Chapter 10. Management of other environmental issues

10.1 Air quality

10.1.1 Potential impacts

Construction

The project has the potential to generate dust emissions during construction. Any earthworks, particularly where large volumes are being moved has the potential to result in emissions of particulate matter. The quantity of dust generated is dependent on both the type of machinery and construction technique employed. Furthermore, the implementation of management and mitigation measures can reduce the potential for dust generation and its impact.

As 16 km of the project would be constructed below ground, dust impacts would mainly be confined to the areas where the proposed alignment is above ground, or in areas where 'cut and cover' tunnel were proposed.

A number of construction sites would be established for the project. Heavy vehicle movements around the construction sites have the potential to generate dust.

The tunnel boring machine conveyors would convey all the spoil from the tunnels, cross passages and mined station sites to the Balmoral Road construction site. Stockpile sites would need to be maintained appropriately to avoid the potential for erosion and dust impacts.

Operation

Rail operations generate carbon dioxide emissions at the electricity generation source and brake dust at locations where trains are required to slow or stop at stations. In addition, there is potential for minor levels of dust to be generated from exposed areas within the corridor and from the gradual breakdown of track ballast and embankments/cuttings. These emissions are not likely to result in any impact on surrounding receptors. Furthermore, brake pad technology is improving constantly to reduce brake wear. Exhaust emissions from maintenance vehicles and equipment is expected to be minor in nature.

The Bureau of Transport and Communication Economics estimates that carbon dioxide emissions for a train with a typical loading in an urban area is about 150 grams per passenger kilometre (including emissions from electricity generations), compared with 210 grams per passenger kilometre for cars (State Rail Authority of NSW, 1994). Therefore, if it is assumed that train passengers are merely replacing car passengers, then the net carbon dioxide emissions could be expected to reduce.

During operation, the project is likely to have a positive impact on air quality as it would be expected to moderate the increase in vehicle kilometres travelled. Unlike cars and buses, trains

do not emit nitrogen oxides, carbon monoxides, hydrocarbons, lead, exhaust particles or tyre wear particles, which are a major cause of most types of air pollution in Sydney.

Additional ancillary facilities associated with the tunnel include ventilation at stations. Although no comprehensive ventilation design has been undertaken for the project, the ventilation layout used in the Epping to Chatswood Rail Link is considered to be an indicative layout for the tunnel sections of the route.

Tunnel ventilation would be required every 2.5 to 3 kilometres to meet fire controls for use in the event of an emergency. The spacing between outlets is influenced by the operational characteristics of the route as fire requirements restrict the number of trains allowed in each section of the tunnel.

Generally vents have been positioned at stations as they are located close enough to satisfy the maximum allowable spacing requirements. Ventilation is proposed at both ends of the rail platform/s for all sub-surface stations. Intermediate ventilation would be incorporated into the emergency access site on Pennant Hills Road.

Due to the developed nature of the existing environment, dust and emissions from the operation of the project are not likely to result in any detectable reduction in air quality within the surrounding area.

10.1.2 Recommended management measures

Recommended environmental management measures

A dust management plan would need to be prepared as part of the construction environmental management plan detailing measures for the control of dust generation, including:

- Vehicle movement controls, particularly entrance to and exit from construction work sites;
- When conditions are excessively dusty and the dust emissions criteria from operations cannot be maintained, then all dust generating activities must cease until dust suppression can be adequately carried out;
- Site management controls; and
- Dust monitoring would be undertaken during construction. Monitoring would comply with DEC guidelines for the Sampling and Analysis for Air Pollutants in NSW.

10.2 Soils

10.2.1 Potential impacts

Soils

The project passes through a number of soil landscapes, some which are subject to severe erodibility, therefore there is potential for erosion during excavation and other construction activities. This has potential, without mitigation, to lead to sedimentation of drainage lines, stormwater systems and, ultimately, waterways.

In addition, temporary stockpiles have the potential to erode due to wind or water exposure, and construction vehicles have the potential to track sediment onto adjacent roads.

Appropriate erosion and sediment controls taking into account the erosion risks would need to be implemented, as outlined in section 10.2.2.

Salinity/dispersive soils

Apart from general geotechnical and other environmental considerations, other issues to be managed relate to salinity and dispersive soils conditions along the proposed alignment. The surface section of the route intersects areas of high salinity potential and known salinity. Development in such areas would need to be controlled in order to manage the potential for impacts and protect the surface section from the adverse affects of salinity (corrosion, masonry/concrete deterioration etc.).

Developments within areas containing saline potential/affectation require assessment of the saline processes and the preparation of a salinity management plan to control the affects of salinity on the development and of the development on the saline processes. Typical control measures include drainage/water management, construction with appropriate durability requirements for building materials, appropriate damp-proofing, management of saline discharge waters etc.

Normally, saline conditions may exist at depth within the soils and groundwater without producing adverse affects on development and infrastructure, which are built near the ground surface. However, when salts are concentrated near surface either through poor management of low permeability soils, natural waterlogging and/or a shallow (typically<2m) depth to a saline groundwater table; they have the potential to adversely impact on vegetation and the built environment. For the project, saline seepages are a potential risk for the tunnel route, due principally to the presence of the Wianamatta Group shales, and are a risk for the emergent and cut/cover sections of the route.

Dispersive soil management requirements, which are associated with the saline landscapes, also should form part of the salinity management plan (a component of the construction environmental management plan).

Processes that can occur in the areas of moderate to high saline potential include, but are not limited to:

» Waterlogging/evaporation due to changed drainage conditions that could lead to saline accumulation (for example, above areas of compacted fill or in poorly drained ‘low-spots’). This can occur even in soils with concentrations of salinity in the ‘non-saline’ range (it is noted that the range classifications were developed for agricultural rather than construction purposes).

» Interception of potentially saline soils/seepages at permeability contrasts within the bedrock or near the base of the soil profile.

» Potential dispersive erosion, particularly on cut batters.

Contamination

As the project would be constructed in a predominantly disturbed environment, there may be contaminated land issues. During construction, potential contaminated soil may be

encountered and disturbed. Soils may potentially contain contaminants of concern to human health (that is to excavation workers and people occupying the land in the vicinity of the site during excavation works). Mitigation measures would be implemented to prevent potential health risks associated with exposure to possible contamination.

There is also limited potential for spills to occur during construction activities. Should this occur, appropriate mitigation measures would be implemented.

Acid sulphate soils

A search of the acid sulphate soils risk map showed that acid sulphate risk is considered unlikely. However, excavation activities have the potential to encounter acid sulphate soils and as such, this should be confirmed prior to construction commencing. Acid sulphate soils can weaken concrete and steel infrastructure, which can increase maintenance and replacement costs.

10.2.2 Recommended mitigation measures

Soils

A construction water and soil management plan of the construction environmental management plan would need to be prepared prior to the commencement of construction detailing methods for the management of surface water, groundwater and excavated soils, including any contaminated soils and water. The plan would be prepared in accordance with 'Managing Urban Stormwater: Soils and Construction' (Landcom, 2004). The plan should include:

- Detailed erosion and sedimentation control strategies, prepared in consultation with relevant agencies. Strategies presented would aim to control soil erosion and sediment generation and minimise the potential for the project activities to adversely affect downstream water quality;
- The management of earthworks and vegetation removal;
- The management of stockpiles; and
- The installation and maintenance of sediment control structures.

Salinity

A project specific salinity management plan should be prepared for the route. Preparation of the salinity management plan should include site investigations and sampling.

Contamination

An assessment of potential contamination risks would be undertaken prior to construction. Procedures for the management of contaminated material would be outlined in the construction environmental management plan.

10.3 General waste management

The project has the potential to generate a number of different types of waste, which would require management and disposal in accordance with relevant state legislation and government policies. Spoil, the main form of waste material that would be generated, has been discussed in

section 9.5. This section outlines the framework for general waste management that would apply to the project.

Waste management in NSW is prioritised according to the principles of a resource management hierarchy, giving consideration to the principles of ecologically sustainable development. TIDC adopts the Resource Management Hierarchy principles embodied in the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) as follows:

Priority	Strategy	Action
1	Avoidance as top priority	Action to reduce waste generated by industry and government
2	Resource Recovery	Reuse, reprocessing, recycling and energy recovery
3	Disposal as last resort	Environmentally responsible management of disposal

TIDC is also committed to the objectives of responsible management of waste and would ensure that the project complies with this hierarchy and the legislation relevant to waste management.

In addition, the following guidelines would be used throughout the project to ensure responsible waste management:

» Construction and Demolition Waste Action Plan (DEC, 1998);

» Environmental Guidelines: Assessment, Classification and Management of Non-Liquid and Liquid Waste (DEC 1999);

» Green Waste Action Plan (DEC, 1997);

» NSW Government's Waste Reduction and Purchasing Policy; and

» Waste Planning for Industry: A Guide (Waste Management Authority of NSW) 1990.

ESD principles in waste management would also be recognised in the construction of the project through adherence to the waste hierarchy and by ensuring:

» The production or generation of waste does not exceed the assimilative capacity of the means/method of disposal and the environment; and

» The adoption of a whole of lifecycle approach in formulating a waste minimisation and management plan for the project.

Protection of the Environment Operations Act 1997

The requirements of the *Protection of the Environment Operations Act 1997*, which are relevant to the project include:

» Any hazardous waste must be stored in an environmentally safe manner and not come into contact with any incompatible waste;

» Waste must be transported to land that can lawfully receive that waste for example, unsuitable material may be transported to local properties that may legally accept the material for driveway construction, etc;

» Transport vehicles must be kept in a clean condition and be constructed and maintained so as to prevent waste spillage; and

» Transport vehicles must be covered when loaded so as to prevent spilling and loss of waste and to prevent emission of odours.

10.3.1 Recommended management measures

» The Resource Management Hierarchy principles of the *Waste Avoidance and Resource Recovery Act 2001* would be implemented as follows:

  – Unnecessary resource consumption would be avoided;

  – Avoidance would be followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery); and

  – Disposal would only be undertaken as a last resort.

» Where feasible, suitable waste would be recycled in accordance with the NSW Government's Waste Reduction and Purchasing Policy. Items for recycling would be sorted, collected and taken to a recycling depot in the region. Non-recyclable materials would be disposed of at licensed disposal facilities.

» A waste management sub-plan would be prepared as part of the construction environmental management plan provide details of the requirements for handling, stockpiling and disposal of wastes.