details of the hazards and risks associated with the project;
    (b) procedures for storing and handling chemicals and fuel to prevent spills;
    (c) pro-active and reactive mitigation measures including contingency plans to be implemented in the event of a pollution incident;
    (d) maintenance of detention basins and their immediate surrounds to ensure that they remain free from dry material likely to lead to an escalation of a burning liquid fuel fire from an accident; and,
    (e) fencing to prevent unauthorised access.

## Location of Construction Facilities

99. The Proponent shall only establish construction compounds, stockpiles or any other ancillary facilities under this Approval in locations that satisfy the criteria outlined in Table 6.3 in the EIS.

## ATTACHMENT 1

### Guidelines for the Establishment of the Community Liaison Groups

The proponent shall consider the following when establishing a Community Liaison Group:

1. At its first meeting, the Group shall consider its interrelationship with any existing community liaison/ consultative groups of adjoining or interrelated developments.

2. Representatives from relevant government agencies or other individuals may be invited to attend meetings as required by the Chair.

3. Where determined necessary by the Chair, an independent note taker would be provided by the Chair at the expense of the Proponent.

4. The Proponent shall, at its own expense:

    - nominate two (2) representatives to attend all meetings of the Committee;
    - provide to the Group regular information on the progress of work and monitoring results;
    - promptly provide to the Group such other information as the Chair of the Group may reasonably request concerning the environmental performance of the development;
    - provide access for site inspections by the Group; and
    - provide meeting facilities for the Group, and take minutes of Group meetings. These minutes, once endorsed by the Chair, shall be available to Group members within 14 days of the meeting.

Where reasonably required the Proponent shall engage consultants to interpret technical.

*APPENDIX A*

# WINDSOR FLOOD EVACUATION ROUTE – LANDSCAPE AND URBAN DESIGN PLAN

*APPENDIX B*

# REVIEW OF URBAN DESIGN ISSUES IN WINDSOR FLOOD EVACUATION ROUTE, URBAN DESIGN ADVISORY SERVICE, MARCH 2003

*APPENDIX C*

# OPTION A PRELIMINARY ROUTE ACROSS SOUTH CREEK CONCEPT DESIGN FORBES STREET, CONNELL WAGNER

*APPENDIX D*

# ATTACHMENT C – DISCUSSION OF OPTIONS FOR FORBES STREET

*APPENDIX E*

# WINDSOR FLOOD EVACUATION ROUTE – CONCEPT PLAN FOR PROPERTY OF PAUL LITTLE

| | |
|---|---|
| Appendix A | Windsor Flood Evacuation Route – Landscape and Urban Design Plan |
| Appendix B | Review of Urban Design Issues in Windsor Flood Evacuation Route, Urban Design Advisory Service, March 2003 |
| Appendix C | Option A Preliminary Route Across South Creek Concept Design Forbes Street, Connell Wagner |
| Appendix D | Attachment C – Discussion of Options for Forbes Street |
| Appendix E | Windsor Flood Evacuation Route – Concept Plan for Property of Paul Little |