



## **BUSINESS CASE SUPPORTING THE NEED FOR INVESTMENT IN PRIORITY ROADS -**

**(S.W. SLOPES HAULAGE STUDY)**

**June 2015**

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## SUMMARY

This “Business Case report” supports the estimation of capital funding required to upgrade the most important components of roading infrastructure of the SW Slopes, to :

- enable the more efficient operation of the regional timber growing and processing industry
- ensure access to the plantation resource of the future
- minimise risk of supply interruptions for the processing sector
- deliver safe roads for local communities
- reduce on-going maintenance costs for assets owners (Local Government)

One “case study” project has been identified by each of the four Local Government Areas of the region, and the economic benefits delivered by these identified projects have been examined via the preparation of a Benefit-Cost Analysis (CBA).

The forest growing and timber processing industry of the SW Slopes region of NSW has been a significant component of the regional economy for at least the past thirty-five years. The regional industry can be currently valued at around \$967million per year (gross value of output), and provides an important source of jobs and wages for local residents. The first study into the haulage needs of the industry was prepared nearly twenty-five years ago, and frequent updates of this study have continued to identify deficiencies in the transport infrastructure available. This is the first attempt to quantify the potential economic benefits which could be delivered by a program of road upgrade and renewal, in order to provide a strong justification for the funding assistance sought in order to implement the upgrade program.

A Workshop held for the four Local Government Areas, together with representatives of both the public and private plantation sectors, identified some **key priorities** for investment in local road infrastructure. This is by no means a complete list of the upgrades required for the local road network, but rather quantifies the most important projects for investment. This analysis conducted has been largely limited to investment required for road asset owned by local government, and thus excludes some regional, State, and national roads which are also of vital importance to the efficient operation of the forest and timber processing industry.

The Softwoods Working Group considers that this total expenditure will result in benefits for the industry and the region via :

- Reduced vehicle operating costs for all road users, including the heavy vehicles involved in the transport of raw materials from forests to mills, as well as passenger cars
- Reduced recurrent operating expenditure for asset managers such as Councils, as upgraded roads require less ongoing maintenance
- Reduced accidents as improved roading standards increases safety for all road users.
- Reduced environmental costs, imposed as externalities by road use, because of improved productivity in transport
- Reduced strategic risk for the industry, from improvements to safety and productivity by the upgrade of key critical links where risk of road failure is paramount due to the lack of limited alternative links

- Providing on-going access to a valuable forest resource that supports local industry and therefore contributes to local jobs, wages, and demands for associated goods and services.

The CBA model has attempted to quantify the first four of these benefit items – the question of strategic risk is an issue that must be addressed subjectively at this time, based on interviews with major processors. The value of timber potentially accessed by each identified priority link is also listed, as a valuable indicator in its own right of the importance of an efficient haulage network.

This analysis has demonstrated that a clear business case can be established, to support the funding required. Results obtained for the identified case studies deliver a BCR (at 2% discount rate) of between 1.47 and 0.55. Moreover, a clear hierarchy of priorities can be established, as a result of the different BCR's calculated for the priority projects. The Softwoods Working Group is therefore confident that this first "business case" analysis clearly demonstrates the economic benefits available from the proposed investment program, and strongly recommends the program, set out in this report, to government for support.

It is anticipated that subsequent versions of this Business Case report will be prepared by the Softwoods Working Group, as identified projects are completed and new priorities become apparent. By investing in the vital road haulage network, the international competitiveness of the timber industry of the SW Slopes can be protected, and this important regional industry be supported to maintain jobs and output for the region.

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## **1 Introduction : South-West Slopes Haulage Studies**

Five reports (1990, 1995, 1997, 2001, and 2009) have been produced over the past twenty four years, as “Haulage Studies”, to provide a regular update on the road transportation requirements for growing and processing products from softwood plantations in the south-west slopes of New South Wales.

The first formal report was developed in 1990 at the suggestion of the then Premier of New South Wales, Nick Greiner. The catalyst for this report was a proposal from Australian Newsprint Mills for a major upgrade of the Riverina Highway from Heywoods Bridge below the Hume Dam to Thurgoona, to bypass the Albury-Wodonga Hume Highway bottleneck. The Batlow office of the Forestry Commission also proposed a major upgrade of the Lochinvar link between Wondalga Road and Main Road 85. It became apparent that a detailed examination of all woodflows on the regional arterials was necessary to determine priorities and costs. This work was carried out in the 1990 report.

This latest iteration of the haulage study continues the analysis of upgrades and improvements required to the road network used by the SW Slopes forest and timber industry. For the first time, this haulage study also presents the “business case” supporting the funding request – the estimation of economic benefits which will be delivered as a result of the identified transport network upgrades.

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## **2 Background : The Regional Forest and Wood Processing Industry**

### **a) Establishment of the Industry**

The south-west slopes of New South Wales, together with the north-east region of Victoria, forms the largest plantation wood basket in Australia. This region also contains the greatest concentration of wood processing in Australia. The major investments in pulp and paper, sawmilling, plywood and particleboard have been established since 1979, with the exception of the particleboard plant at Tumut which was built in 1964. More than \$1.2 billion has been invested in processing activities since 1999.

The plantation estate in the south-west slopes resulted from recognition of the softwood timber shortages that followed both World Wars. The State and Commonwealth governments, through the Softwood Forestry Agreement Acts (1967-1978), delineated sites around Australia where softwood plantations could be successfully established. The south-west slopes of New South Wales and north-east Victoria offered by far the largest available area. When the plantation establishment program commenced it was entirely on Crown land covered with native timber. There was no move onto cleared agricultural land in the south-west slopes until the mid-1980s. Since then, both government and privately owned plantations have been established on substantially cleared grazing and farming land.

### **b) Road Infrastructure**

The plantations around the south-west slopes of New South Wales, bordered by the Hume Highway to the west, had little high standard road access and most of the access road in the plantation areas had to be constructed by the forest owners, in this case the Forestry Commission of New South Wales. To this day the bulk of the road transport task, say 70%, is undertaken by the forest network. This is unique in Australia, where more usually 80 to 90% of the log haulage task is completed on roads owned by state or local governments. In summary there really has been no co-ordinated planning for plantation establishment along with road access. Both processes have been separated by time and government policy.

The previous Haulage Studies reflected the state of the industry in terms of processing facilities and transport needs, and reflected the priorities of the day. Nonetheless priorities have always focused on the backbone route from Jinjelic to Gundagai via Main Road 85. However Main Road 284 (from Tumbarumba to the Hume Highway) received early priority to allow pulpwood to flow from Tumut, Batlow, and Tumbarumba to the Australian Newsprint Mill at Albury. This update of the study will consider twelve priority road projects, identified by local Councils in consultation with forest (plantation) owners. All these priorities involve local roads – i.e. assets owned by local Government.

The objectives of the 2009 Haulage study were to :

1. Outline current industry planning and expected developments.
2. Review quantities hauled on the primary network.
3. Describe the standard and condition of the primary network.
4. Identify and quantify roadwork funding requirements of the primary network. There is also a need to fund road management works on the supplementary roads.
5. Demonstrate the economic benefits of preservation and development of the road network.

6. Provide a framework for road authorities to set priorities and coordinate operations.

The objective of this study is simple – to identify the economic benefits delivered (to the industry, to other road users, and to the regional community) as a result of investing in upgrades of key priority local road links in the timber haulage network of the SW Slopes.

### **c) Growth of the Industry**

The first major development in the regional timber processing industry was the particleboard plant at Tumut. This was the first large scale industry to take early thinnings from the plantations around Tumut. At this time (around the mid-60s) the plantation estate was being rapidly expanded and a number of small softwood sawmills were set up around the region in Tumut and Tumbarumba.

The next major development in the industry based on a rapidly increasing supply of pulpwood was the ANM newsprint mill at Albury. It was commissioned in 1980 and initially consumed around 300,000 t of pulpwood from the south-west slopes plantations. About 2000 ha per year was being first-thinned, and by the early 90s sawlogs from the pre-war plantations were being bolstered with sawlogs from second thinnings. On the basis of these increasing supplies of sawlogs larger additional allocations were made to Softwood Holdings and Petersville Sleigh (then owner of the Tumbarumba mill). Incremental improvements were made to these sawmills to handle the additional volumes, but there was no serious investment in new milling equipment until the late 1990s and early 2000's. By this time CSR had added a second particleboard line to the Tumut plant, using mainly sawmill residues.

During the 1990s the Forestry Commission had negotiated with ANM to reduce its pulpwood allocation to accommodate an increased input of recycled fibre. ANM then spent four years considering a decision to install a second paper machine. With the volume of sawmill residues and pulpwood rapidly increasing, it became a high priority task to facilitate the establishment of another pulp and paper facility. Visy commenced negotiations with the Forestry Commission in about 1993, after the Commission had become extremely frustrated with the lack of action by ANM's successor Fletcher Challenge. Visy's Kraft pulpmill at Tumut was commissioned in 1998 (is this the correct date?) and immediately made a large impact on the volume of first thinnings, and sawmill residues.

Meanwhile CSR Softwoods sold their Tumut sawmill to Weyerhaeuser International and that company significantly increased the capacity of the Tumut sawmill. (Note – no mention of this having been established?)

In the early 2000s the new owners of the Tumbarumba sawmill formerly owned by Petersville and Boral, Hyne Timber, constructed a new 1,000,000 t capacity mill at the Tumbarumba site . This mill drew supplies from both the south-west slopes, and north-east Victoria.

Visy commissioned a second paper machine in Tumut in 2010, with this machine utilising all available pulp and residues in the region, and drawing additional raw material supplies from Bombala and Oberon.

During the whole of this developmental period (1990 to 2006) the plywood factory at Forest Hill in Wagga Wagga continued in various ownerships, and is now owned by Big River Timbers of Grafton New South Wales.

All these major and significant developments to processing have also required large-scale mechanical harvesting operations. While there has been some loss in total employment, as labour-intensive practices are replaced with mechanisation and automation, there has been a considerable increase in required skill levels, and a commensurate increase in wage rates paid to harvesting workers. Similarly large-scale log haulage operations have developed.

Various economic studies by the Forest Industry Council, the Forest and Wood Products Research and Development Corporation, and Tumut Shire Council, conclude that all these developments have led to around 45% of the regional population relying on the forest industries for employment, either directly or indirectly. In summary, the plantation-based industries have been in a constant state of evolution since the very start of the plantation establishment program between the first and second world wars, and have now expanded to form a vital part of the regional economy.

#### **d) The current plantation estate**

The plantation estate of the south-west slopes of New South Wales has some unique features. The plantations zone is bordered by national park to the east, the Murray River to the south and the Hume Highway to the west and covers an area approximately 200 km long by 100 km wide, representing about 3% of the total land mass above Hume and Burrinjuck Dams. The rainfall varies from 700 mm in the West to 1200 mm in the east. Radiata pine has been grown in this area since 1920.

Native hardwood grows extensively through the same area in State forests and on privately owned land. Growth rates are slow and harvesting has almost totally ceased, due to environmental regulations. The last detailed cutting cycle analysis was completed (Bob Orman and Peter Crowe) in 1985. The sustained cut was 24,000 m<sup>3</sup> per year, but by now would be well in excess of 30,000 m<sup>3</sup> per year. The hardwood contribution to the road haulage task is therefore practically nil.

The region is an importer of softwood pulpwood because of the demands of the newsprint mill (now owned by Norske Skog) at Albury, and of the Visy paper mill at Tumut. Rationalisation of sawlog allocations in New South Wales and Victoria has eliminated cross border haulage of sawlogs except for isolated small sales.

No logs, pulpwood or chips are exported out of the region and these products are processed to their highest end use short of remanufacture for specific customer purposes. For example cardboard manufactured by Visy at Tumut is converted into boxes by the company's plant at Wodonga. The opportunity exists for the manufacture of engineered wood products (such as laminate beams, cross-laminate structural timber, wood/plastic composites, etc.) within the region.

There is no doubt that as the use of wood in large buildings (and particularly multi-residential buildings) increases this type of manufacturing will take place close to the forest.

The south-west slopes of New South Wales and north-east Victoria plantations and processing industries are identical in everything except size, to the major wood baskets of Chile and Brazil. Over

the last 20 years there have been major investments in pulp and paper in both countries, which have driven the need for highly efficient integrated harvesting and transport systems. There has been massive investment in road construction and upgrades by government and corporate entities in both these countries. The clear aim has been to reduce transport costs, and improve safety.

#### **e) Transport Needs**

As previously noted, forest and transport policy development have been completely separated and dislocated. The early days of log and pulpwood transport were typified by small rigid trucks. These were superseded by small semi-trailers which again were superseded by Bogie Drive tri-axle trailers along with greatly increased gross mass regulations. These developments were devastating to all road owners, and in the south-west slopes we have been trying to catch up with truck developments, and have never managed to get in front. While the usage of B-doubles has resulted in a relatively fewer truck movements, the wider community and the road owners have had to come to grips with much larger vehicles on relatively low standard roads. The current trends are towards multi-axle vehicles with even greater gross mass.

The primary timber road network within the region used for log and product haulage is most unlikely to change, for all the obvious reasons. Priorities for road upgrades and major maintenance have been regularly reviewed, as part of this planning process. When the initial plan was prepared in 1990 SWG decided which roads would be included, and which roads be excluded, on the basis of use or non-use. The industry and road owners realised that available funding should be concentrated on the most essential roads, and that other roads should be excluded from both log haulage usage and funding proposals. This view is still held by the industry, as is evident by the close focus of this current haulage study on key priority road projects.

The results of these decisions were that the backbone route from Gundagai to Jingellic was determined. The other primary routes from Tumbarumba to the Hume Highway and the Snowy Mountains Highway were also determined. The Snowy Mountains Highway is funded separately and is not part of this plan's deliberations. In more recent times main road 331 has been included but its potential share of the transport load is relatively small.

Priorities for major works have changed over time. After much debate about a Batlow bypass, and main road 85, Tumbarumba to Jingellic, the latter was prioritised and completed with major RTA funding because of the load capacity of the Jingellic Bridge over the Murray. However with the advent of Visy at Tumut and the rapid increase in B double usage, as well as the Adelong curfew, top priority was conferred on Gocup road and this remains the case now. The recent announcement of funding for the Gocup Road, sufficient to meet the total upgrade program identified, has been warmly welcomed by the SWG.

In consideration of all these issues, plus possible new processing opportunities and any changes in size of the plantation estate, it is impossible to see any significant change to the arterial road framework. Similarly the consistent development of transport equipment, and new developments in products and processing will continue over time. Some things are certain - there will be relentless pressure to ensure transport systems are cheaper, faster, and safer.

### 3 Current Role of the Industry in the SW Slopes region

Forestry in the South West Slopes of NSW centres about the Tumut and Tumbarumba Districts, and the forest growing and timber processing industry has developed over the last 40 years or so as set out in the previous chapter. As a result of this development, and combined with NE Victoria, the region is now the largest softwood producing area in Australia.

Growth in the overall industry was critically examined in 2004 (Schirmer, et al, 2005). This work demonstrated that the plantation sector contributed a significant proportion of economic activity in the LGAs of Tumut, Tumbarumba, Hume, and Holbrook. While relatively large areas of plantation have been established in Gundagai, most of the employment in the forest-related sectors is located in other LGAs.

Current output of the industry is estimated at \$970 million per annum, made up of :

- Sawn timber \$300 million
- Newsprint \$230 million
- Paper \$420 million
- Boards and plywood \$20 million

This current value of output estimate can be compared with earlier estimates of industry size of \$400 million in 1993/94 (Margules 1995) and \$574 million in 2002/03 (URS Forestry 2004). It is clear that the industry has been expanding steadily over the past decades. Productivity has also been increasing, with the value of output per hectare of plantation increasing from \$4,270 in 1993/94 to \$5,334 in 2002/03 (Schirmer, 2005).

The URS study (2004) also estimated that a total of 1680 people were directly employed by the SW Slopes forestry and timber processing sector in 2003/04. An estimated additional 3250 jobs were indirectly created in the region as a result of the activities of the timber industry. A total of nearly 5000 jobs for the regional population are therefore supported by this industry. The number of people employed has remained relatively steady from the mid 1990's, while the volume of timber harvested has risen – i.e., labour productivity has increased.

The region has two pulp and paper mills (3 paper machines), including the state-of-the-art Visy mill at Tumut. These mills have the capacity to produce around 1 million tonnes of newsprint and paper product per year. There are also four sawmills, two panel board plants, one plywood factory and two timber treatment plants located in or supplied from the region. These facilities are utilising nearly 3 million tonnes of roundwood resource from public and private softwood plantations, plus more than 1 million tonnes of local sawmill chips and pulpwood from other regions.

This region is unique to Australia in that timber is grown, harvested and processed locally, to its highest value added form: products from this region, being value added locally, are especially significant to Australia's balance of payments.

The South West Slopes Region of NSW currently produces around 1.6 million tonnes of softwood sawlogs and 1 million tonnes of pulpwood annually with a further 240 000 tonnes produced in Northern Victoria's Upper Murray. Including the volumes of other products required by the processing operation, together with the export of finished product, the total **haulage task** to be met by the road network of the region has grown to approximately 6 million tonnes (estimated 2014 levels).

The \$970 million output value generated by the combined forest growing and processing sector provides employment, and therefore household incomes, for local residents, and also creates

demand for other locally-provided goods and services. Economic development strategies for the local Shires, as well as for the Murray and Riverina regions, all recognise the critical importance of the softwood plantation resource as a source of local value-adding economic activity.

Forest ownership is mixed. Currently, and up to at least 2020, the region's supply from plantations will be very stable. The total plantation area managed by Forests NSW is decreasing slightly, however it is balanced by growth in private plantations. There is also a significant volume of pulp logs being transported to the Visy Mill at Tumut from the Macquarie (Bathurst) and Monaro (Bombala) regions.

The Timber Supply Agreement between Visy and Forests NSW required additional plantings of 20,000 ha (FNSW) and 10,000 ha (Visy). While more than half of these plantations have now been established, it will be at least 5 years before product from these additional plantings impacts on haulage.

The Norske Skog newsprint mill at Albury sources around 410,000 of pulplogs annually, from State Forests in the SW Slopes region, from Hancock Victorian Plantations (carried on highways only), from Murray River and Hume forests, and from private plantations. Another 100,000 tonnes of sawmill chips are sourced from both NSW and Victoria.

The Hyne sawmill at Tumbarumba has been redeveloped and has incorporated the former Austral operation based at Holbrook. This world-class facility has the potential to utilise 1 million tonnes sawlogs per year.

The forest plantation resource produced in the SW Slopes region thus supports a large, integrated, processing (value-adding) industry. Together, the forest and processing sector make a very significant contribution to the economy of the region, both in terms of output value and employment. All this economic activity depends on an efficient and safe road network, maintained at a suitable standard to support the transport of raw materials and finished product through the region.

## 4 Regional Context

It is also useful to consider the transport needs of the regional timber industry in the context of identified freight transport needs in the wider region. The Regional Freight Transport Plan prepared by REROC (the Riverina Eastern Regional Organisation of Councils) – *REROC, June 2014* – has identified investment required in roads that are integral to the total freight task in the REROC region. This study has identified the following roads (listed in order of priority) within the areas of Tumut, Tumbarumba, Greater Hume, and Gundagai, as being important to the timber industry, and also in need of upgrade/repairs to bring the road link up to standards required for HML and CML vehicles, especially B-Doubles :

- Gocup Road (MR 279) between Gundagai and Tumut
- Snowy Mountains Highway between Tumut and the Hume Highway
- Bombowlee Creek Road
- Batlow Road (MR 85N) from Tumut to Tumbarumba
- Rosewood Road (MR 284) from Tumbarumba to the Hume Highway
- Coppabella Road
- Jingellic Road (MR 331)
- Tooma Road (MR 628) south from Tumbarumba
- Tumbarumba to Jingellic Road (MR 85S)

The REROC Plan (and therefore the upgrade priorities listed above) is viewed as being entirely consistent with the goals of relevant State planning instruments – viz. the NSW State Plan, the NSW Master Transport Plan, the NSW Freight and Ports Strategy, the Regional Transport Plan, and the Riverina Regional Action Plan.

The SWG notes that plans are being developed for expenditure on **regional** roads in the area. For instance, funding of \$70 million has recently (February 2015) been announced for improvements to the Gocup Road. This link has long been recognised, by previous SWG Haulage Studies, by Tumut Shire Council, and by the REROC Freight Study, as being of prime importance to the regional timber industry. The funding provided will be sufficient to deliver the full program of works proposed for Gocup Road, and is warmly welcomed, after multiple funding requests. Similarly, expenditure on important links such as MR85, relevant portions of the Snowy Mountains Highway, and other regional roads is expected to come from other sources, and such roads have therefore not been identified as “priorities” by Local Government – although confirmed as being of great importance to the timber haulage function required by the industry.

It should also be noted that the industry has taken steps to minimise problems associated with the use of MR85 between Tumbarumba and Wondalga, by prohibiting access through Batlow for timber trucks. Instead, timber is hauled over the Greenhills Access Road, which acts as a *de facto* Batlow by-pass. This road, constructed by FC NSW, therefore reduces the need for further expenditure by the NSW Government on MR85. Indeed, the SW Slopes timber region differs from other plantation regions in the State in that FC roads deliver a far higher share of the total timber haulage task – it is estimated (*pers comm*) that around 50% of the SW Slopes timber is hauled on forestry roads, compared to around 10% in other areas such as Oberon. **Peter C to check this.**

The evaluation presented in following chapters of this report is therefore focussed on local roads – those roads owned by Local Government, and for which no funding can be expected unless by the provision of special grants.

The business case analysis presented in this study provides the justification for such requests to be granted.

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## 5 Priority Road Investment Needs

The four Local Government Areas of the region convened a Workshop in February 2015, at which each identified the three highest priority road upgrade programs, relating to use of local roads by the timber industry. The following table 1 summarises the dimensions of these priority projects, and their use by the timber industry.

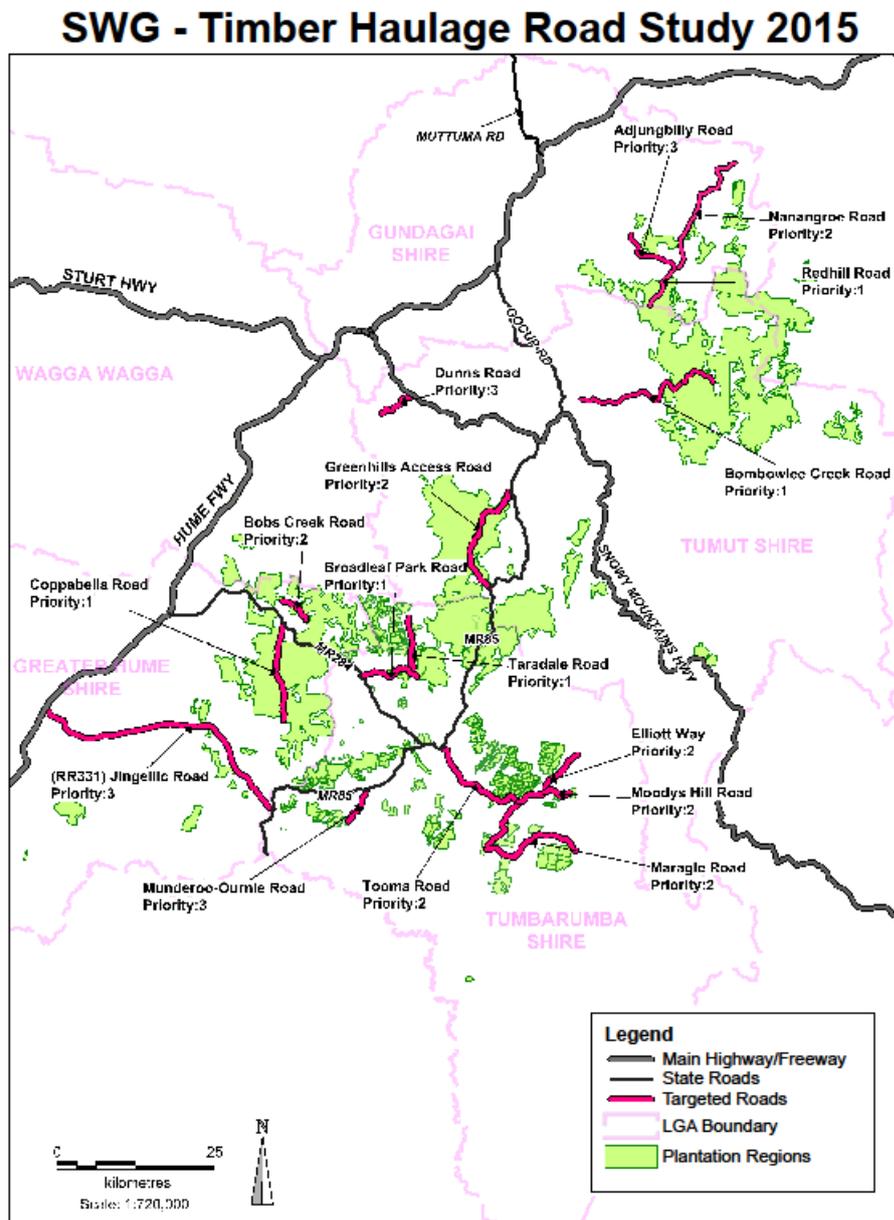
**Table 1 : Priority Investment Needs**

	Road	Length of Project (kms)	Cost of Project (\$)	Timber Hauled	
				Yrs1-5	Yrs 6-10
Greater Hume	Coppabella	12	\$8.0 million	920,000	836,000
	Jingellic	5.6	\$1.5 million	128,000	80,000
	Bobs Creek	36	\$9.0 million	78,000	104,000
Gundagai	Redhill	8.1	\$0.83 million	304,000	516,000
	Nanangroe	18.1	\$1.47 million	137,000	440,000
	Adjungbilly	11.5	\$1.2 million	120,000	0
Tumbarumba	Taradale complex (includes Broadleaf Park Road)	9.5 + 10.21	\$8.15 million	469,000	262,000
	Elliott Way complex (includes Tooma Rd, Maragle Rd, and Moody's Hill Rd)	27.92+16.6 +11.26+6.32	\$17.06 million	1,152,000	939,000
	Munderoo-Ournie Road	6	\$2.23 million	20,000	0
Tumut	Bombowlee Ck	28.17	\$2.31 million	3,305,000	2,646,000
	Greenhills Access	20.89	\$1.6 million	2,443,000	2,264,000
	Dunns	7	\$0.44 million	100,000	50,000

The locations of these roads is illustrated in Figure 3 following. A funding program to address these identified projects for these priority roads would involve the expenditure of \$53.80 million, spread over 235.2 kms of road. The roads will carry an average of 1.729 million tonnes of timber **each year** over the next 10 years – i.e. a total of 17.29 million tonnes. This volume of timber can be valued (in log form, allocated as per confidential information into pulplogs and sawlogs) at \$1,215 million over 10 years – or an average of \$121 million per annum.

Following preliminary analysis of these proposals, it was agreed that the evaluation (business case) task would focus on just four case studies, selected from these priority projects. Results are reported in the following section.

Figure 3 : Location of 12 Priority Projects identified for SW Slopes



## 6 Economic Evaluation of Four Priority Case Studies

From the preliminary twelve identified priorities, four case studies have been selected for more detailed analysis:

- Bombowlee Creek Road in Tumut Shire
- Broadleaf Park Road in Tumbarumba Shire
- Coppabella Road in Greater Hume Shire
- A complex of roads in Gundagai Shire, involving sections of the Adjungbilly, Redhill, and Nanangroe Roads (termed the Northern Road Complex).

Projects to improve these links were selected for evaluation because of their **particular importance** to the timber industry (in terms of volume of timber carried and strategic risk of supply disruption), and for **road safety concerns** for all users of these links.

Each of these case studies has been subjected to a cost-benefit evaluation, whereby data is compiled on the basis of “with” the project and “without” the project. The resultant difference in costs and identified benefits are then compared over a 10 year period, to yield results in terms of :

- An internal rate of return (IRR), or the discount rate at which the project delivers a Net Present value (NPV) of zero.
- A Benefit/Cost ratio (BCR) derived by comparing the present value (PV) of benefits and the PV of costs, at specified discount rates.

Details of model output are presented in Appendix 2. In addition to calculating NPV, IRR, and BCR for each project, the modelling process including an assessment of the sensitivity of results to certain key variables. Results of this sensitivity analysis are also presented in Appendix 2.

The benefits assessed for each case study were :

- Reductions in vehicle operating costs (VOC) for cars and heavy vehicles, resulting from improvements in road standard
- Reductions in environmental costs, resulting from improvements in road standard.

These two benefit items were calculated using data available from the NSW Government, as used for the evaluation of public sector transport projects (Transport for NSW, 2013). This document contains relevant data on VOC (\$/km for cars, and \$/tonne-km for HV) for various specified road standards, as well as for “environmental costs” associated with vehicle use.

Other benefit items were also assessed :

- Reductions in accident rates, because of improvements to road conditions
- Reductions in Council operating expenses

Data from Councils were used to assess the levels of operating (maintenance) costs, before and after the specified project. Using accident cost data from the Transport NSW “Guidelines” document (Transport for NSW, 2013), estimates were prepared of the savings resulting from likely reductions in observed accident rates on the roads.

In each of the models, results were assessed as being sensitive to:

- The quantum of capital expenditure proposed
- Changes in road safety (a function of estimated incidence of accidents, and assumptions as to future reductions in incidence following road upgrades).

The location of each of these roads is indicated in Figure 4. The overall summary results are presented in Table 2 – details of the modelling for each case study are contained in Appendix 2, and the individual case study results are discussed below.

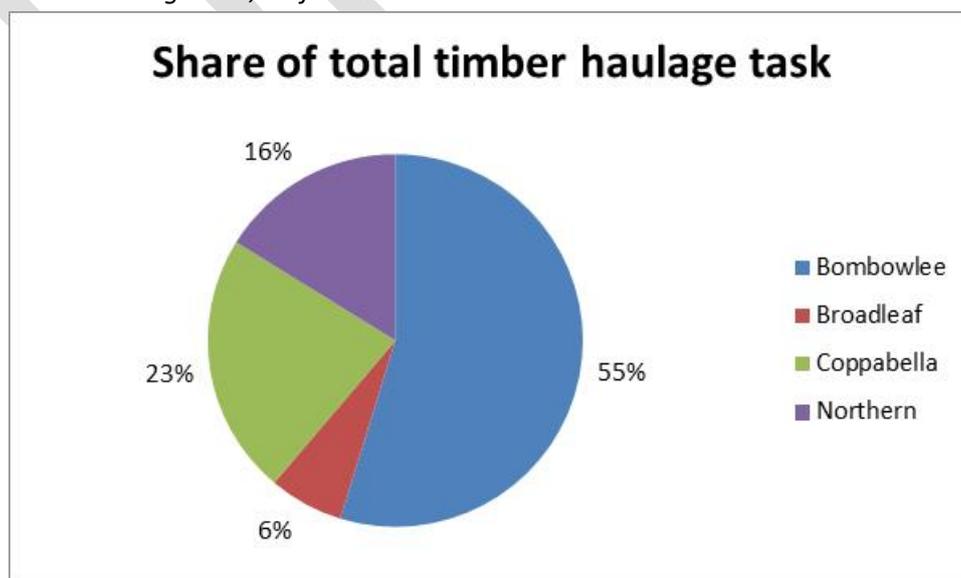
**Table 2 : Case Study CBA results**

Case Study	Capex (\$m.)	IRR (%)	BCR @ 5%	Capex/km	Capex/tonne
Bombowlee Creek Road	5.020	9.79	1.33	\$0.492 mill	\$9.33
Broadleaf Park Road	1.150	na	0.71	\$0.158 mill	\$18.21
Coppabella Road	5.000	na	0.48	\$0.625 mill	\$22.44
Northern road complex	3.295	na	0.84	\$0.106 mill	\$20.77
<b>TOTAL CASE STUDIES</b>	<b>14.465</b>	<b>1.56</b>	<b>0.88</b>	<b>\$0.256 mill</b>	<b>\$14.72</b>

In summary, grant funding is sought for a total of \$14.465 million, to be spent over 56.6 kms of roads in four LGA's. Taken collectively, the total of the four projects will deliver an IRR of 1.56, and a BCR of 0.88. These roads carry an average of just under 1 million tonnes of timber per year over the next 10 years, with this volume having an average annual value over the same period of \$69.176 million.

The relative contribution of each of these four projects to the total timber haulage task is indicated in Figure 4 :

**Figure 4 : Timber haulage task, on four case studies**



Details of the evaluation of each case study is presented below.

## 6.1 Evaluation of the Case Studies – summary of results for each

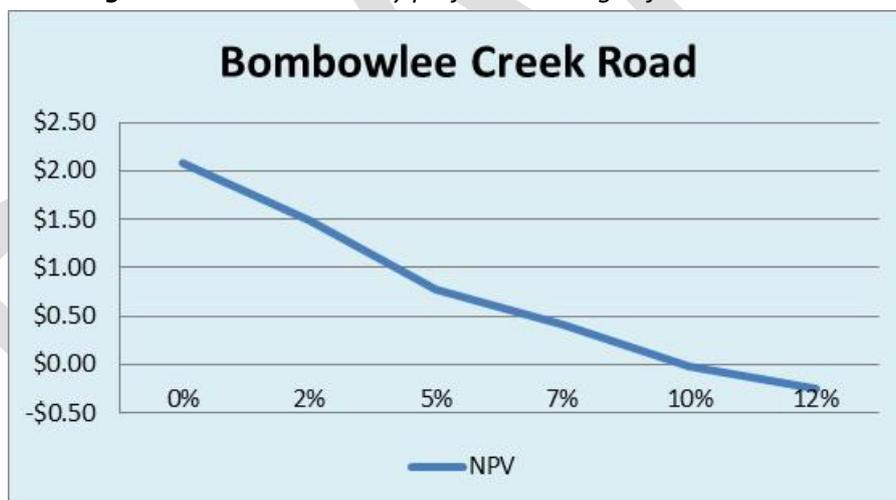
### **Bombowlee Creek Road:**

This case study delivers attractive returns from the required investment – an IRR approaching 10%, and a positive (higher than 1.0) BCR at 10% - see Figure 5. A total capital cost of \$5.020 million is involved, split between road upgrades (just over \$3 mill) and a new bridge (\$2 mill), over a total distance of 10.2 kms).

One reason for the attractive returns generated by this project relate to timber volumes hauled. This road carries more timber than any of the other links evaluated – an average of 538,000 tonnes per year over the next 10 years, with an average value of \$38.2 million. This is around 55% of the total timber haulage task delivered by the four case studies. As a result of this high timber haulage task, this project delivers the lowest ratio of capital cost to volume of timber carried – just \$9.33 per tonne (see Table 2 above).

The other main reason for the strong business case delivered by this case study is the unfortunately high accident rate experienced over the last 5 years. There have also been two fatalities over this period – so any reduction in incidence, together with the high value placed on a life (Transport for NSW, 2013), makes a significant difference to the IRR delivered. An assumed reduction in current accident incidence is the largest single source of benefit for this project.

**Figure 5 : NPV delivered by project at a range of discount rates**



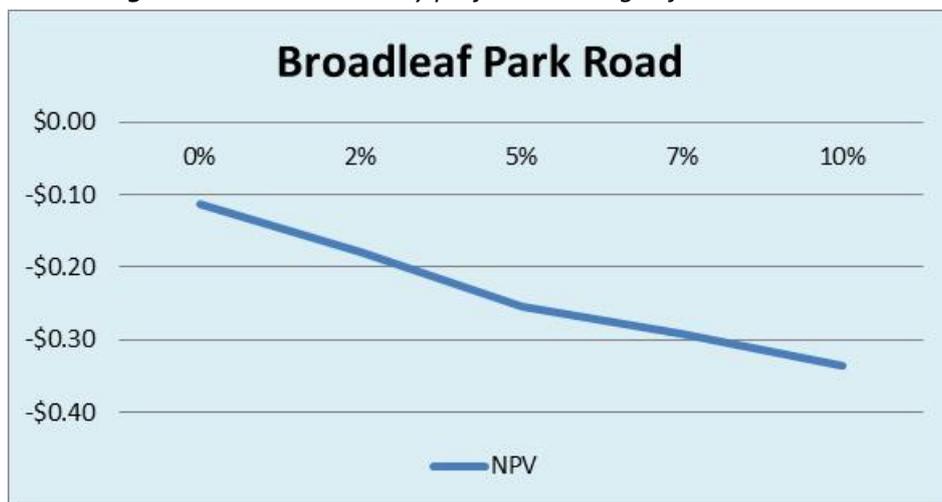
As indicated in Appendix 2, an IRR of 10% can be delivered if a 25.26% reduction in accident rates can be achieved. Similarly, a capex of \$4.99 million would deliver a 10% IRR. These strong results lead to this project being recommended for funding.

### **Broadleaf Park Road:**

This is a much smaller project, in terms of both capex and volume of timber involved. A total of \$1.15 million is required, to upgrade two sections of the road covering a distance of 7.3 kms. Average annual timber volumes hauled on this road are around 63,150 tonnes – just 6% of the total volume of timber travelling along the four case study roads.

Despite the relatively low capex, the relatively short section of road, combined with the low haulage task, delivers a fairly poor result – see Figure 6. The project does not deliver a positive IRR, and a BCR of just 0.82 at 2%. In addition, this road has a fairly good accident record, and so there is not so much scope for improvement (and therefore benefits) from improved safety. The largest single source of benefits delivered by the Broadleaf Park Road project is the anticipated reduction in ongoing Council maintenance spending.

**Figure 6 : NPV delivered by project at a range of discount rates**



However, sensitivity testing on capex variables suggests that a BCR of 1.0 (at 2%) could be achieved if capex were to be restricted to \$0.963 million. In other words, a reduction in capex of just 16% (\$187,000) would allow the project to yield an acceptable BCR (i.e. 1.0) at 2% discount rate. An IRR of 2% could also be delivered by the project if capex were restricted to \$0.975 million. This project could therefore be favourable assessed with only minor changes to proposed capex, and so is recommended for funding.

**Coppabella Road:**

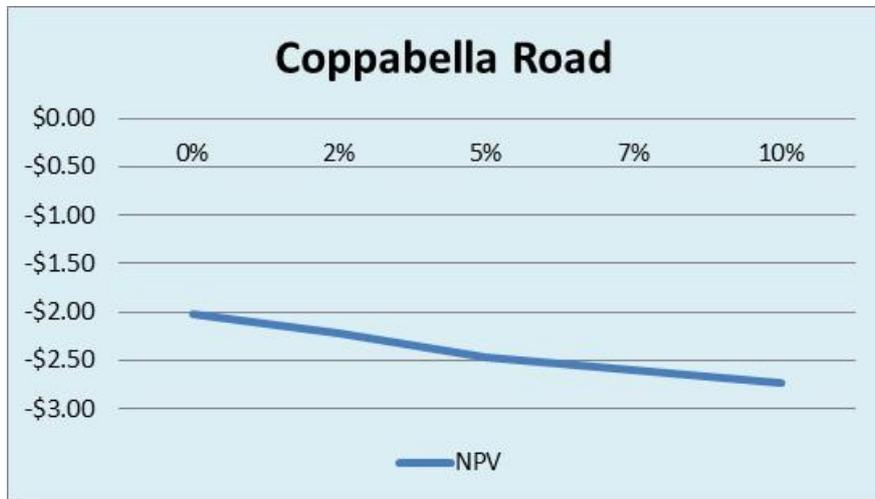
The Coppabella Road project involves a capex of \$5 million, and a road length for upgrade of 8.0 kms. This case study has the highest cost in terms of \$/km, and also in terms of \$/tonne timber carried. Estimates of the capex required are high because of the need for several bridges and culverts to be constructed on this poor standard section of road. It is important to upgrade this road, as it is expected to carry an annual average of 222,850 tonnes of timber over the next 10 years, or nearly 25% of the total timber haulage task estimated for these four case studies.

The most important single source of benefit delivered by the Coppabella Road upgrade is the reduction in Council opex (maintenance expenditure) which will be obtained. Without the proposed investment in road upgrades, the Council expects to incur major costs in trying to maintain the road to the current standard.

Sensitivity testing of these results has indicated that if capex could be reduced to \$2.727 million, then an IRR of 2% could be achieved, with a BCR of 1.0. To deliver an IRR of 10% would require capex to be further reduced to \$1.994 million.

This road also has a good accident record, to date. However, with the increased volumes of timber expected to be carried, and the associated deterioration of the road if no upgrades are conducted, safety will become of paramount importance.

**Figure 7 : NPV delivered by project at a range of discount rates**

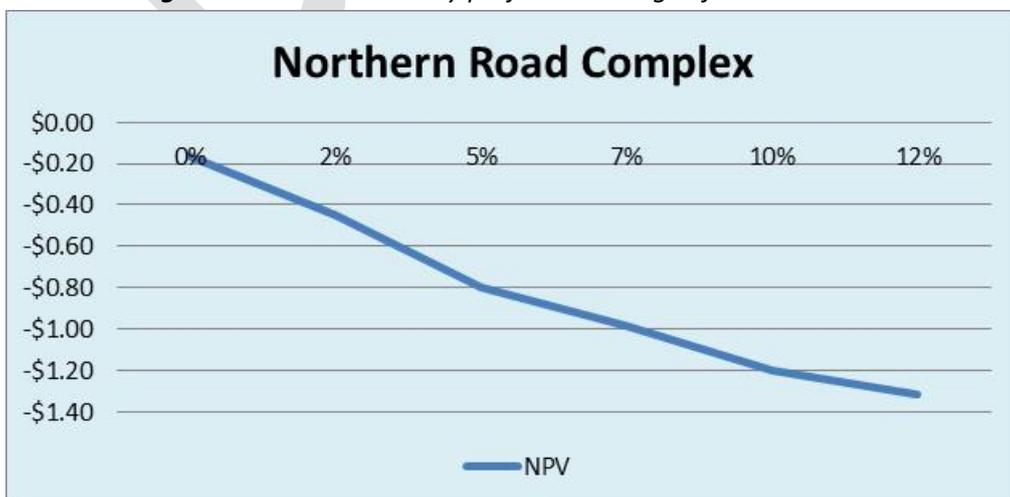


Although yielding the poorest results of the four case studies, this project is still recommended for funding given the high volume of timber to be carried and the likely failure of the road without investment. The high volumes of logs hauled on this road indicate high levels of strategic risk for the processing operations based on this resource (see Section 7 for discussion of the implications of this risk). In addition, the current poor state of the road, combined with anticipated high HV usage, is likely to result in declining road safety standards and therefore increase the risk of accidents.

**Northern road complex:**

There are a number of roads which run from the north to intersect with the Bombowlee Creek Road, owned by Gundagai Shire and also the Forestry Corporation of NSW. A combined project has been identified, involving a total of 31 kms but including several different roads. The map presented in Appendix 1 indicates this “northern complex”, comprising sections of Redhill, Nanangroe, Adjungbilly, and Billapaloola Roads.

**Figure 8 : NPV delivered by project at a range of discount rates**



Results obtained from the economic evaluation of this project do not, at first glance, appear favourable. The project cannot deliver a positive IRR, and even at 2% discount, the BCR is still less than 1. However, sensitivity testing reveals that the project can become positive with minor changes in some of the assumptions – particularly the total quantum of capex. If capex were to be reduced to \$3.154 million (a 4.3% decline from the estimated cost of \$3.295 million), a BCR of 1 at 2% can be obtained. If capex is further reduced to \$2.456 million, an IRR of 5% will be delivered by this project. The results are also sensitive to minor adjustments in assumptions relating to accident rate reductions – if the road upgrade can halve the current accident rate, then an IRR of 8.90% will be delivered, with a BCR (at this rate) of 1.16.

The project is therefore recommended for funding. If capex is reduced to \$3.2 million, and the accident rate can be reduced by 40%, the project will deliver an IRR of 5.85% and a BCR at this rate of 1.14.

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## 7 Business Case to Support Investment

The economic evaluation of the four cases studies has concluded that all four projects should be recommended for funding. Despite some apparently poor results being delivered by three of the projects (see Table 2, reproduced below), there are a number of reasons for this conclusion:

- In its totality, a positive result can be obtained from the investment program.
- In most cases, relatively minor adjustments to capex can deliver positive results - results are sensitive to relatively minor changes in some key assumptions.
- Improved road standards offers potential for the timber haulage sector to move to higher productivity vehicles.
- Safety issues are considered paramount – the combination of use of these roads by HV carrying timber, with private vehicles (especially cars driven by tourists who may not be familiar with these roads, or with driving on small and often deformed country roads generally) greatly increases the risk of accidents.
- If these upgrades are not implemented, the four Councils involved will face significant increases in the need for on-going maintenance expenditure on the roads in question. This will place further pressures on limited budgets.
- There are strategic risks involving an interruption in supply of logs to the processing industry which is based on the plantation resource of the SW Slopes. This is further discussed below.

**Table 2 : Case Study CBA results(repeated)**

Case Study	Capex (\$m.)	IRR (%)	BCR @ 5%	Capex/km	Capex/tonne
Bombowlee Creek Road	5.020	9.79	1.33	\$0.492 mill	\$9.33
Broadleaf Park Road	1.150	na	0.71	\$0.158 mill	\$18.21
Coppabella Road	5.000	na	0.48	\$0.625 mill	\$22.44
Northern road complex	3.295	na	0.84	\$0.106 mill	\$20.77
<b>TOTAL CASE STUDIES</b>	<b>14.465</b>	<b>1.56</b>	<b>0.88</b>	<b>\$0.256 mill</b>	<b>\$14.72</b>

In summary, grant funding is sought for a total of \$14.465 million, to be spent over 56.6 kms of roads in four LGA's. Taken collectively, the total of the four projects will deliver an IRR of 1.56, and a BCR of 0.88. These roads carry an average of just under 1 million tonnes of timber per year over the next 10 years, with this volume having an average annual value over the same period of \$69.176 million.

Bombowlee Creek Road has the lowest cost in terms of capex per tonne of timber carried, while the Northern Road complex delivers the lowest cost per km of road upgrade. Coppabella Road delivers the highest costs, in terms of both capex/tonne of timber carried, and capex/km. Broadleaf Park Road has a relatively low cost/km, but a fairly high cost/tonne – as it is a fairly low quantum of capex, with low volumes of timber carried.

Sensitivity testing has revealed that all projects can deliver favourable returns if minor changes are made in a few key variables.

## **Strategic risk considerations**

Section 3 of this report has outlined the size (in economic terms) of the processing industry of the region, and has indicated the contribution that the overall forestry and wood processing sector makes to the regional economy. With a total gross value of output approaching \$1 billion per year, and an estimated 5,000 jobs in the region being supported (directly or indirectly) by activities within the sector, any measures to protect and support this activity must be considered as being of the highest priority.

Discussion with the major corporate operators in the processing sector has revealed a high level of concern over any factors which may act to interrupt resource supply to processing facilities. An interruption to supply would be caused by road closure, due to events such as a bridge collapse, and/or a decision by Council to close a road due to excessive damage (e.g. pavement failure) rendering the road unsafe. While there are alternative routes available in some cases, use of such alternatives would increase vehicle operating costs and cause delays in delivery. Such costs become particularly crucial in the case of Bombowlee Creek Road, where there is no viable alternative access into Tumut from the plantations to the east.

While individual assessments of financial costs imposed must remain confidential, the concerns can be summarised as :

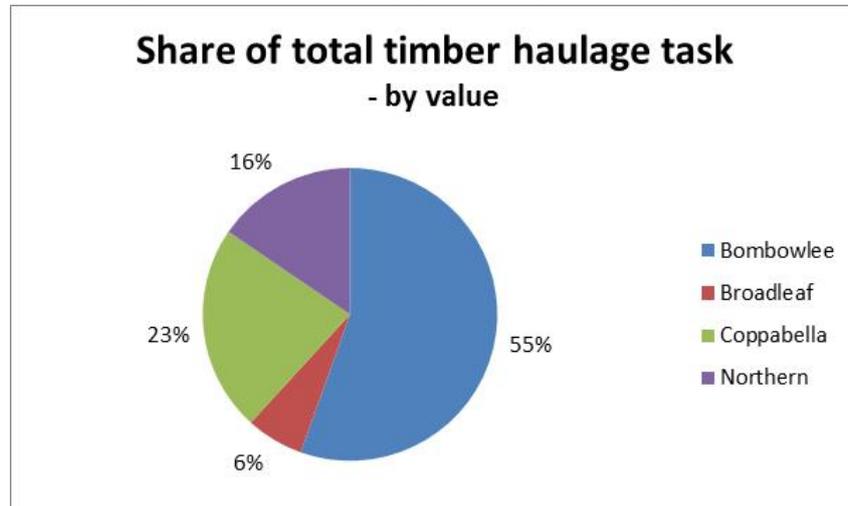
- Loss of profits due to any production halts imposed, and the need to maintain fixed costs. In total, a halt of even one day would result in revenue loss of several million dollars. Many facilities operate on a 24 hour per day, 7 days per week, basis.
- Risk of breaching market supply contracts, which would impose penalties and could even result in loss of market to competitors such as imported timbers
- Higher operating costs if supplies have to be brought in over longer distances – there are very limited alternate supplies available locally, due to lack of new investment in plantation establishment, and loss of forest area to fires in 2003 and 2012
- Any impacts from supply restrictions would be swift and dramatic – inventories of resource stock on site at the mills tend to be adequate for a few days only
- Loss of income for forest growers if resource is not supplied, as well as risk of penalties resulting from breaching contractual arrangements. Assuming a 365 working-day year, the four case study roads are responsible for the delivery of an average of \$190,000 worth of timber each day
- Depending on the length of supply interruption, and the additional cost of any alternate supplies, mill operations could be cut back, with associated reductions in shift requirements. This would result in a loss of income (and even jobs) for employees, with resulting flow-on effects through the regional economy.

## **Value of timber considerations**

As indicated above, the four case study roads will be responsible for the delivery of an average of \$69.18 million of timber each year over the next 10 years. This is split between the four roads examined as illustrated in Figure 9.

Over the next 10 years, the annual value of timber carried ranges from a low of \$58.98 million to a high of \$89.52 million. This average value (\$69.18 million) represents 4.7 times the total value of investment being sought for the proposed road upgrades (\$14.46 million). Assuming a 365-day year, this average annual value means that, on average, around \$190,000 worth of timber will be hauled on the four roads every day.

**Figure 9 : Timber haulage function of case study roads**



It is clear that Bombowlee Creek Road provides the largest share of this haulage function, carrying around 55% of the timber (by volume and by value) that is carried on the four case study roads.

## Conclusions

The business case presented here suggests that all four case studies should be funded. While not all these projects deliver a positive result from the economic evaluation conducted, other factors must also be considered relevant to the funding decisions, such as:

- The sensitivity of results to changes in key variables/assumptions
- The strategic risk to industry from road failures
- The importance of safety concerns for all road users
- The relativity of funding sought to timber values hauled
- The fact that, taken as a whole, a positive economic result is delivered

All four case studies are therefore recommended for funding.

## References

Margules Groom Poyry Pty. Ltd., 1995. *The Economic Impact of the NSW Timber Industry*. State Forests of NSW, December 1995.

REROC, 2014. *Regional Freight Transport Plan*. Riverina Eastern Regional Organisation of Councils (Infrastructure Planning Sub-Committee), June 2014.

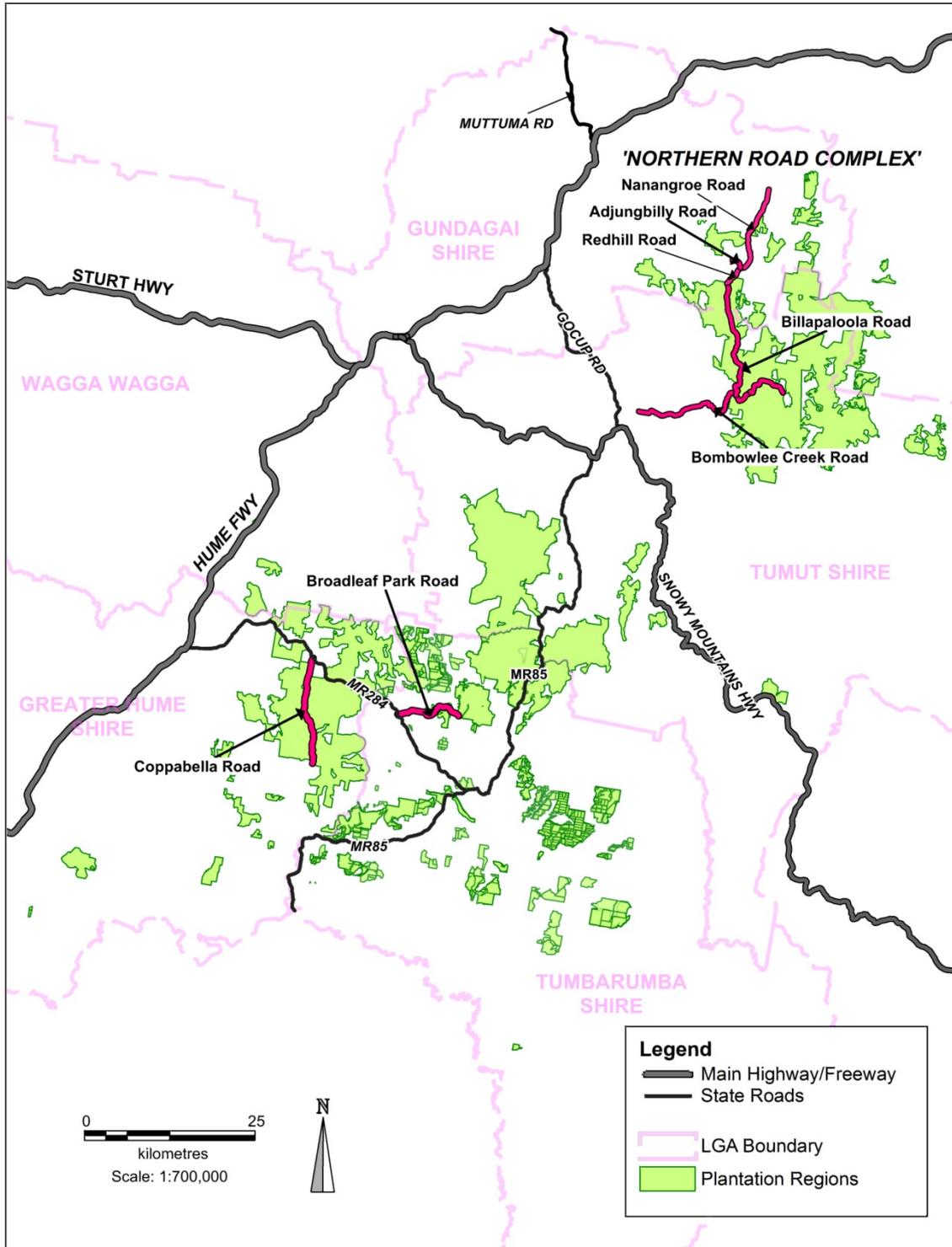
Schirmer, et al, 2005. *Socio-economic impacts of Plantation Forestry in the South West Slopes region (NSW)*. Forest and Wood Products Research and Development Corporation, and Bureau of Rural Sciences, November 2005.

Transport for NSW, 2013. *Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives*. March 2013.

URS Forestry, 2004. *Profile of the value of the timber industry in the SW Slopes region of NSW*. Report prepared for the Riverina Regional Development Board, August 2004.

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## SWG - Timber Haulage Road Study 2015



## **APPENDIX 2 : Details of economic evaluation**

Output from the models built to evaluate each of the four case studies, together with a summary of output, is presented in the following spreadsheet extracts:

- Summary of case studies
- Bombowlee Creek Road results
- Broadleaf Park Road results
- Coppabella Road results
- Northern Road Complex results

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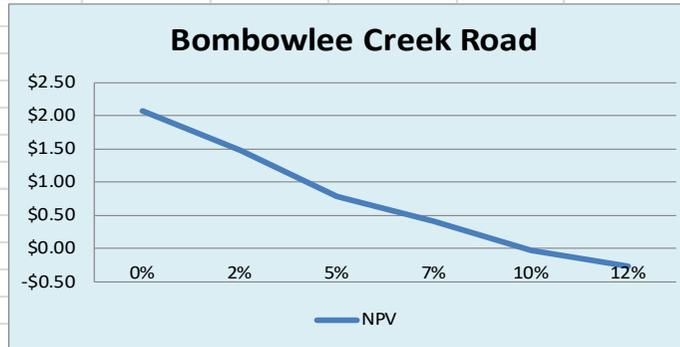


**BOMBOWLEE CK. ROAD**

<b>6. Results</b>		<b>NPV</b>	0%	\$2.08
			2%	\$1.48
<b>METRICS :</b>			5%	\$0.78
<b>Cap/Km</b>	0.492 \$ m./km.		7%	\$0.41
<b>Cap/t.</b>	9.33 \$/tonne timber		10%	-\$0.03
<b>Cap/\$ tim</b>	0.131 \$\$/\$ val timber		12%	-\$0.26

**IRR**  
9.79%

**BCR (10%)**  
1.16



**SENSITIVITY TESTING**

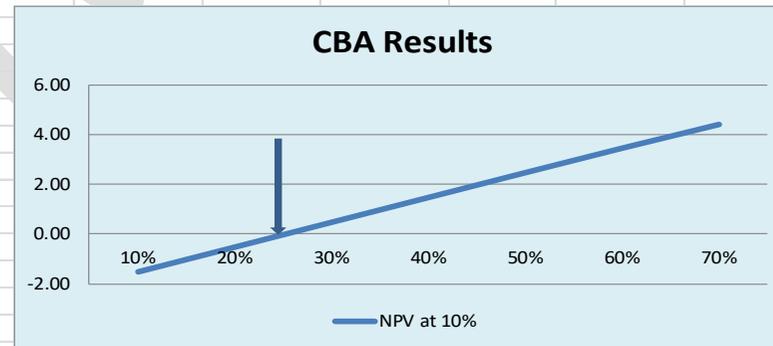
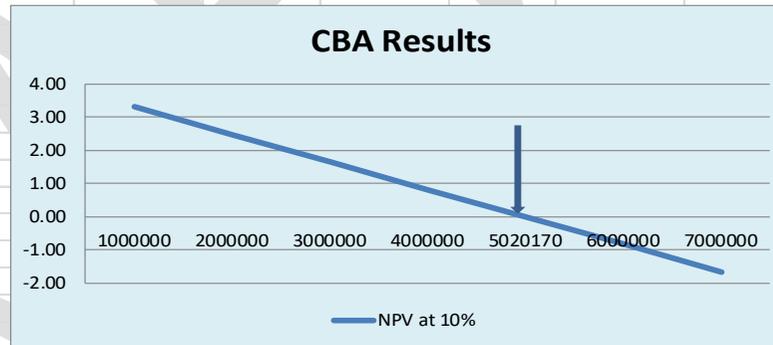
Capital cost	NPV @ 10%	-\$	0.03
\$ mill.	1000000		3.30
	2000000		2.47
	3000000		1.64
	4000000		0.82
	5020170		-0.03
	6000000		-0.84
	7000000		-1.66

but - assumes 25% accident reduction

**B'even capex (@10%)**  
\$4.99 mill.

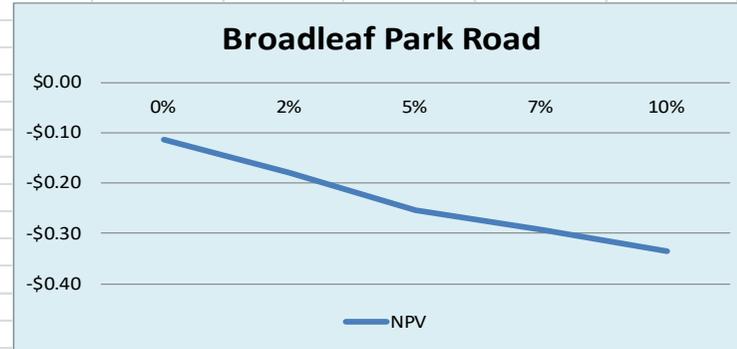
Assumed red'n. in accidents	NPV @ 10%	-\$	0.03
10%			-1.51
20%			-0.52
30%			0.47
40%			1.46
50%			2.44
60%			3.43
70%			4.42

**B'even reduction rate (@10%)**  
25.26%



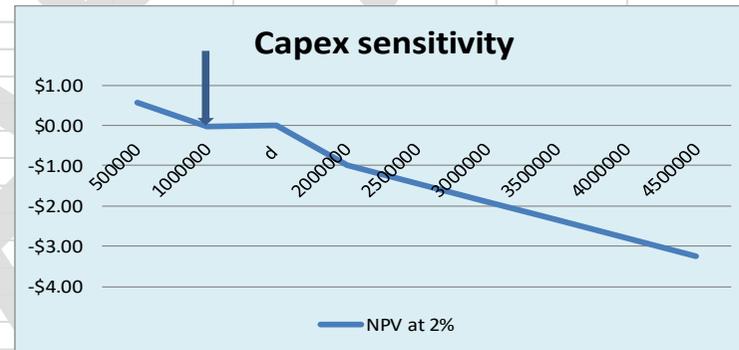
BROADLEAF PARK ROAD :				
<b>6. Results</b>		NPV	0%	-\$0.11
			2%	-\$0.18
<b>METRICS :</b>			5%	-\$0.25
<b>Cap/Km</b>	0.158	\$ m./km.	7%	-\$0.29
<b>Cap/t.</b>	18.21	\$/tonne timber	10%	-\$0.34
<b>Cap/\$ tim</b>	0.263	\$/val timber		

<b>IRR</b>	na
<b>BCR (10%)</b>	0.58
<b>BCR (2%)</b>	0.82

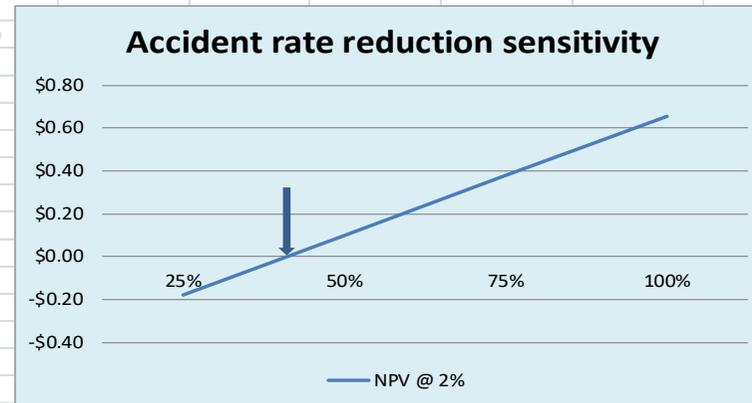


### SENSITIVITY TESTING

Capital cost		NPV @ 2%	NPV @ 5%	NPV @ 10%	BCR @ 2%
\$ cost	500000	-\$0.18	-\$0.25	-\$0.34	0.82
	1000000	\$0.56	\$0.38	\$0.16	2.18
	1000000	-\$0.03	-\$0.12	-\$0.24	0.96
	d	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	2000000	-\$0.99	-\$0.94	-\$0.86	0.45
For IRR of 2%	2500000	-\$1.45	-\$1.32	-\$1.15	0.35
B'even capex =	3000000	-\$1.90	-\$1.71	-\$1.44	0.29
\$0.975 m.	3500000	-\$2.35	-\$2.09	-\$1.73	0.25
(BCR of 0.70)	4000000	-\$2.80	-\$2.46	-\$2.02	0.21
For IRR of 5% =	4500000	-\$3.25	-\$2.84	-\$2.30	0.19
\$0.862 m.					
(BCR of 0.80)					
For BCR =1, capex =	\$0.963 m.				
(@2%)					25%

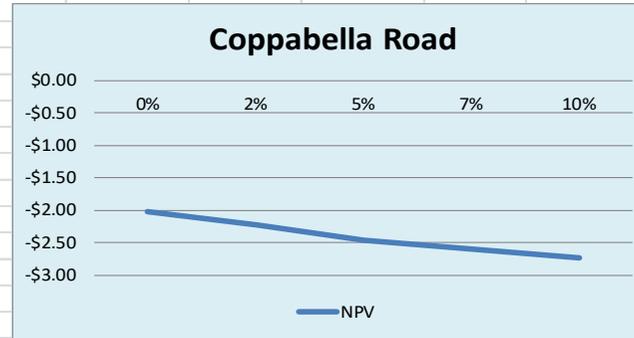


Accident rate reduction	NPV @ 2%	NPV @ 5%	BCR @ 10%
	-\$0.18	-\$0.25	
25%	-\$0.18	-\$0.25	
50%	\$0.10	-\$0.02	
75%	\$0.38	\$0.22	
100%	\$0.66	\$0.45	
For IRR of 2% =			
	41%		
For IRR of 5% =			
	52%		

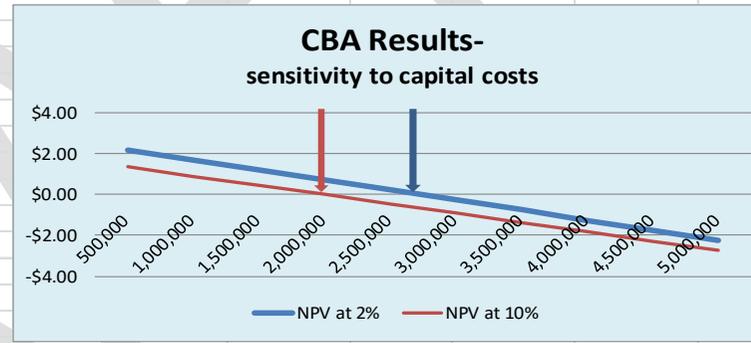


<b>COPPABELLA ROAD :</b>				
<b>6. Results</b>		NPV (\$ mill.)	0%	-\$2.02
			2%	-\$2.23
<b>METRICS :</b>			5%	-\$2.47
<b>Cap/Km</b>	0.625	\$ m./km.	7%	-\$2.59
<b>Cap/t.</b>	22.44	\$/tonne timber	10%	-\$2.73
<b>Cap/\$ tim</b>	0.317	\$/val timber		

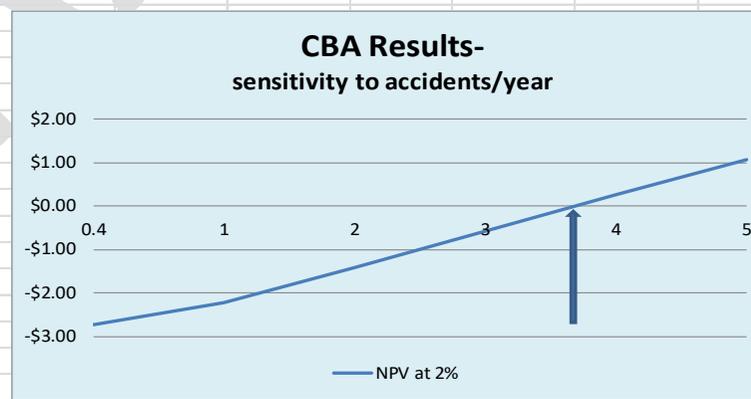
<b>IRR</b>	na
<b>BCR (10%)</b>	0.40
<b>BCR (2%)</b>	0.55



<b>SENSITIVITY TESTING</b>		NPV @ 2%	NPV @ 10%	BCR (2%)
<b>Capital costs (\$)</b>				
		-\$2.23	-\$2.73	0.55
	500,000	\$2.18	\$1.36	5.45
For NPV of 2%	1,000,000	\$1.69	\$0.90	2.73
B'even capital cost =	1,500,000	\$1.20	\$0.45	1.82
\$2.727 mill.	2,000,000	\$0.71	-\$0.01	1.36
(BCR of 1)	2,500,000	\$0.22	-\$0.46	1.09
For NPV of 10%	3,000,000	-\$0.27	-\$0.91	0.91
B'even capital cost =	3,500,000	-\$0.76	-\$1.37	0.78
\$1.994 mill.	4,000,000	-\$1.25	-\$1.82	0.68
	4,500,000	-\$1.74	-\$2.28	0.61
	5,000,000	-\$2.23	-\$2.73	0.55



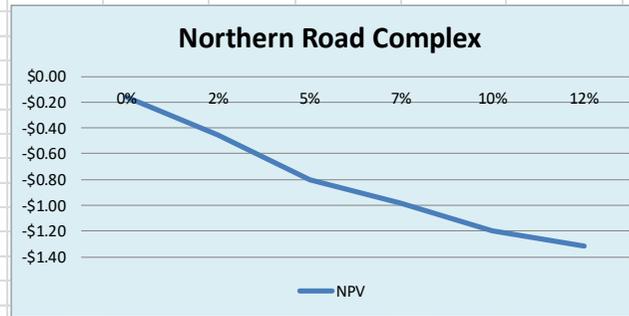
<b>Number of accidents (over 60 months)*</b>		NPV @ 2%	NPV @ 10%	BCR @ 10%	
annually -	0.4	2	-\$2.23	-\$2.73	0.40
	1	5	-\$2.72	-\$3.07	0.32
	2	10	-\$2.23	-\$2.73	0.40
	3	15	-\$1.40	-\$2.17	0.52
	4	20	-\$0.58	-\$1.60	0.65
	5	25	\$0.25	-\$1.04	0.77
			\$1.07	-\$0.47	0.90



\*injuries only, no fatalities

NORTHERN ROAD COMPLEX:				
6. Results		NPV	0%	-\$0.16
			2%	-\$0.45
METRICS :			5%	-\$0.80
Cap/Km	0.106	\$ m./km.	7%	-\$0.98
Cap/t.	20.77	\$/tonne timber	10%	-\$1.20
Cap/\$ tim	0.308	\$/val timber	12%	-\$1.31

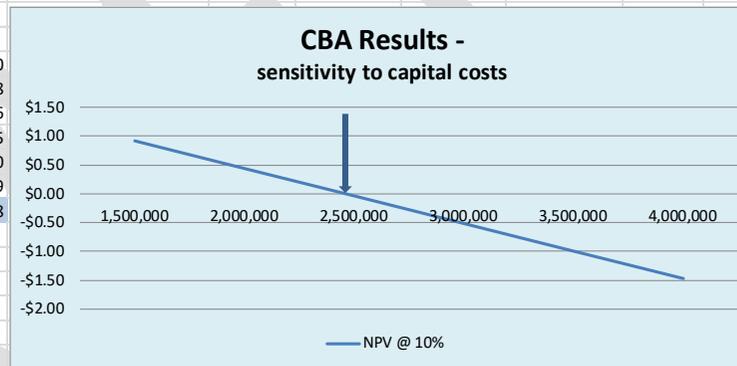
IRR	na
BCR (10%)	0.70
BCR (2%)	0.96



NORTHERN ROAD COMPLEX

**SENSITIVITY TESTING**

	NPV @ 2%	NPV @ 5%	BCR (2%)	
Capital costs (\$)	-\$0.45	-\$0.80	0.96	
1,500,000	\$1.31	\$0.91	2.10	
For IRR of 2%	2,000,000	\$0.82	\$0.43	1.58
B'even capital costs =	2,500,000	\$0.33	-\$0.04	1.26
\$2.833 mill.	3,000,000	-\$0.16	-\$0.52	1.05
For IRR of 5%	3,500,000	-\$0.65	-\$0.99	0.90
\$2.456 mill.	4,000,000	-\$1.14	-\$1.47	0.79
For BCR of 1 =	2,456,299	\$0.37	\$0.00	1.28
\$3.154 mill.				



	NPV @ 5%	NPV @ 10%	BCR (10%)	
Assumed reduction in accidents	25%	-\$0.80	-\$1.20	0.70
	30%	-\$0.52	-\$0.99	0.78
	35%	-\$0.25	-\$0.77	0.86
	40%	\$0.03	-\$0.56	0.95
	45%	\$0.30	-\$0.35	1.03
	50%	\$0.58	-\$0.13	1.12

