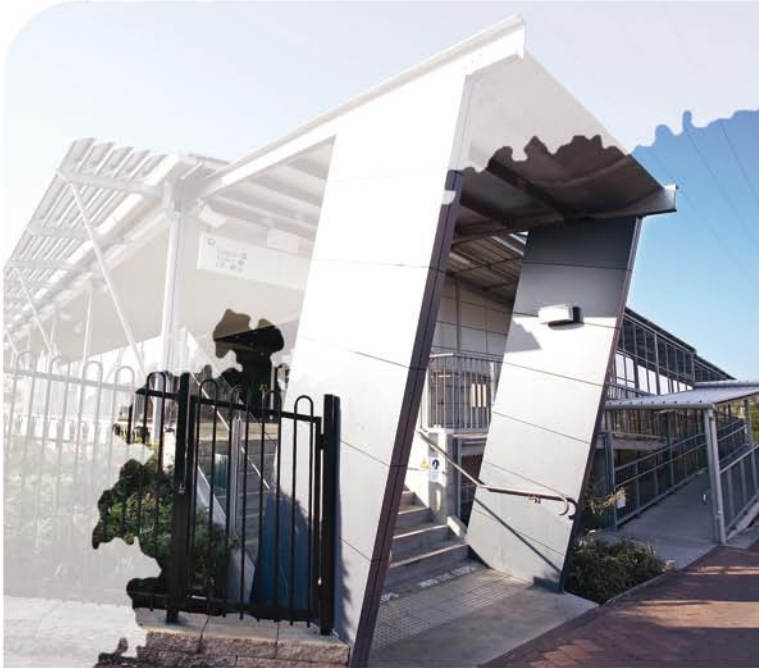




PART D

Justification and conclusions

18 Justification and conclusions

Chapter 18 provides a summary of the key considerations affecting the justification of the Proposal. These relate to biophysical, economic and social issues and the principles of ecologically sustainable development as required in Schedule 2(6) of the Environmental Planning and Assessment Regulation 2000. Consideration is also given to the cumulative impacts of the Proposal and its performance in achieving its objectives.

18.1 Cumulative impact assessment

Cumulative impacts are likely to arise from the interaction of the construction and operation of the Proposal and other proposed activities locally and across the Sydney metropolitan area. Rail transport related activities and Proposals and other developments planned in the local area and within south western Sydney are outlined in **Chapter 3**. Cumulative social, economic and biophysical impacts have been assessed in the context of these activities. In particular, the cumulative impacts of the Proposal have been addressed together with other proposed rail improvements in south western Sydney and the urban and other development that has been initiated in the region.

Table 18.1 provides a summary of the anticipated cumulative impacts of the Proposal. The various interactions of effects on the social, economic and biophysical environment are derived from the assessments summarised in **Part C, Chapters 12 to 17**.

Table 18.1 Assessment of cumulative impacts

Interaction	Assessment
Social environment	Proposed developments in the vicinity of the Proposal that may coincide with the construction phase include:
Public access and severance	- Revesby Turnback Project
Changes to amenity	- Other Clearways projects including Macarthur Turnback
- air quality	- Extension of Revesby Workers Club and redevelopment of Revesby town centre including mixed-use development and streetscape improvements
- noise	
- character	
Public safety	- Proposed Southern Sydney Freight Line from Macarthur to Chullora
Built heritage	- Residential redevelopments on various sites along and adjacent to the rail corridor
Distribution of benefits	There would be short-term disruption to access at five stations during construction and construction activities at bridges may cause short-term disruption to local access and traffic movements on major roads in the study area

Interaction	Assessment
	Local access would be maintained and movement across the corridor at Revesby improved Improvements to passenger transport infrastructure in south west Sydney would lead to cumulative, improved regional access The Proposal would improve passenger reliability by separating express passenger services from local services There would be some uneven distribution of benefits within the region depending on location. Those residents directly affected would experience some disbenefits although these would be minimised by the inclusion of mitigation measures while others would benefit by the cumulative improvement in train services, traffic and air quality Increasing development in south west Sydney would result in changes to the amenity of the region. Cumulative impacts are likely to be diminished air quality, increased noise levels and changed local character. The contribution of the Proposal to these impacts would be small and could assist in an improvement in some impacts, notably air quality by stimulating a shift from car to public transport use There would be some adverse changes to local amenity as a result of the Proposal relating in particular to noise and associated visual impacts of the necessary noise barriers. There may be some changes to local character as a result of these barriers and changes to embankments and ground profiles The major development proposed for the region can be expected to result in a slow but progressive loss of historic and indigenous heritage. The Proposal would result in some changes to common engineering structures but would not result in the loss of built heritage values. There would be no known impact on indigenous heritage. The contribution of the Proposal to cumulative impacts would therefore be negligible
Economic environment User savings Non-user benefits Employment Induced development/changes to land use Demand for materials Cost of infrastructure and maintenance	The improvement of the rail infrastructure would lead to a reduction in transport costs and additional revenue expected from an increase in rail usage leading to cumulative economic benefits, regionally Growth and infrastructure development would improve local and regional employment opportunities and encourage further development and changes in existing land uses. The cumulative economic impacts of changes in south west Sydney are expected to be beneficial There would be an increased demand for resources following development of the Proposal. The contribution made by the Proposal to resource depletion would be small as fuel use during operation would be low The cost of infrastructure and maintenance would be offset against the economic benefits accruing to the Proposal

Interaction	Assessment
Biophysical environment	
Loss of biodiversity	Development in south west Sydney could be expected to lead to cumulative loss of biodiversity
Effects on water quality	The Proposal would result in the loss of small areas of Coastal Salt Marsh and Swamp Oak Forest (Endangered Ecological Communities) and small areas of Downy Wattle and Gosford Wattle (Threatened Flora Species) from within and adjacent to the rail corridor. In addition, the Proposal would result in the removal of a number of individual mangroves within the Salt Pan Creek corridor. These would be replaced at a ratio of 2 to 1
Hydrological impact	
Greenhouse gas emissions	
Visual quality changes	
	Cumulative impacts on water quality would result from development in south Sydney. However, the Proposal would not result in changes to water quality or upstream flooding with the appropriate mitigation measures in place
	Additional development in south west Sydney could be expected to lead to additional flooding unless appropriate control measures are instigated. Construction of a new bridge over Salt Pan Creek as part of the Proposal would not result in any additional upstream flooding either during construction or operation
	Proposed development in south west Sydney can be expected to result in increased greenhouse gas emissions. The Proposal would improve the efficiency and reliability of passenger transport resulting in a potential relative increase in the use of public transport to offset greenhouse gas emissions resulting in a reduction of up to 8,650 tonnes per year by 2021
	There would be a significant change in scenic quality in south Sydney resulting from cumulative urban and infrastructure development. The Proposal would result in some local changes to scenic quality, although these would be limited to a narrow corridor

South west Sydney is forecast to experience a high rate of population growth and development. This includes urban and industrial development and associated road and rail infrastructure. The cumulative social, economic and biophysical impacts of this growth are significant. However, while the Proposal would support this growth, its contribution to total cumulative impacts across the region would be small. It would also provide cumulative benefits in particular to access, economic development and employment and greenhouse gas emissions.

It is likely that construction of the Proposal would coincide with the construction of one or more of the developments listed in **Table 18.1**. As the precise timing of construction of these developments is not known, the cumulative construction impacts cannot be quantified. Account would be taken of them during detailed construction planning in order to manage and minimise potential cumulative impacts.

There is unlikely to be substantial cumulative construction impacts associated with both components of the Kingsgrove to Revesby Upgrading (see **Section 1.1**) as the Revesby Turnback Project will be substantially completed prior to the start of construction of the Proposal. There may however be a short period of overlap between the Projects and the area adjacent to Revesby Station would experience a continuation of construction activities until completion of the Proposal.

Expansion and redevelopment of Revesby Workers Club is expected to start in early 2009. Coordination to ensure that issues such as construction traffic movements and material deliveries are undertaken as efficiently as possible while minimising impacts on local businesses and residents using the area would be required. It would also be necessary to coordinate the final configuration of Blamey Street with the Workers Club, Bankstown City Council and RailCorp to ensure that the flow of pedestrians from the station is managed effectively. Details of passenger and pedestrian movements in this area would be determined during the detailed design phase.

Other developments could be underway within the Revesby commercial area during the construction stage of the Proposal. Details of these are not known at present but there would be some potential for cumulative impacts over this period.

18.2 Economic assessment

18.2.1 Approach to assessment

The economic assessment of the Proposal has been undertaken using conventional benefit cost analysis typically used for major transport project evaluations (RailCorp 2005). This complies with NSW Treasury guidelines.

The assessment compares the benefits and costs of the Proposal over its construction and operating life taking account of those which may not be reflected in monetary transactions. This includes the value of time by reducing rail interchange time or improving service reliability and externality costs such as noise and air pollution. Such evaluations take account of the opportunity cost of the resources to be used in the Project and are performed from the viewpoint of the whole economy.

Resource costs and benefits in the economic evaluation are estimated without enhancements such as tax and subsidy payments. These are not considered to be resource costs as they are not used in production or consumption and do not represent increases or decreases in the supply of the State's resources.

The costs and benefits considered in the economic assessment fall into five categories:

- project capital costs;
- project recurring costs mainly related to the management and maintenance of the new asset;
- producer benefits such as additional farebox revenue expected from an increase in rail usage;
- user (net) benefits including the value to rail users of attaining service reliability, enjoying a reduced journey time and an increase in passenger services; and
- non-user (net) benefits including time saved in road travel from reduced road congestion and savings in car operating costs.

The net value of the investment in the Proposal is determined by comparing two scenarios. In this case, the Proposal to build two additional tracks from Kingsgrove to Revesby (the Project case) is compared with the existing situation where express and all stations services share a common double track section between Kingsgrove and Revesby (the base case).

18.2.2 Assessment parameters

Units

All costs and benefits are expressed in June 2006 prices discounting for the relative movement of prices (inflation) over the life of the Project

Discount rates

The discounting of benefits and costs which occur over time are adjusted by the discount rate to provide comparable benefit and cost values at a particular time. The base year in this case was the 2005-06 financial year.

NSW Treasury has recommended a benchmark real discount rate of seven percent to be used to convert money values over time to a common date to provide a present value. The effect of changing this discount rate, normally to four and 10 percent, is investigated as part of the sensitivity analysis.

Life of the Project

Although the economic life of infrastructure assets is around 50 years, an evaluation period of 35 years has been used. The consideration of residual benefits and costs takes account of the differences in the economic life of infrastructure, where appropriate.

Residual values

Some assets may still be useful to RailCorp or be resaleable at the end of their project life. This value is a benefit to the Project and is included in the economic evaluation.

Net worth of the Project

The net worth of a project is expressed as the net present value. Benefits and costs are discounted to the base year and total discounted costs subtracted from total discounted benefits to calculate the net present value (NPV) of the Project. If the NPV is greater than zero, the quantitative analysis suggests that there are grounds for proceeding with the Project.

Other criteria used to evaluate the Project are benefit/cost ratio (BCR) and the economic internal rate of return (IRR).

18.2.3 Project costs

Project costs required for the economic assessment include those necessary to undertake the development of the Proposal excluding items such as taxes and recurrent costs calculated as a charge of 0.8 percent of the capital cost of the assets. The project capital cost discounted at seven percent is estimated at \$262.7 million with recurrent costs discounted over 35 years at \$25.9 million. The turnout costs of the Proposal are estimated to be \$450 million. This is the actual value of all costs required to construct the Proposal over the four year period up to completion.

18.2.4 Project benefits

The addition of two new tracks between Kingsgrove and Revesby would meet estimated traffic growth requirements and avoid the need for train delays. Increasing passenger demand, in the absence of the Project would lead to further overcrowding and deteriorating travel conditions. New rolling stock will help to accommodate this increase but its effectiveness would be constrained by the capacity of the rail infrastructure.

In the absence of enhancement of the rail network, services would slow down and journey times increase. Benefits of the Project for users are therefore improved:

- journey times;
- service reliability (reduction in delays); and
- service frequency.

Computer modelling was undertaken to quantify the costs and benefits to users. This included the effects of improvements in generating additional demand leading to changes in farebox revenue and externality benefits to non-rail users and the community.

18.2.5 Economic benefits

The total socio-economic benefits of the Proposal include user and non-user benefits and benefits to RailCorp (producer surplus). The total economic benefit of the Proposal was estimated at \$490.7 million at a seven percent real rate of discount.

The results of the evaluation indicate that the Proposal has a NPV of \$202.1 million (discounted benefits minus discounted costs), a benefit/cost ratio (BCR) of 1.7 at a seven percent real rate of discount and an internal rate of return (IRR) of 12.3 percent.

Sensitivity analysis was undertaken by varying the discount rates (4 percent and 10 percent) and increasing the capital cost of the Project by 20 percent. The results indicate that the Proposal demonstrates economic worth across all discount rates and continues to return a positive NPV when capital costs are increased.

18.3 Justification of the Proposal

This section provides the justification of the Proposal. This is predominantly based on the ability of the Proposal to meet the Project objectives developed to address the need identified for it in **Section 4.8**. Justification has also been considered in the context of the four principles of ecologically sustainable development as listed in **Section 18.3.2**.

18.3.1 Project objectives

In relation to operational capacity, efficiency and reliability:

- Increase capacity to run additional local and express services on the East Hills Line including provision for future services from the South West Rail Link.

Operational requirements change over time and a range of operating patterns would be possible. The timetable would need to respond to demand, operational requirements and resource availability at any particular time. Local services (Revesby local) would have the ability to run independently of the express services with up to eight trains per hour starting there in the morning peak. Increased system capacity would allow the existing eight express services per hour to be increased.

- Improve service reliability by separating service types and providing infrastructure to support out of course train running.

The Proposal is one of an integrated set of projects to remove operational impediments to improved services on the metropolitan rail network. These are designed to reduce the sharing of train paths by different service patterns which result in over-complex operating conditions and timetables. The separation of such services by the removal of bottlenecks and an increase in operating capacity would result in a more reliable service with an improved capacity to accommodate increasing demand.

- Provide journey time improvements on trips to the south west.

The increase in the capacity of the rail infrastructure resulting from the implementation of the Proposal between Kingsgrove and Revesby provides the potential to improve service frequency at a higher level of efficiency and reliability allowing journey times to be improved.

- Manage safe and reliable operations.

The separation of express and local services would allow operations on the East Hills Line to be simplified with resulting benefits for safety and reliability.

In relation to the attractiveness of commuter rail transport:

- Modify existing passenger facilities to provide a high level of customer service compatible with the improved services.

Additions and modifications to Revesby Station included in the Proposal would result in improved facilities available to rail passengers.

In relation to acceptable environmental and economic outcomes:

- Support State economic development by the provision of improved transport infrastructure.

The Proposal is one of 15 projects designed to improve the efficiency and reliability of operations on the metropolitan rail network. Improvements introduced by this and other projects included in the program would improve the attractiveness of rail travel and provide the opportunity to reduce reliance on the private vehicle for both the journey to work and trips for social and recreational purposes. Related improvements in accessibility would encourage both changes to land uses and the intensification of development close to the stations where services have improved leading to an increased level and variety of services.

- Enhance potential environmental effects and manage potential adverse environmental impacts by:
 - conserving biological diversity and ecological integrity
 - eliminating the threat of serious and irreversible environmental damage
 - improving air quality and reducing greenhouse emissions
 - minimising use of energy and non-renewable resources
 - minimising construction and operation-related impacts on the local community.

The Proposal is located within the existing rail corridor with new tracks adjacent to existing rail infrastructure. Such areas are typically highly disturbed and degraded. Impacts on biological diversity and ecological integrity are not considered significant. Nevertheless a small area (1,020 m² in total) of three separate endangered ecological communities would need to be removed plus a limited number of Downy Wattle and Gosford Wattle individuals found on the existing embankments within the corridor. A number of individual mangrove trees would also need to be removed along the Salt Pan Creek corridor to make way for the new bridge. These would be replaced at a ratio of 2 to 1 in areas along the creek where the existing vegetation is degraded or dieback is occurring.

The alignment and design of the Proposal would not pose a threat of serious or irreversible damage to the environment.

There would be a reduction in the generation of air pollutants and greenhouse gas emissions as a result of the operation of the Proposal compared to the situation without it. The anticipated shift from cars to rail transport in 2021 along the east west corridor would lead to a decrease in fuel use reducing emissions by 8,650 tonnes per year of carbon dioxide and contributing to regional air quality benefits.

There would be little increase in emissions of air pollutants as a result of increased movements of trains along the rail corridor. Electric powered trains produce negligible emissions. Additional electricity generation at the power stations would be necessary to provide increased traction supply which would partially offset air quality gains resulting from a reduction in non-renewable fuel consumption.

Improvements in the efficiency of rail movement would reduce the use of energy and non-renewable fuel resources overall compared to the situation without the Project.

Construction and operation related impacts on the local community would be minimised by the inclusion of mitigation measures. Construction activity would result in short-term and intermittent impacts which would include noise, visual intrusion and possibly dust. Specific measures would be put in place during construction. Noise impacts during operation would be controlled by the introduction of acoustic barriers along much of the corridor.

- To achieve acceptable economic outcomes.

An economic assessment undertaken by RailCorp (2005) estimated that the net economic benefit of the Proposal, at a real discount rate of seven percent would be \$490.7 million. The ratio of benefits to costs was 1.7 and the internal rate of return, 12.3 percent. The results also indicated that the Proposal demonstrates economic worth across all discount rates and continues to return a positive net present value when capital costs are increased by 20 percent.

18.3.2 Ecologically sustainable development

TIDC seeks to ensure that all major infrastructure Proposals are consistent with the principles of ecologically sustainable development and that each environmental assessment provides sufficient detail to be assessed against the adopted principles. Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* provides the most relevant definition of these principles.

Ecological sustainability is the use, conservation and enhancement of community resources so that ecological processes, and hence the quality of life, are sustained and improved for present and future generations.

It is based on four principles:

- **The precautionary principle** – the Proposal is needed for operational and environmental reasons. It is a prudent approach to resolving issues associated with the need for the Rail Clearways Program in a way that minimises impacts on the human, built and natural environment. There are no threats of serious and irreversible environmental damage as a result of the construction and operation of the Proposal.
- **Intergenerational equity** – the Proposal, in conjunction with other related projects and Proposals would provide a more efficient rail network which would accommodate projected passenger demands over the next 20 years. There would be some changes to local amenity relating to noise impacts and their associated mitigation measures resulting in some visual impacts.
- **Conservation of biological diversity and ecological integrity** – the Proposal would be largely constructed within an existing rail corridor minimising the potential for impacts on biological diversity. There would be minor short-term impacts on mangrove communities but any losses would be compensated at a ratio of 2 to 1.

- **The improved valuation and pricing of environmental issues** – consideration of environmental issues in the early stages of project planning has assisted in achieving improved consideration of environmental resources by ensuring that these were included in the planning of the Proposal and definition its need.

Ecological sustainability has been considered in the development of the Proposal and during the environmental assessment. Such considerations have included both short-term and long-term economic, environmental, social and equity issues and are summarised in **Table 18.2**.

Table 18.2 Integrating principles of ecologically sustainable development

ESD Principle	Incorporation in the assessment process
Precautionary approach	Scope and methods used for environmental assessment derived from detailed consultation with authorities, the community and other stakeholders as described in Volume One, Part C and Volume Two, Technical Papers 1 to 5 Potential threats of serious or irreversible damage identified and assessed throughout the environmental assessment Identification and management of potential hazards and risk as described in Volume One, Part C, Chapter 17 Measures to mitigate damage identified for all environmental impacts as described in Volume One, Part C
Intergenerational equity	Community consultation strategy implemented as described in Volume One, Part A, Chapter 3 An assessment of the potential social impacts of the Proposal undertaken as described in Volume One, Part C, Chapter 15 with specific reference to community concerns and values
Conservation of Biological Diversity and Ecological Integrity	Identification and management of potential impacts on species and vegetation communities of local, regional , State and national significance as described in Volume Two, Technical Paper 2
Improved valuation of environmental resources	Community values have been identified as described in Volume One, Part C, Chapter 15 Undertaking cumulative impact assessment as described in Volume One, Part D, Chapter 18

The Proposal is therefore also justified against the principles of ecologically sustainable development.

18.4 Conclusions

The Proposal would provide economic, social and environmental benefits. These would be:

- a significant improvement in the availability of passenger services from existing and rapidly developing areas in south and south western Sydney to the central business district and other parts of the metropolitan area;
- reduction in delays to passenger services by simplifying the operation of the network, and reducing the impacts of incidents on service reliability;
- increasing the capacity of the network to provide additional services, reduce overcrowding and improve passenger comfort;
- improvements in reliability by the separation of service types and achievement of a predictable and repeating pattern of service;
- a reduction in the growth of car passenger usage within the Sydney metropolitan area with a potential reduction in future road infrastructure costs and related environmental and safety benefits for local residents; and
- flow-on benefits to the overall economy through more efficient and cost-effective passenger transport and improved rail transport infrastructure for the Sydney region. The project would deliver on the objectives contained in the NSW Government *Metropolitan Strategy for Sydney* and *Urban Transport Statement* to facilitate the upgrading of the metropolitan rail network via the implementation of the Rail Clearway Program.

The Proposal is complementary to other components of the Rail Clearways Program and a precursor of the South West Rail Link which is a key transport component of strategic plan for Sydney's growth.

The project would also result in a number of predicted environmental impacts requiring appropriate management:

- disruption during the two year construction phase with associated noise, traffic and other amenity-related impacts; and
- increased noise levels for some properties along the rail corridor due the increase in train movements and the reduction in separation distance to affected properties. Noise barriers and other measures are proposed to mitigate operational noise levels.

The construction and operation of the Proposal would meet the objectives of the Rail Clearways Program. These have been developed to achieve improved reliability and efficiency of passenger services in the Sydney Metropolitan area. The Proposal would result in a range of economic, social and environmental benefits. Potential environmental impacts have been assessed and with the adoption of the proposed environmental

management measures and safeguards included in the Proposal they can be effectively mitigated and managed.

The Environmental Assessment has also demonstrated that the Proposal could be developed in accordance with the principles of ecologically sustainable development.