Southern Explorer Feasibility Study

DERWENT VALLEY COUNCIL

Feasibility Study Report

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JACOBS

Southern Explorer Feasibility Study

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Executive Summary

Jacobs was engaged by Derwent Valley Council (DVC) to undertake the Southern Explorer Feasibility Study (the Study). The Southern Explorer (Plenty Link Road) provides a link between the Derwent Valley and the Huon Valley.

The potential to upgrade the Southern Explorer to provide a tourism and transport link between the two valleys was identified in the 2010 Southern Tasmanian Integrated Transport Strategy. Funding for the Study was secured through the Australian Government's Tasmanian Jobs and Growth Plan.

The objective of the study was to provide a clear understanding of the benefits provided to the community and local industries so an informed decision can be made regarding the project's progression. The Study included a review of existing conditions, identification of issues and opportunities through a comprehensive stakeholder engagement program and a Cost Benefit Analysis (CBA).

The Southern Explorer is approximately 40km long and connects from Glenora Road in the north to Lonnavale Road in the south. The existing road is a forestry road under the Forestry Management Act and is a pivotal part of the forestry road network.

The road conditions are variable along the length of the Southern Explorer. The majority of the road is unsealed. Widths vary from 5m in the northern section to up to 8m through the middle. The geometry is challenging for much of the road, in particular in the northern section.

Forestry traffic on the Southern Explorer varies significantly and depends on harvesting schedules. The average annual daily traffic for forestry trucks is estimated to be approximately 20 vehicles per day. A combination of 68t High Productivity Vehicles (HPVs) and mini B-Doubles are used on the road. Light vehicle volumes on the road are currently low.

A comprehensive stakeholder consultation program was undertaken in order to identify potential issues and opportunities provided by the Southern Explorer. Individual meetings were held with road owners, local Council and key potential users. A series of stakeholder workshops were undertaken with the forestry industry, the tourism industry, the agriculture industry and local residents.

The forestry industry has a number of concerns about the impact on forestry operations if the road was to become a public road. Key concerns include the loss of flexibility (eg the ability to transport heavy machinery as required without a permit) and the loss of forestry coupes to provide the required buffer zone either side of the road.

An upgraded Southern Explorer could potentially be promoted as a tourism link between the Derwent Valley and the Huon Valley. The link would provide the opportunity for cross promotion of tourist attractions in the two regions. There are a number of complimentary attractions in the regions such as Hastings Caves, the Tahune Forest Airwalk and Mt Field National Park.

The Southern Explorer could potentially be used for the transport of aquaculture and agriculture products which are currently moved through the Hobart CBD. A number of fruit growers transport product from orchards in one region to cool stores in the other. Volumes are generally low and transport is seasonal.

In consultation undertaken for this project a number of producers reported that they are unlikely to use the Southern Explorer even if the road was upgraded. Concerns with using the road include fire safety, remoteness, low traffic volumes and lack of mobile coverage.

A major concern for all stakeholders was the increased conflict between light and heavy vehicles. While an upgraded road would provide safety improvements for current users, there is potential to increase the number of crashes through increased traffic volumes on the route. There are particular concerns regarding tourists who will be unfamiliar with the road conditions.

If the Southern Explorer is upgraded, it is anticipated some traffic currently travelling through the Hobart CBD will relocate to the Southern Explorer. The CBA compared the Southern Explorer to the alternative route through the Hobart CBD.

Benefits and costs were assessed for the two routes for the Base Case (current conditions) and the Project Case (the Southern Explorer is upgraded). The Project Case assumed the Southern Explorer is upgraded to an 8m seal width to meet HPV route standards. Benefits were assessed over a 30 year evaluation period.

Results of the CBA showed that upgrading the Southern Explorer is not viable for relocating less than 250 trucks per day or 1.8 Million Tonnes (MT) of freight per year to the Southern Explorer. This is approximately 10 times the current traffic volume and is unlikely to be achieved given current transport regimes.

The required demand of 250 trucks per day (or 1.8MT per year) represents the volume of trucks on the Brooker Highway in 2011-2012 and is significantly higher than current freight estimates on the Huon and Lyell Highways.

The results of the Study show that upgrading the Southern Explorer is not feasible based on current demand.

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to undertake a feasibility study on the development of the Southern Explorer in accordance with the scope of services set out in the contract between Jacobs and the Client. That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

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1. Introduction

1.1 Feasibility Study background

Jacobs was engaged by Derwent Valley Council (DVC) to undertake a feasibility study on the development of the Southern Explorer (Plenty Link Road). The Southern Explorer provides a link between the Derwent Valley and the Huon Valley.

The project was funded through the Australian Government's Tasmanian Jobs and Growth Plan. The funding was secured through a jointly supported initiative by DVC and Huon Valley Council (HVC).

The existing road is primarily used for forestry activities. The potential to upgrade the road to provide a tourism and transport link between the two valleys was identified in the 2010 Southern Tasmanian Integrated Transport Strategy.

An upgraded road has the potential to benefit a number of industries. The road could be used for the transport of agriculture and aquaculture products which are currently moved through the Hobart CBD. Providing a link for tourists has the potential to increase tourism in both regions. Construction and maintenance of the road would also create employment and re-skilling opportunities.

1.2 Project objective

The objective of the study was to provide a clear understanding of the benefits provided to the community and local industries so an informed decision can be made regarding the project's progression.

1.3 Study area

The Southern Explorer is defined as the section of road between the junction of Glenora Road and Glenfern Road at the northern end and the junction of Plenty Link Road and Lonnavale Road at the southern end. The road is approximately 40km long and passes through the DVC and HVC municipalities.

To determine the potential benefits of upgrading the Southern Explorer, the link was compared to the alternative route between the Huon Valley and the Derwent Valley through the Hobart CBD.

The study area is illustrated in Figure 1, with the Southern Explorer shown in red.

1.4 Municipality areas

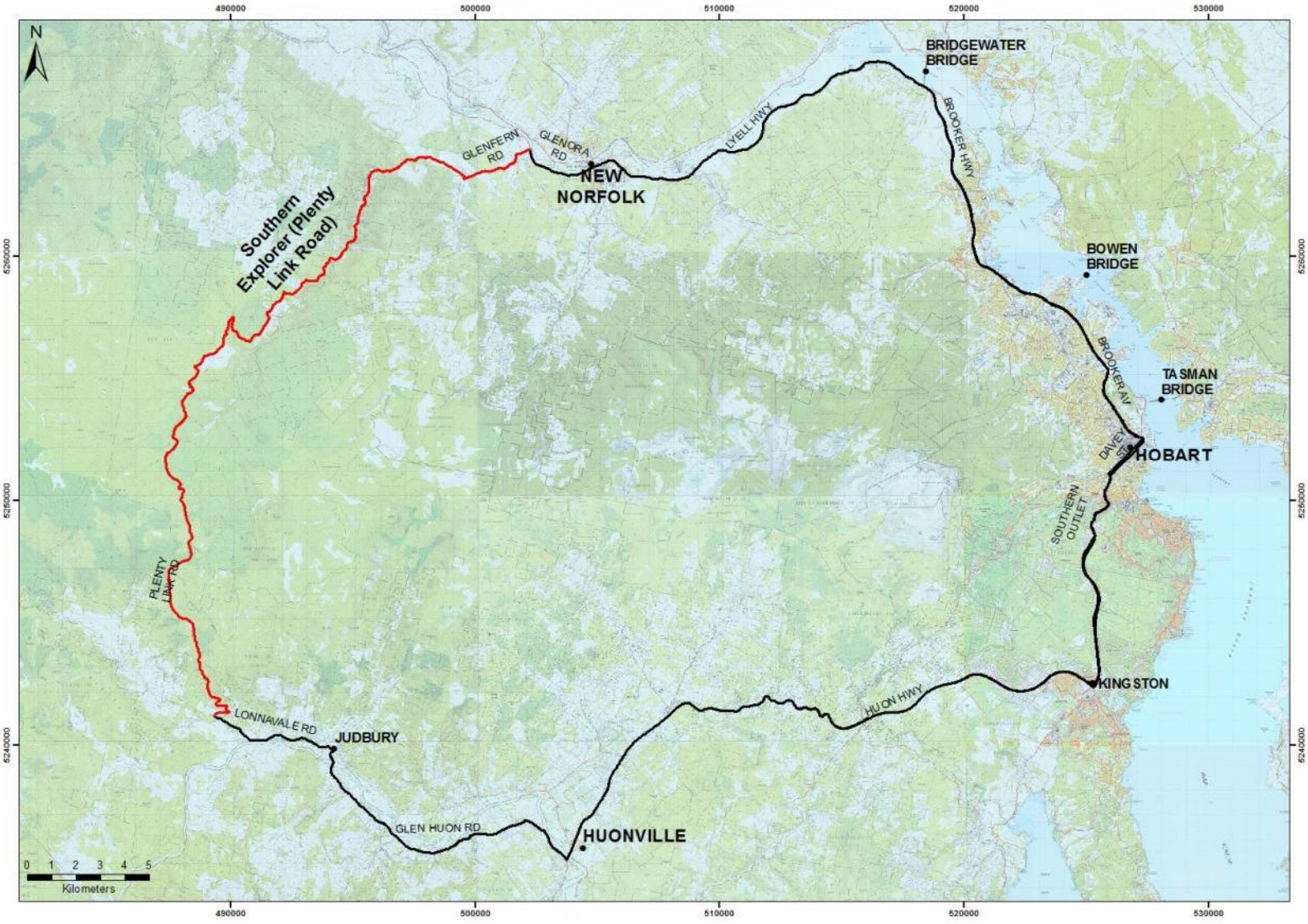
The DVC municipality covers 4,111 sq kms. The main township of New Norfolk is approximately 30 minutes north of Hobart. The population of the DVC municipality is approximately 10,000 people.

Key industries in the region include forestry, agriculture and tourism. Norske Skog's paper mill at Boyer is a critical economic driver for the region. The mill produces approximately 290,000 tonnes annually and employs 300 people. The regions agriculture industry includes fruit, cattle and hops. The Derwent Valley provides the gateway to popular tourist destinations including Mt Field National Park and the Western Tasmanian World Heritage Area.

The HVC municipal area covers 5,497 sq kms. The township of Huonville is approximately 30 minutes south of Hobart. The population of 15,000 is spread across the five main townships of Huonville, Franklin, Cygnet, Geeveston and Dover.

Key industries in the region include forestry, agriculture, aquaculture and tourism. Ta Ann operates a timber mill at Geeveston. Fruit and wine are key contributors to the agriculture industry. Aquaculture is a growing industry with Huon Aquaculture and Tassal both operating in the region. Major tourist attractions include the Tahune Airwalk and Hastings Caves.

Figure 1 Study area



1.5 This report

This report includes the following main sections:

- **Existing Conditions:** A review of current conditions including road ownership, land ownership, road standard, mobile phone coverage and traffic composition.
- **Identification of Issues and Opportunities:** Identification of potential issues and opportunities associated with upgrading the Southern Explorer through a comprehensive stakeholder consultation program.
- **Cost Benefit Analysis Method:** Method for assessing the benefits and costs associated with upgrading the Southern Explorer including travel times, accident costs, vehicle operating costs, environmental costs, operating and maintenance costs and construction costs.
- **Cost Benefit Analysis Results:** A summary of the cost benefit analysis results.
- **Potential Funding Sources:** Identification of potential funding sources for upgrading the Southern Explorer.
- **Conclusion and Recommendations:** A summary of the findings and recommendations from the Study.

2. Existing Conditions

2.1 Road ownership

The northern section of the Southern Explorer (approximately 15km) is owned by DVC. Norske Skog is the main user of the northern section and it is understood Norske Skog contributes to maintaining this section of the road.

The southern section of the Southern Explorer is owned by Forestry Tasmania. This section is a forestry road under the Forestry Management Act. The road is not a public road however it is not gated.

2.2 Land tenure

The northern 15km section of the Southern Explorer passes through privately owned land. The southern section is mostly managed by Forestry Tasmania. A 3km section of the road passes through land managed by Parks and Wildlife.

2.3 Road standard

2.3.1 Data collection

A site visit was undertaken in order to observe existing conditions on the Southern Explorer. A GPS was used to collect travel times, speeds and geometry data. The full loop (Hobart- New Norfolk- Southern Explorer- Huonville- Hobart) was recorded to allow comparison of the Southern Explorer to the alternative route through the Hobart CBD. Data points were recorded at one second intervals.

Photos taken during the site visit are shown in Figure 2.

2.3.2 Road surface

The northern 9km of the Southern Explorer is sealed. The remainder of the road is unsealed. Pot holing was observed in some sections, particularly at the northern end of the unsealed section.

2.3.3 Road width

The pavement width varies significantly over the length of the Southern Explorer. Pavement width ranges from 5m at the northern end of the road up to 8m in sections through the middle.

2.3.4 Geometry

The existing alignment follows the terrain as best as possible, resulting in inconsistent geometry. The tight horizontal alignment generally dictates vehicle speeds.The existing vertical alignment is primarily determined by the mountainous topography of the area. Vertical gradients vary from flat to over 12%.

Figure 2 Site photos

2.3.5 Structures

The Southern Explorer between Moogara and Lonnavale Road includes three timber bridges. The bridges are single lane.

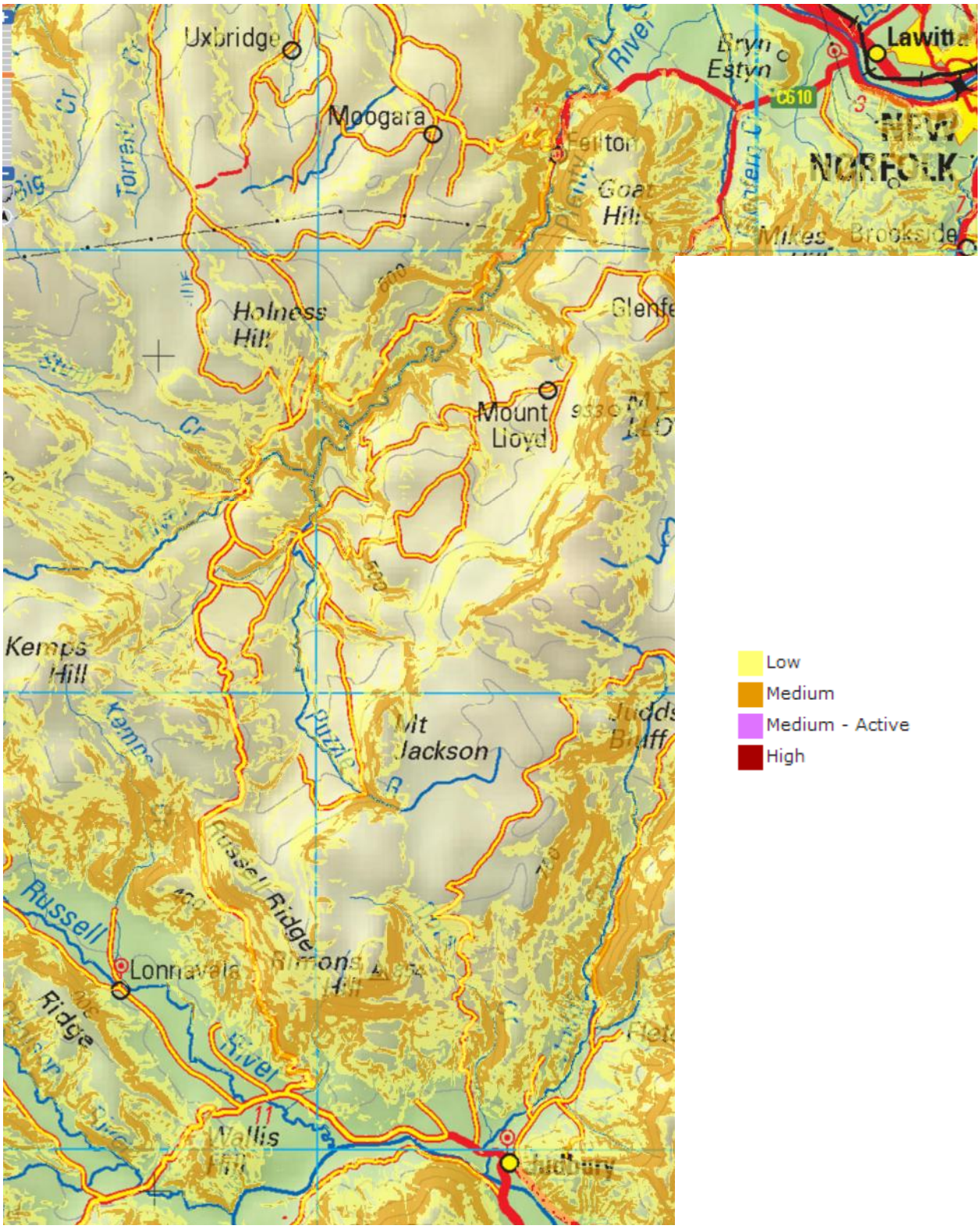
2.3.6 Geology

The Mineral Resources Tasmania (MRT) Tasmanian Landslip Database shows existing landslips within the project area. The Southern Explorer passes through areas that vary between the acceptable and medium hazard bands. Medium hazard bands are areas with known landslide features, or are within a landslide susceptibility zone, or have legislated controls to limit disturbance of adjacent unstable areas. The definitions of hazard bands are noted in Table 1. Refer to Figure 3 for the land slip vulnerability within the project area.

Table 1 Hazard band definitions (Mineral Resources Tasmania)

Hazard band	Consequence statements
Acceptable hazard band	No damage is likely to occur from the hazard in this area, or the likelihood of any damage is negligible and manageable in the normal course of events. Controls should not influence the use of land, with no planning or development controls required in this area due to the low level of 'hazard' for the natural hazard.
Low hazard band	Relatively minor damage may occur from the natural hazard, and relatively infrequently. Simple measures are available to keep the likely level of damage to acceptable levels. The likelihood or lack of knowledge of the natural hazard is such that the residual risk to most types of development is *most likely tolerable* but some caution is required. The following advice is provided to ensure that residual risk is tolerable: – routine site assessment is required to identify the existence of natural hazards and to inform any consideration of the need for controls; and – vulnerable and hazardous use should be allowed where it can be demonstrated that the residual risk is tolerable. Controls in place in the low hazard band should improve the ability of residents to resist the impact of a natural hazard event, and increase the resilience of the community.
Medium hazard band	Structures exposed to this level of natural hazard are likely to sustain repeated minor damage or infrequent major damage during their service life, unless significant mitigating measures are used. The following guidance is provided on the mitigation: – detailed site assessments are required to describe the nature of the natural hazard; to make recommendations regarding the controls required to respond to the hazard; and to provide the development with a greater ability to resist a hazard event. – Vulnerable and hazardous use should be avoided unless it can demonstrate it is in the public interest and needs to be located in this area, and the residual risk can be reduced to a tolerable level through a combination of use and development controls. Controls in place in the medium band should discourage inappropriate development that is likely to significantly increase the costs of mitigating the natural hazards for the community; seek to improve the ability of residents to resist the impact of a natural hazard event; and increase the resilience of the community.
High hazard band	Without taking extraordinary measures, structures exposed to this level of natural hazard are likely to sustain repeated damage during the period they are in use. Development should generally be prohibited unless evidence can be supplied that an exceptional departure from the controls is warranted. Significant control and assessment would be required, including the following: – residential, vulnerable, and hazardous uses should be treated as prohibited, and allowed only where the need for the location can be justified. There is a requirement to demonstrate a suite of controls, including behavioural, physical and procedural, that will make the residual risk tolerable, and not be a burden on the community. – minor developments should be allowed only where they can demonstrate appropriate levels of performance.

Figure 3 Landslip planning map (Mineral Resources Tasmania)



2.4 Mobile phone coverage

There is limited mobile coverage on the Southern Explorer. Telstra, Optus and Vodafone mobile network coverage maps indicate intermittent coverage along the road. Discussions with current users indicate coverage is not available for the majority of the road.

2.5 Traffic

2.5.1 Volumes

There is no traffic data available for the Southern Explorer. Discussions with Forestry Tasmania and Norske Skog indicate forestry traffic varies significantly and depends on harvesting schedules.

Based on volumes forecasts provided by Forestry Tasmania, it is estimated the average annual daily traffic (AADT) for forestry trucks is approximately 20 vehicles per day (vpd) (two way traffic).

Current volumes of light vehicle are unknown. Based on discussions with current users it is understood light vehicle volumes are low.

2.5.2 Vehicle types

Forestry Tasmania is currently using a combination of 57t mini B-doubles and 68.5t high productivity vehicles (HPVs) on the Southern Explorer. Norske Skog is currently using mini B-doubles.

HPVs are vehicle combinations, such as B-Doubles, which exceed standard mass and dimension limits and operate on a restricted route network or under permit condition. HPVs deliver significant gains in productivity due to increased carrying capacity. They can also deliver significant maintenance and safety improvements as fewer trips are required to move the same freight load.

2.5.3 Current routes

Forestry Tasmania transports wood to Ta Ann at Geeveston. Wood is transported south on the Southern Explorer and then via Council and Forestry Tasmania roads west of the Southern Explorer. Forestry Tasmania does not use the northern section of the Southern Explorer. Norske Skog transports wood to the paper mill at Boyer, utilising the northern section of the Southern Explorer.

2.6 Connecting roads

Glenora Road, connecting to the northern end of the Southern Explorer, is owned by DVC and is sealed.

Lonnavale Road connects to the southern end of the Southern Explorer and is owned by HVC. Lonnavale road is unsealed.

Glen Huon Road connects Lonnavale Road to the Huon Highway. Glen Huon Road is owned by the Department of State Growth and is sealed. Traffic volumes on Glen Huon Road range from 2,500 vpd near Huonville to 1,000 vpd near Judbury.

Glen Huon Road is a classified as a Category 5- Other Road under the Tasmanian State Road Hierarchy. Category 5 roads are primarily access roads but may be used for comparatively low frequency heavy freight vehicle transport.

Glenora Road, Lonnavale Road and Glen Huon Road are not HPV routes.

2.7 Alternative route

The alternative route between the Huon Valley and the Derwent Valley consists of the following roads:

- The Huon Highway
- The Southern Outlet
- Macquarie Street/ Davey Street
- The Brooker Highway
- The Lyell Highway

This route is owned by the Department of State Growth, with the exception of the Macquarie Street/ Davey Street couplet which is owned by Hobart City Council. It is a gazetted HPV route.

Under the Tasmanian State Road Hierarchy, the Brooker Highway and the Southern Outlet are classified as Category 1- Trunk Roads. Category 1 roads are the primary freight and passenger roads connecting Tasmania.

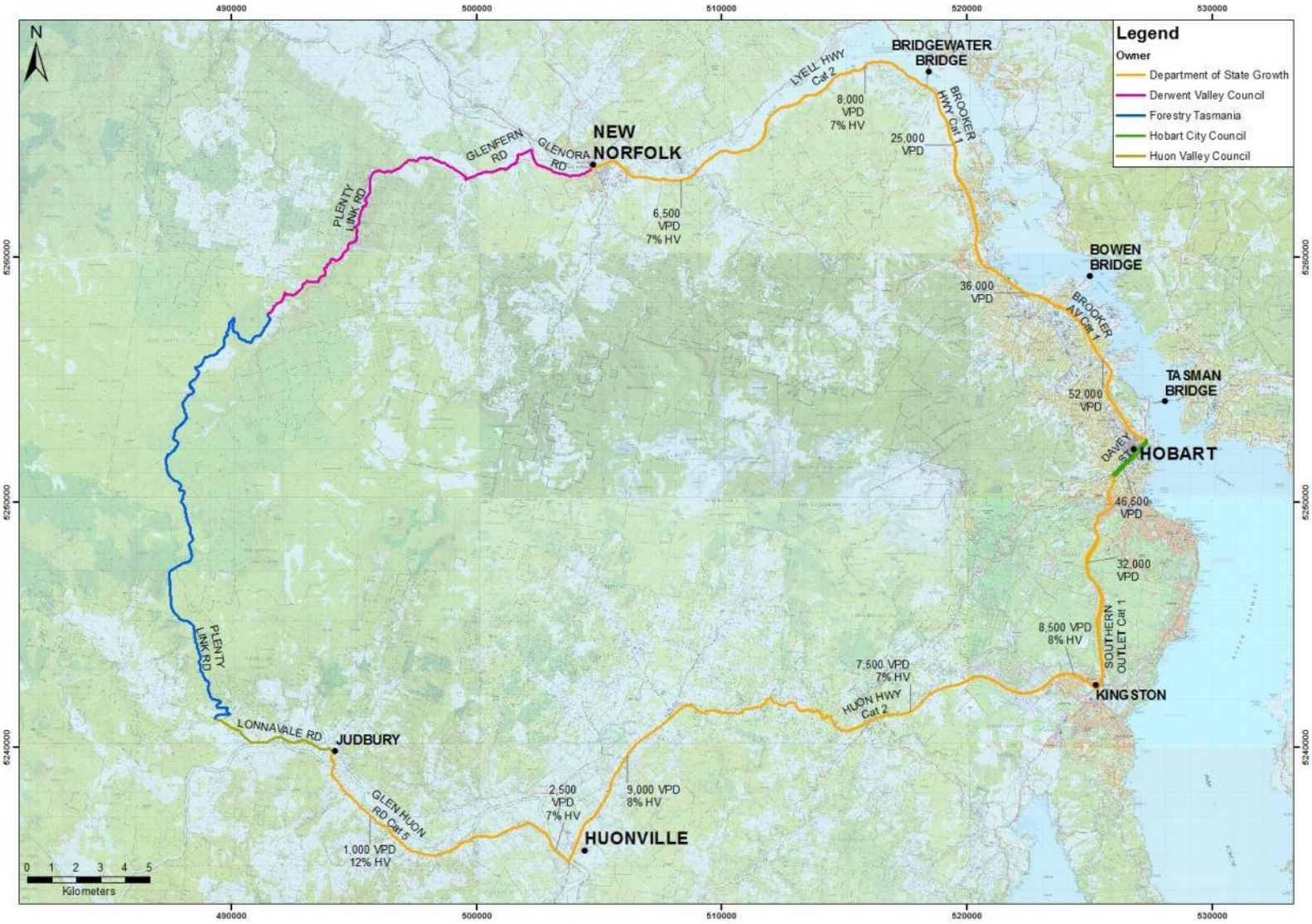
The Lyell Highway and the Huon Highway are Category 2- Regional Freight Roads. Category 2 roads are Tasmania's major regional roads for carrying heavy freight.

Traffic volumes on the Huon Highway, north of Huonville, are in the order of 9,000 vpd. Volumes on the Southern Outlet are in the order 32,000 vpd. Combined volumes on the Macquarie/ Davey Street Couplet are approximately 46,500 vpd.

Traffic volumes on the Brooker Highway reach up to 52,000 vpd north of Hobart and drop to 25,000 vpd closer to the Bridgewater Bridge. Volumes on the Lyell Highway between Bridgewater Bridge and New Norfolk are in the order of 8,000 vpd.

Figure 4 details existing conditions in the study area including road ownership, road category and traffic volumes.

Figure 4 Existing conditions



3. Identification of Issues and Opportunities

3.1 Stakeholder consultation

A comprehensive stakeholder consultation process was undertaken in order to identify potential issues and opportunities provided by the Southern Explorer.

A combination of individual meetings and stakeholder workshops were undertaken. Individual meetings were held with road owners and key potential users. A series of stakeholder workshops were undertaken with industry and local residents. Stakeholders were identified in consultation with DVC and HVC.

3.1.1 Individual meetings

Individual meetings were held with Forestry Tasmania, Norske Skog and Tassal. The key issues discussed at these meetings are summarised below.

Forestry Tasmania

- The Southern Explorer is pivotal for wood flow.
- It is a forestry road under the Forestry Management Act. The road is not a public road but it is not gated.
- If it was a public road there would be landscape considerations. There are forestry coupes up to the side of the road. There is a large network of side roads which would all need to be gated.
- Most of Forestry Tasmania product is transported south on the Southern Explorer. Product is transported from the Lyell Highway onto the Styx Road and then onto Plenty Link Road. Forestry Tasmania does not use the northern section of Plenty Link Road due to safety concerns.
- The area near Plenty River is subject to landslips.
- Forestry Tasmania is aware that there have been a number of near misses- both between two heavy vehicles and between heavy and light vehicles.
- Forestry Tasmania has a quarry on the side of the road in the southern section which is fundamental to maintenance operations.
- Most Forestry Tasmania trucks are 57t mini B-doubles. The maximum size truck used is 68.5t.
- Forestry Tasmania needs to be able to transport heavy equipment on the road. If it was to become a public road, Forestry Tasmania would need a permit before transporting heavy equipment.
- There is a steep grade, approximately 12%, at the southern end of the link. Forestry Tasmania does not transport wood north on this section.

Norske Skog

- Norske Skog only harvests softwood plantations.
- Trucks originating from plantations along Judds Creek Road and near Bermuda Road are travelling through Hobart as opposed to using Plenty Link Road.
- Norske Skog has previously considered delivering pine to Ta Ann operations located on Dennison Road. An upgrade of Plenty Link Road may help make this viable.
- Norske Skog is concerned about landslips at the northern end of Plenty Link Road.

- Motorcycles can be a concern for Norske Skog trucks. Motorcycles typically use the road on weekends.
- Norske Skog's plantations are located very close to the road in some areas and occasionally trucks need to load whilst parked on the road.
- Snow falls on the road in winter.
- Passing bays would need to be considered if the road was upgraded, particularly in the steep section at the southern end.
- Some cycling, walking and rally groups utilise the road. Cyclists on the road are relatively rare however some school groups do cycle on the road.
- More vehicles using the road during bushfires would be a concern. Vehicles may get lost and trapped in the plantation network. Norske Skog has considered locking access gates during periods of high fire danger to prevent access to the plantation network.
- The road can be very confusing at night and any upgrades would need to formalise the priority of a number of junctions to ensure the route was clear.
- Norske Skog has trouble with people littering in plantations and stealing fire wood. There is a concern this may increase if the road was upgraded.
- There is potential for vehicles travelling north to bypass New Norfolk using the plantation road network. Access restrictions may need to be considered to prevent this.

Tassal

- Tassal has processing facilities in Dover, Huonville and Margate. Processed fish is transported to the Port of Devonport.
- Tassal would be interested in any time or distance savings for getting to Bridgewater Bridge. They are particularly interested in time savings due to the labour cost of the driver. The Southern Explorer is unlikely to assist with this trip.
- Tassal deliver smolt from the south to the West Coast three months of the year (August-October). Drivers travel to the West Coast and back in one day. Tassal would be interested in travel time savings for this trip. There would be potential to use the Southern Explorer for this task.
- Tassal's key concern would be travel time reliability. There would need to be places to pass traffic. If there was an accident on the route, the route may become blocked.
- Tassal would have concerns about the poor geometry and the potential conflict between heavy vehicles. Access to support vehicles would also be a concern.
- Harvested fish is a perishable product and needs to be transported on a sealed road. A sealed road would also be required for transporting smolt.
- The Southern Explorer would not assist with the transport of feed which is transported from the east to Huonville.
- A benefit of the Southern Explorer would be reducing heaving vehicle traffic through the Hobart CBD.
- A bypass of Hobart which reduced travel times to Bridgewater Bridge would be more useful to Tassal than the Southern Explorer.

3.1.2 Stakeholder workshops

The following workshops were undertaken:

1. Tourism industry
2. Forestry industry/ transport operators
3. Agriculture industry
4. Plenty Link Road residents

Each workshop was highly interactive. The workshops began by Jacobs providing a summary of the project and progress to date. This was followed by an open discussion of the issues and opportunities provided by the link road. The key issues raised at each workshop are summarised below.

Tourism (10 November 2014)

- It was thought that the tourists who are most likely to use this route are those which have ample time and are interested in the journey.
- The main demographic likely to use the road would be the 45+ age group, undertaking a 2-3 week trip in Tasmania.
- It was thought that the main attraction would be the destinations at either end, rather than the link itself. It was noted, however, that a picnic spot may increase the attraction, particularly for tourists travelling in recreational vehicles.
- It was noted that sealing the road would maximise its potential for use as a tourist link. Many rental car companies do not allow travel on unsealed roads.
- The lack of mobile phone coverage was seen as a major concern. It was thought many tourists, particularly Asian tourists, would not take the route if there was no mobile coverage.
- The route would need to be well signposted. It was noted that the route does not show up on navigation devices.
- The mix of tourism traffic with log trucks would be a safety concern. It was felt that truck drivers are generally courteous and getting stuck behind a truck was unlikely to be a major concern if there were areas for trucks to pull over.
- The high altitude drive would provide interesting views for tourists and is a more aesthetic drive than the alternative. It was noted that the view of working forests may be an attraction to some tourists.
- Tourism use would be seasonal. Weather conditions would also dictate use.
- The group would only recommend the route be used during the day. Signposting the road for day use only was suggested. The remoteness and lack of mobile coverage would make the road dangerous at night time. Animals would also be a safety concern at night time.
- One operator is using the route currently and recommends it to tourists. They do not use the road in winter.
- The route would provide cross promotion opportunities for tourist attractions. There are a number of complimentary attractions in the regions (eg Mt Field and Cockle Creek). The link could be promoted as a day trip or part of a one night stay in one of the regions.

- It was noted that the link may benefit operators north of New Norfolk such as the Salmon Ponds and Redlands. A number of tourists travelling from Hobart to Strahan bypass these attractions.
- Motor cycle clubs would be potential users if the road was sealed.
- The route could be used by mountain bike riders. It was noted Emergency Position Indicating Radio Beacons (EPIRBs) may be required.
- Tour groups could potentially use the road to do day drips, eg small groups in mini vans.
- The group felt that tourism was unlikely to be the main driver for upgrading the road.

Forestry/ Transport Operators (13 November 2014)

- Forestry traffic on the road varies and there can be intense periods throughout the year. Current activities may not reflect future industry volumes.
- Forestry Tasmania utilises the southern section of the link road.
- Forestry Tasmania transports to Ta Ann via Council and Forestry Tasmania roads west of Plenty Link Road. Product from Ta Ann is transported on Arve Road to the Huon Highway.
- The Glen Huon Road is restricted to mini B-doubles. Forestry Tasmania does not use Glen Huon Road.
- Norske Skog uses the northern section of the link road. Norske Skog uses mini B-doubles.
- Loaded trucks are travelling in both directions along the link road.
- It was generally felt that the road is fit for purpose, although it was acknowledged that upgrading the northern section of the link road would assist operations. Forestry Tasmania may use this section if it was upgraded.
- One transport operator felt the road needs upgrading as it is currently too rough for most transport use. It was noted that allowing tourists on the road might provide a means to an end and there is already interaction between light and heavy vehicles on the road.
- There are concerns around security and safety of forestry workers and equipment.
- The current road condition causes high operating costs and is rough on equipment.
- Opening up the road to tourist traffic is seen as a risk to the forestry industry through the potential for future conflicts between the tourism and forestry industries.
- There is a concern that opening up the area will open the debate about forestry practices.
- Interaction between heavy vehicles and tourists is a safety concern.
- It was noted fuel reduction burns would need to be increased for safety purposes.
- Forestry Tasmania would be concerned about losing coupes which are currently adjacent to the road.
- It was noted that if the road was owned by the State, the forestry industry's flexibility would be reduced (eg the ability to log up to the side of the road, transport heavy machinery, close the road and undertake maintenance as required).
- Forestry Tasmania has a working quarry on the southern section of the link road.

- It was agreed if the road was upgraded it would require more width and realignment to allow for high productivity vehicles interacting with tourists.
- It was felt passing opportunities would be required as tourists would get frustrated being stuck behind slow moving trucks.
- It was agreed an upgraded road would reduce vehicle maintenance costs.
- It was noted that even if the road was designed as a link road, some tourists are still likely to drive slowly and pull over to take photos etc.
- It was noted that the road connecting the southern end of Plenty Link Road is not sealed and more upgrades may be required to attract tourists.
- Clear signage would be required as unfamiliar drivers could get lost easily.
- Currently tourist use of the road is low. Forestry Tasmania gets some enquiries from 4W drivers and campers.
- It was agreed there have not been many accidents on Plenty Link Road however there have been a number of close shaves. There have been recent close shaves with motor cycles.
- There are currently problems with vandalism and stealing wood. There are concerns this may increase if the road was opened up to the broader community.
- Locals living in the area like the isolation and it was felt this may be an issue.
- It was agreed that agricultural use of the road would not be an issue as there are not many producers in the area. Most truck drivers use radios and tend to be courteous.

Agriculture (13 November 2014)

- Hansen Orchards has orchards / cold stores in the Huon Valley (Grove) and the Derwent Valley (Rosegarland). Fruit is transported to the Huon Valley for packing between January and May.
- Hansen Orchards has some staff members that currently use the road to travel to and from work or between operations in the regions. Only employees in light vehicles use the road. Trucks transporting produce travel through Hobart.
- Reid's Fruits has orchards at Plenty and a pack house at Grove. Product is transported to Grove for 6 weeks during the summer harvest period.
- Packed product from Reid's Fruits and Hansen Orchards is transported from the Huon Valley to warehouses in northern Tasmania.
- To be suitable to transport fruit the Southern Explorer would need to be sealed with gradients appropriate for semi-trailers, reasonable geometry and bridges with appropriate capacity. Mobile phone coverage would also be required.
- Fire safety was raised as a concern.
- It was noted that Lonnavale Road between Plenty Link Road and Judbury is not sealed and would also need to be upgraded.
- Reid's Fruits and Hansens Orchards are unlikely to use the road as they would need to backtrack to Grove. They also have safety concerns in regards to the remoteness, low traffic volumes and lack of mobile phone coverage.

- The group felt that the consideration needed to focus on the requirement to move freight between the Huon Valley and Bridgewater Bridge. The Southern Explorer does not provide a quicker route to Bridgewater Bridge.
- The group would like to see an upgrade to Jeffries Track considered. Jeffries Track is a shorter route and it was felt this would provide a better route to Bridgwater Bridge.

Residents (19 November 2014)

- Some residents live on Plenty Link Road for the quiet and privacy. There are some concerns about the increased traffic that would result from an upgraded road.
- Some residents are concerned an upgraded road would require acquisition of their land.
- Some residents are concerned property values may decrease.
- There are some problems with littering currently. There are concerns this may increase if traffic volumes increased.
- There are reportedly Tasmanian devils in the area. Residents are concerned about the impact on devils if traffic volumes were increased.
- Some residents are concerned with opening the road up to tourists who do not know the road.
- Some residents feel the road is currently unsafe and more safety barriers are required.
- It was noted an upgrade would be positive for the region and would create jobs through construction and maintenance.
- It was noted that residents would benefit from an improved road.
- It was noted that dust is an issue currently.
- 50km/h speed limits imposed in some sections are not always adhered to.
- Vehicles come in during the day and night to steal wood.
- Residents reported that there is no mobile coverage in the area.
- There are sections of the road that are subject to landslips.
- Quad bikes use the road currently.
- Residents noted that truck drivers are generally courteous. Some residents listen to two-way radios so they know when trucks are approaching.
- Car clubs have previously used the road for events.
- Residents reported that there have been a number of accidents and near misses on the road.
- Residents reported that there have been problems with vandalism of forestry machinery left on the road.

3.2 Summary of issues and opportunities

3.2.1 Forestry industry

The Southern Explorer is a critical road for the forestry industry. If the Southern Explorer is to be upgraded, it will need to continue to cater for the needs of the forestry industry.

The forestry industry has a number of concerns about the impact on forestry operations if the road was to become a public road. Major concerns include:

- Loss of forestry coupes to provide the required buffer zone either side of the road
- Impact on Forestry Tasmania's working quarry
- Permits required before transporting heavy equipment
- Potential increase in littering, vandalism and stealing wood
- Potential cost associated with providing gates on each forestry spur road
- Potential to open the debate about forest practices
- Increased conflict between light and heavy vehicles

The road would need to be upgraded to HPV standard to allow the forestry industry to continue to operate B-Doubles on the road.

An upgraded road would provide some benefits to the forestry industry, including a reduction in vehicle operating costs. A wider road would also provide safety improvements.

3.2.2 Tourism industry

Upgrading the Southern Explorer would provide the opportunity to promote the road as a tourism link between the Derwent Valley and the Huon Valley. It was generally felt by the tourism industry that the main attraction of the link road would be the destinations at either end rather than the road itself. The link could be promoted as a day trip or as part of a one night stay in one of the regions.

It was felt the key demographic was likely to be the 45+ age group. Tourism use would be seasonal.

The link would provide the opportunity for cross promotion of tourist attractions in the two regions. Key tourist attractions and annual visitor numbers are listed in Table 2 and illustrated in Figure 5. Major attractions in the regions include the Tahune Forest Airwalk and Mt Field National Park. Visitor statistics for Huonville and New Norfolk are detailed in Table 3.

There are considerable safety concerns with mixing tourism traffic and heavy vehicles. The lack of mobile phone coverage is also a safety concern and considered a major barrier for getting tourist onto the road.

To maximise the road's potential as a tourist route it would need to be sealed as many hire car companies do not allow travel on unsealed roads. Lonnavale Road at the southern end of the Southern Explorer would also need to be sealed.

Signage would need to be provided and some junctions may need formalising to ensure tourists do not get lost. Mobile phone coverage would be required before many tourists would consider using the road. Passing bays may be required to allow tourists to pass heavy vehicles.

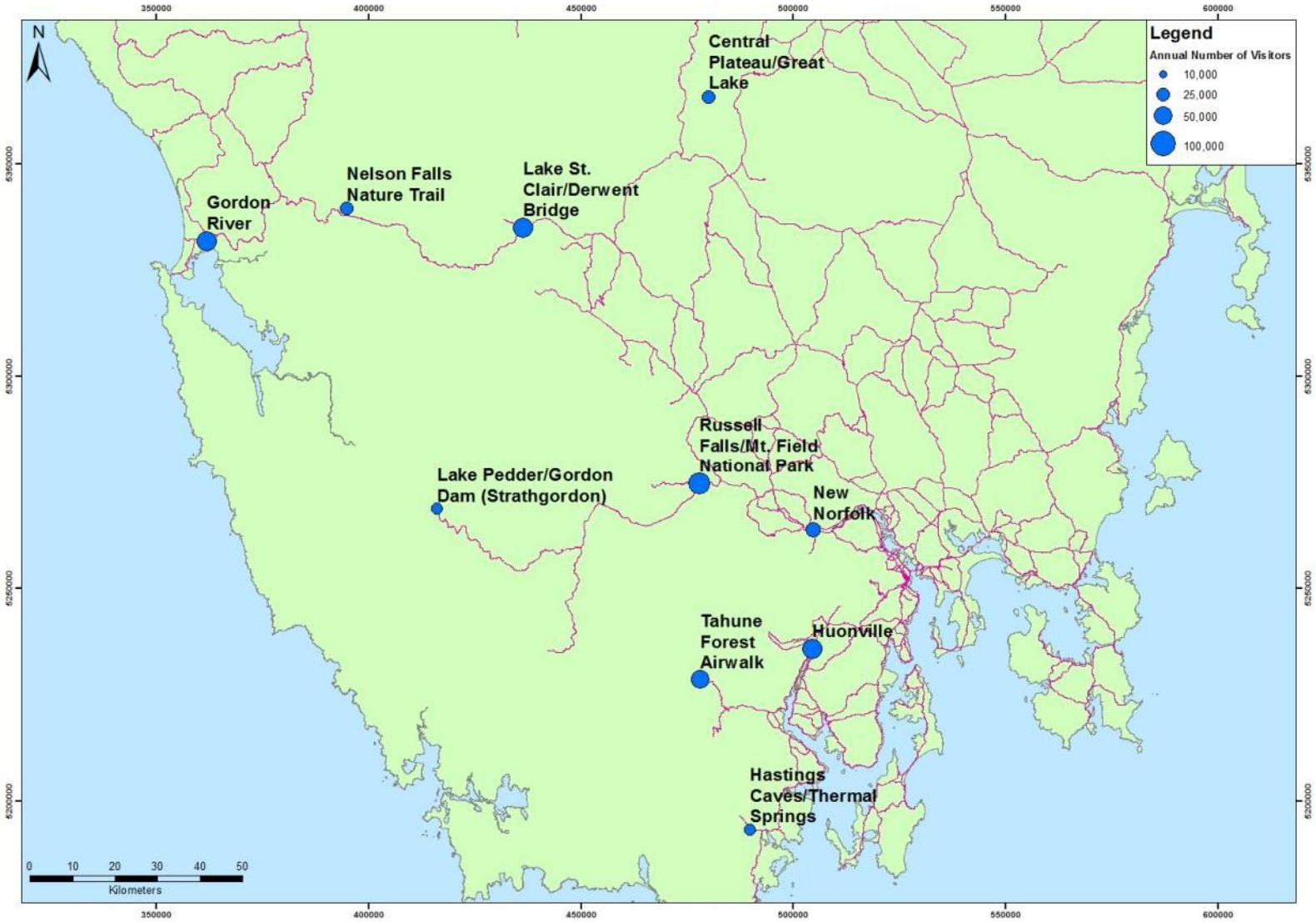
Table 2 Annual visitor numbers for key attractions (Tourism Tasmania 2014)

Attraction	Visitors (aged 14+) July 2013 - June 2014
Tahune Forest Airwalk	59,615
Hastings Caves/Thermal Springs	23,057
Russell Falls/Mt. Field National Park	72,836
Lake Pedder/Gordon Dam (Strathgordon)	21,054
Central Plateau/Great Lake	29,844
Lake St. Clair/Derwent Bridge	69,060
Gordon River	69,480
Nelson Falls Nature Trail	25,725

Table 3 Visitor statistics for Huonville and New Norfolk (Tourism Tasmania 2014)

	Visitors (aged 14+) July 2013- June 2014	
	Huonville	New Norfolk
Passed through	54,606	58,710
Stopped and looked around but did not stay overnight	67,787	40,425
Stayed overnight	22,563	19,778
Average nights spent	3.1	3.8

Figure 5 Key tourist attractions



3.2.3 Agriculture industry

Fruit is currently being transported from the Derwent Valley to packing sheds in the Huon Valley. Volumes are generally low and transport is seasonal. All produce is currently transported through Hobart CBD.

In consultation undertaken for this project a number of producers reported that they are unlikely to use the Southern Explorer to transport produce even if the road was upgraded. Concerns with using the road include fire safety, remoteness, low traffic volumes and lack of mobile coverage. For producers with operations north of Huonville at Grove, the road would provide minimal savings.

Packed produce from the Huon Valley is transported to the north of the State via Bridgewater Bridge. The Southern Explorer does not provide a shorter trip to Bridgewater Bridge and would not be used for this freight movement.

To be suitable for transport of agriculture produce the Southern Explorer would need to be sealed. Lonnavale Road would also need to be sealed. Mobile phone coverage would be required before some producers would consider using the route.

3.2.4 Aquaculture industry

Processed fish is transported from the Huon Valley to the north of the State via the Bridgewater Bridge. The Southern Explorer does not provide a shorter route to Bridgewater Bridge and would not be used for this freight movement.

There is potential for the Southern Explorer to be used for the transport of smolt which is transported from the Huon Valley to the West Coast three months of the year. However the industry raised a number of concerns that would prevent them using the road including travel time reliability, remoteness and conflict between heavy vehicles.

For the aquaculture industry to consider using the road it would need to be sealed with adequate width and passing bays.

3.2.5 Other issues and opportunities

The potential increase in traffic resulting from an upgrade of the Southern Explorer is a concern for some residents living on Plenty Link Road. Some residents are also concerned that land acquisition may potentially be required.

While an upgraded road will provide safety improvements, there is a concern that crashes may increase due to increased traffic on the road. There are particular safety concerns regarding tourists who are not familiar with the road.

The upgraded road would benefit members of the community who travel between the regions. Some community members have reported to Council that they would use the road to visit relatives.

The construction of the road would create employment opportunities in the region. There would also be benefits to local businesses during the construction period.

Upgrading the Southern Explorer has the potential to provide benefits through reducing heavy vehicle traffic through Hobart CBD.

4. Cost Benefit Analysis Method

4.1 Overview

A cost benefit analysis (CBA) has been undertaken to determine the feasibility of upgrading the Southern Explorer. A CBA is a systematic process for calculating and comparing benefits and costs of a project, with the purpose of determining whether the project is a sound investment.

In defining the project, consideration has been given to the key transport tasks of the road network. This is illustrated in Figure 6 (extracted from the Tasmanian Freight Survey, Data Summary 2013).

The Southern Explorer provides a viable route for transport between Huonville and New Norfolk. The use of the Southern Explorer to access regional areas via the Bridgewater Bridge or the Tasman Bridge is not viable as the Southern Explorer route is longer.

The project model is determined as the road networks linking the Huon River Bridge to the New Norfolk Bridge via the Southern Explorer (Route A) and also via Hobart (Route B) as shown in Figure 7. Table 4 and Table 5 provide details of each route. Route A is approximately 10km shorter than Route B. If the Southern Explorer is upgraded, it is anticipated some traffic will relocate from Route B to Route A.

Table 4 Route A details

Road	Length (km)	Owner
Glenora Road	3.0	Derwent Valley Council
Southern Explorer (Glenfern Road / Plenty Link Road)	41.2	Derwent Valley Council/ Forestry Tasmania
Lonnavale Road	5.5	Huon Valley Council
Glen Huon Road	13.3	Department of State Growth
Total Length	63.0	

Table 5 Route B details

Road	Length	Owner
Lyell Highway	16.3	Department of State Growth
Brooker Highway	17.5	Department of State Growth
Davey Street/ Macquarie Street	3.2	Hobart City Council
Southern Outlet	9.2	Department of State Growth
Huon Highway	27.4	Department of State Growth
Total Length	73.6	

Figure 6 Southern Intra-Regional Freight Task (Department of Infrastructure, Energy and Resources 2013)

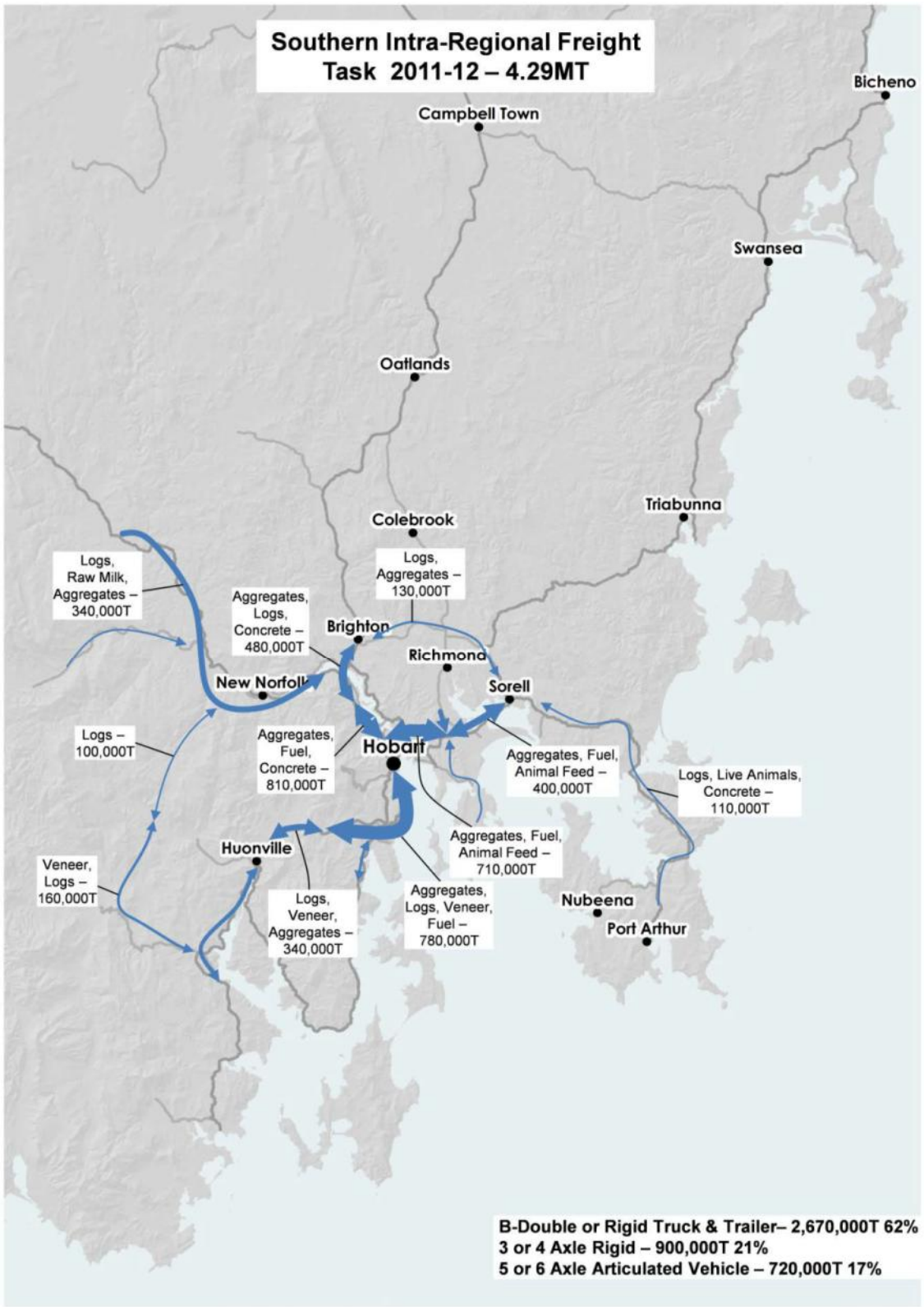
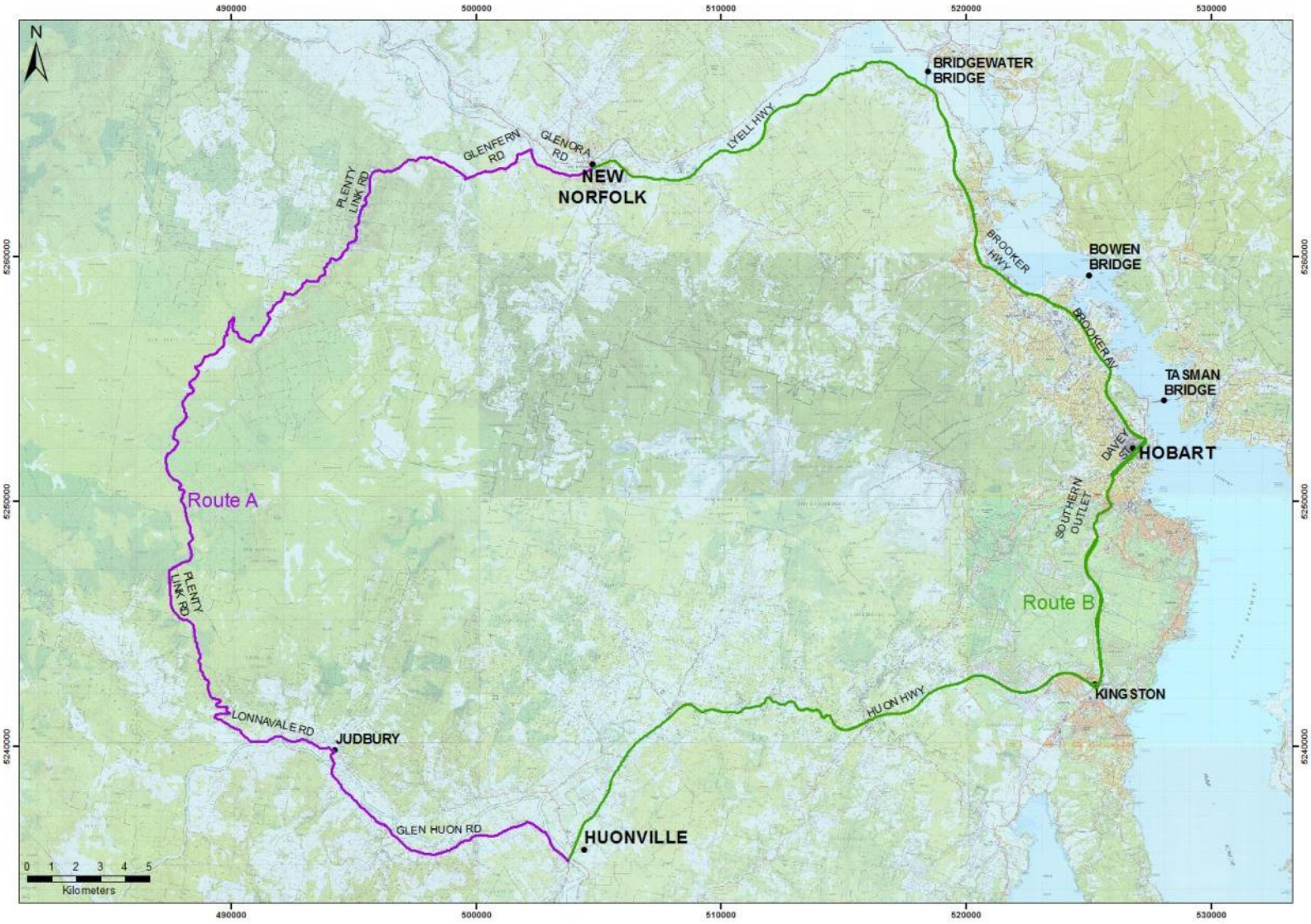


Figure 7 Alternative routes between Huonville and New Norfolk



Costs and benefits have been assessed for the two routes for the Base Case (current conditions) and the Project Case (the Southern Explorer is upgraded). Benefits and costs have been assessed over a 30 year evaluation period.

To determine the benefits of upgrading the Southern Explorer, the following road user costs have been assessed:

- Travel time costs
- Accident costs
- Vehicle operating costs
- Environmental and other externalities

The method for assessing each parameter is discussed in Section 4.3.

To determine the costs, the following expenditure costs have been calculated:

- Operations and maintenance costs
- Construction costs (Project Case only)

The method for determining expenditure costs is detailed in Section 4.4.

4.2 Data inputs

4.2.1 Geometry

Geometry data was obtained for the two routes using a GPS tracker. Recordings of longitude, latitude and elevation were obtained at one second intervals. These recordings were used to determine chainage, horizontal radius and grade. Current pavement widths were estimated based on site observations.

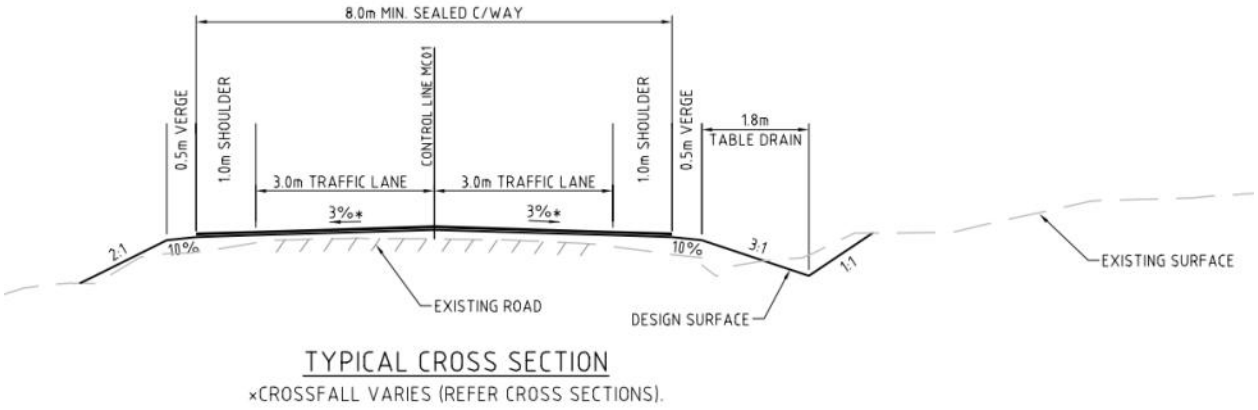
DVC and HVC have indicated that they would like the Department of State Growth to take over ownership of the Southern Explorer if it was upgraded. Based on the current use of the Southern Explorer, which includes 68.5t B-Doubles, the upgraded road would need to meet State Growth standards for HPV routes, which are detailed in Table 6.

The Project Case considers an upgraded road with an 8m seal width to meet HPV requirements. The typical road cross section is shown in Figure 8.

Table 6 Tasmanian HPV Straight Road Width Requirements (Department of Infrastructure, Energy and Resources 2011)

AADT	Road Surface	Trafficable Width	Land Width	Shoulder Width
Industry Only	Unsealed	5.5m	N/A	0.6m
<2000	Unsealed	6.7m	N/A	1.0m
150-2000	Sealed	N/A	3.0m	1.0m
2000-6000	Sealed	N/A	3.0m	1.2m
>6000	Sealed	N/A	3.25m	1.2m

Figure 8 Typical Cross Section (Department of Infrastructure, Energy and Resources 2012)



The existing alignment of the Southern Explorer follows the terrain as best as possible, resulting in inconsistent geometry. No major adjustments to the alignment are proposed for the Project Case. It is foreseen that any upgrade of the road would include local road geometry improvements such as adjustments to horizontal and vertical curves and superelevation.

4.2.2 Traffic volumes

Existing traffic counts are not available for the Southern Explorer. Volumes have been estimated based on discussions with Forestry Tasmania and Norske Skog.

Traffic counts have been obtained from the Department of State Growth for State roads and the Macquarie Street / Davey Street couplet. Traffic volumes have been estimated for the remaining council roads.

Table 7 shows traffic volumes used for the Base Case. The impact of relocating traffic from Route B to Route A is investigated for the Project Case.

Table 7 Base Case traffic volumes

Road	AADT	%Trucks
Southern Explorer (sealed section)	50	15
Southern Explorer (unsealed section)	50	40
Lonnavale Road	1,000	20
Glen Huon Road	2,000	12
Huon Highway	7,500	8
Southern Outlet	32,000	6
Macquarie Street / Davey Street Couplet	46,500	6
Brooker Highway (Hobart to Bowen Bridge)	46,500	7
Brooker Highway (Bowen Bridge to Bridgewater Bridge)	25,000	8
Lyell Highway	8,000	7
Glenora Road	1,000	12

4.2.3 Vehicle speeds

Vehicle speeds and travel times have been obtained from the GPS recording.

4.3 Road user costs

4.3.1 Travel time costs (vehicle occupant)

Travel time costs for the vehicle occupant have been assessed for the Base Case and the Project Case. Value of time for the vehicle occupant has been determined using data from Austroads (2012) *Guide to Project Evaluation- Part 4: Project Evaluation Data.* Parameters have been escalated to 2014 values in line with Average Weekly Earnings. Parameters for cars and heavy vehicles are shown in Table 8.

Table 8 Estimated value of travel time

Type of vehicle	Occupancy rate (persons/vehicle)	Value per occupant ($/person-hour)	Value of time ($/vehicle hour)
Private Car	1.7	15.4	26.2
Heavy vehicle	1.0	28.9	28.9

4.3.2 Crash costs

There is no historical crash data available for the Southern Explorer. A crash rate prediction model has been used to predict crash costs for the Base Case and the Project Case.

The crash rate prediction model has been developed based on Figure 9, extracted from Austroads (2001) *Relationship Between Crash Risk and Geometric Characteristics of Rural Highways*. The model predicts the crash rate based on lane width, horizontal geometry and grade.

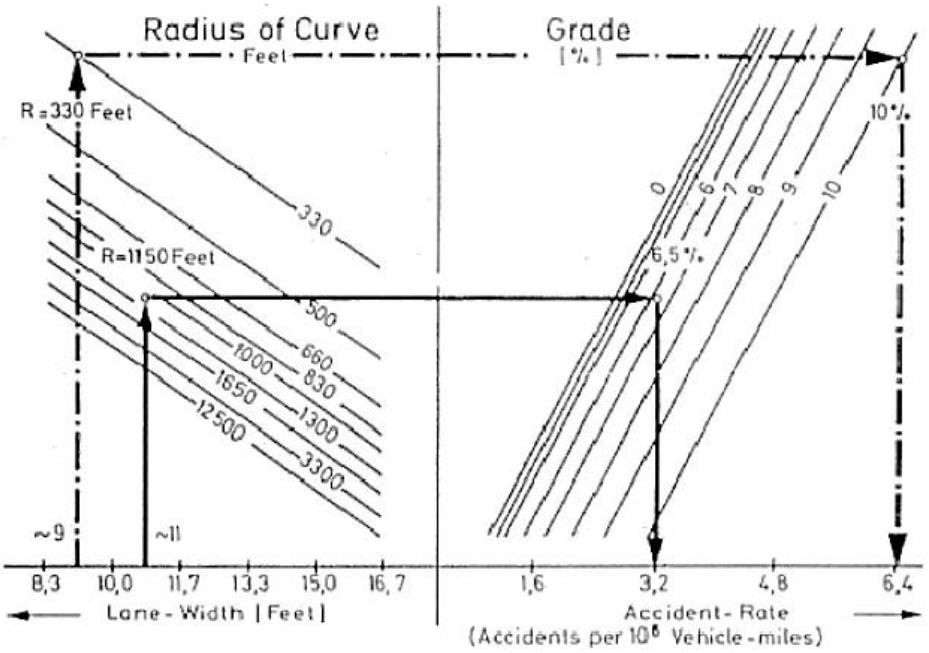
The crash rate is measured in accidents per million vehicle kilometres. To determine the total crashes, the crash rate is multiplied by the road length and the traffic volume.

The cost of crashes has been determined based on parameters from Austroads (2012). Table 9 shows the estimated average crash costs based on crash severity for Tasmania in urban and non-urban environments, together with the estimated split of crashes by severity. The parameters have been escalated to 2014 values in line with CPI.

Table 9 Estimated average crash costs by severity category for Tasmania

Crash Type	Non-Urban	Urban	Percentage of crashes
Fatal	$2.753M	$2.203M	1.75%
Serious Injury	$0.582M	$0.550M	6.00%
Minor Injury	$0.028M	$0.026M	16.25%
Property Damage Only	$0.010M	$0.010M	76.00%

Figure 9 Determining accident rate as a function of lane width, radius of curve, and grade (Austroads 2001)



(Source: Choueiri et al 1994)

4.3.3 Vehicle operating costs (including value of freight)

Austroads (2012) provides a method for determining vehicle operating costs based on speed for at-grade urban roads. Vehicle operating costs can be estimated based on Equation 1, with parameter values for cars and heavy vehicles detailed in Table 10. Vehicle operating costs determined using this method include freight time costs.

Equation 1 Vehicle operating cost for at-grade roads (Austroads 2012)

$$c = A + \frac{B}{V} + C \times V + D \times V^2$$

$$where: A, B, C, D = model\ coefficients$$

$$c = vehicle\ operating\ costs + freight\ time\ costs\ \left(\frac{cents}{km}\right)$$

$$V = all\ day\ average\ link\ speed\ in\ km/h$$

Table 10 Parameter values for at-grade roads vehicle operating cost models (Austroads 2012)

Vehicle Type	A	B	C	D
Cars	59.889	-27.96	-0.9768	0.005926
Heavy Vehicles	316.434	2835.72	-4.2828	0.025487

The Austroads vehicle operating cost model is based on speed and is appropriate for roads at low grades. The Southern Explorer has a number of sections with significant grades. Vehicle operating costs will be higher on these sections.

An adjustment has been applied to the Austroads vehicle operating cost model to account for the effect of grade. The effect of grade has been estimated based on the ARRB Research Report *Review and enhancement of Vehicle Operating Cost models: Assessment of non urban evaluation models* (1996).

Figure 10 shows the increase in fuel consumption for a medium car travelling on a grade of 8% compared to flat terrain. For example, the figure shows a car travelling at 104km/h would use approximately 3 litres more per 100km on an 8% grade compared to flat terrain.

Figure 10 has been used to apply an adjustment factor to the vehicle operating costs determined using Equation 1. A linear interpolation has been assumed between 0% and 8% to determine the adjustment factor for other grades. A fuel cost of $1.5 per litre has been assumed. Figure 11 shows the detemined impact on fuel consumption for grades up to 13%.

Figure 10 Effect of gradient on fuel consumption (ARRB 1996)

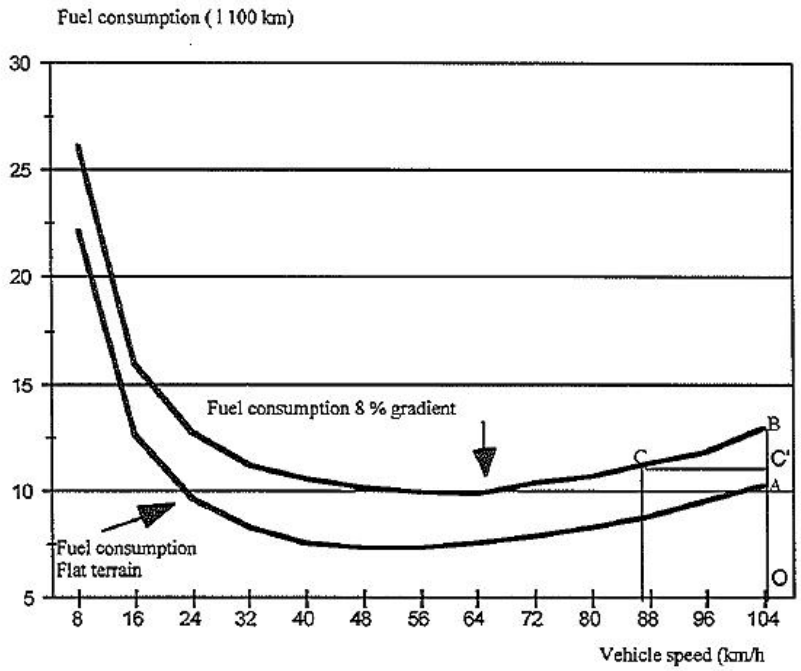
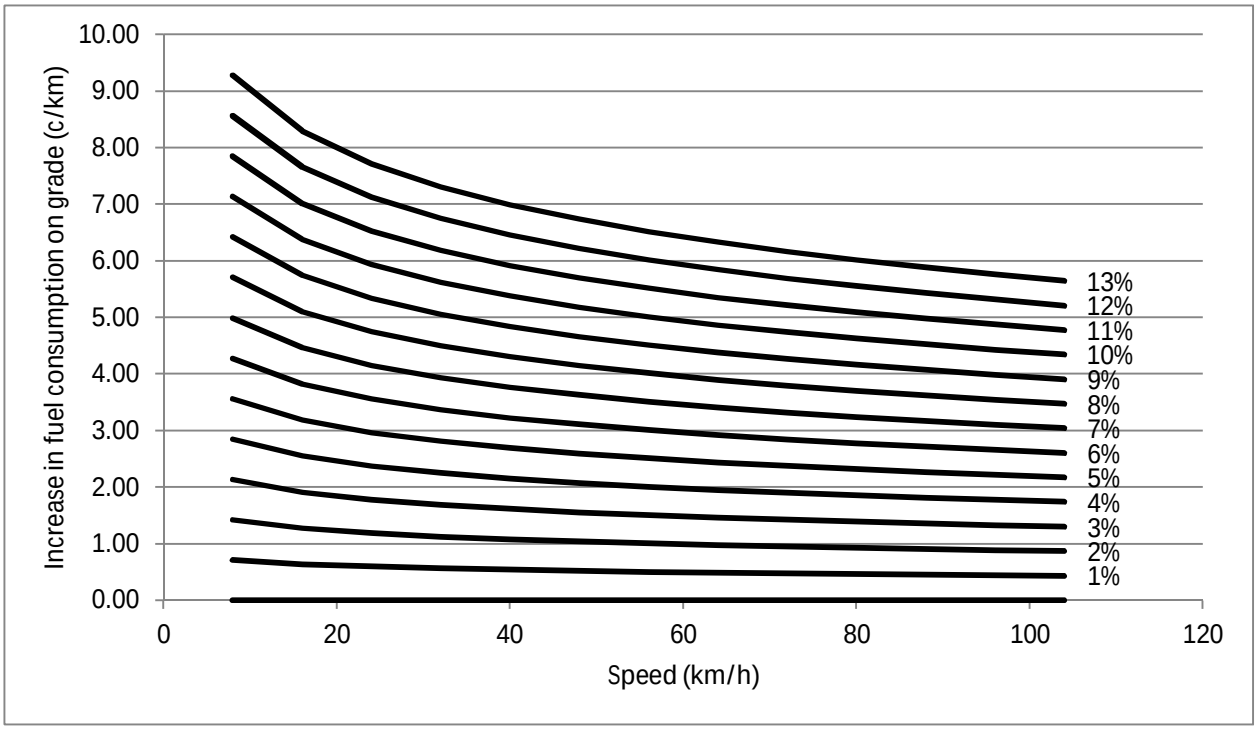


Figure 11 Increase in fuel consumption due to grade



4.3.4 Environmental and other externalities

The cost of environmental and other externalities has been estimated based on externality unit costs from Austroads (2012). Parameters for cars are detailed in Table 11 and parameters for heavy vehicles are detailed in Table 12. Unit costs have been escalated to 2014 values in line with CPI.

Table 11 is expressed in vehicle kilometres of travel whilst the values in Table 12 are expressed as per 1000 tonne kilometres. It must be emphasised that environmental valuation involves significant uncertainty and the values presented in the tables should be regarded as illustrative of the methodology rather than as definitive unit costs.

Route A has been classified as Rural and Route B is a mixture of Urban and Rural, as shown in Figure 12.

Figure 12 Rural / Urban classification

Table 11 Externality unit costs for passenger vehicles (cents per vehicle kilometres travelled)

Externality	Urban	Rural
Air Pollution	3.07	0.03
Greenhouse	2.42	2.42
Noise	1.00	0.00
Water	0.46	0.04
Nature and landscape	0.06	0.56
Urban Separation	0.71	0.00
Upstream and Downstream costs	4.13	4.13

Table 12 Externality unit costs for freight vehicles ($ per 1000 tonne-km)

Externality	Urban	Rural
Air Pollution	25.55	0.25
Greenhouse	5.68	5.68
Noise	4.26	0.43
Water	3.83	1.53
Nature and landscape	0.42	4.27
Urban Separation	2.85	0
Upstream and Downstream costs	22.75	22.75

4.4 Expenditure costs

4.4.1 Construction costs

Construction costs have been estimated for upgrading the Southern Explorer to a seal width of 8.0m as discussed in section 4.2.1.

The adopted cost rates per metre for upgrading the road are detailed in Table 13. The construction cost rates are based on previous experience in working with similar road projects for the State Government. The rates are based on historical cost rates derived using the Best Practice Cost Estimation Standard for Publicly Funded Road and Rail Construction. The rates are inclusive of:

- Construction costs
- Client costs
- Risk and Contingency

Table 13 Construction costs

Road section	Construction cost ($/m)
Existing pavement width is relatively narrow, terrain is challenging with steep side slopes and land slip potential. Road upgrades includes significant pavement widening and overlay, retaining structures, safety barriers, significant cut / fill volumes, drainage improvements.	2,000
Existing pavement width is less than desirable, moderate terrain grades. Road upgrade includes pavement widening and overlay, some retaining structures and safety barriers may be required, drainage improvements and roadside hazard clearing.	1,400
Existing pavement width greater than 7 metres wide. Road upgrade includes overlay, drainage improvements and roadside hazard clearing.	1,000

4.4.2 Operations and maintenance costs

Road maintenance costs are a cost per kilometre for various maintenance tasks. The annual cost rates adopted in the BCA are shown in Table 14. The values are based on the 2012 State Grants Commission report, making recommendations to the Treasurer concerning the distribution of Commonwealth financial assistance grants to Tasmanian councils.

The maintenance tasks included in the costings are pothole patching, edge breaks, shoulder maintenance, table drains, guideposts, guardrail and sign maintenance. It excludes roadside vegetation management, resurfacing and rehabilitation.

Table 14 Operations and maintenance costs

Road section	Annual operations and maintenance costs ($/km)
Unsealed road	1,000
Sealed rural road	2,399
Sealed urban road	4,576

5. Cost Benefit Analysis Results

5.1 Overview

In order to better understand the cost benefit of upgrading the Southern Explorer, a comparison of single vehicle costs for the alternative routes has been undertaken. Figure 13 shows the modelled user costs for a single truck and car to travel a single trip from Huonville to New Norfolk via Route A and Route B with no upgrade to the Southern Explorer (Base Case).

Note that Chainage 0 is the Huon River Bridge and the completion point is the New Norfolk Bridge.

Table 15 shows monetary values for a single trip by a single vehicle, broken down by user cost components.

Figure 13 Cumulative user costs for a single vehicle travelling from Huonville to New Norfolk (Base Case)

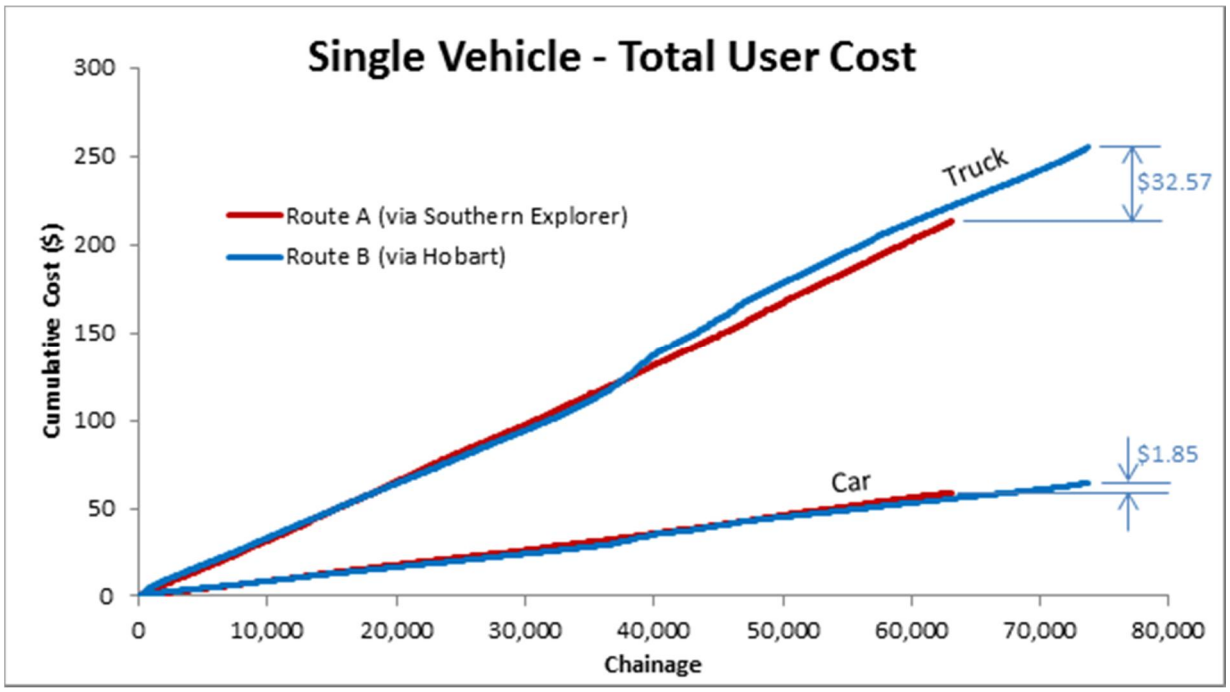


Table 15 User costs for single vehicle use (Base Case)

	VOC ($)	Travel Time ($)	Crashes ($)	Environmental ($)	Total ($)
Truck – Route A	133	28	18	44	222
Truck – Route B	144	29	15	67	255
Truck Savings (Route B – Route A)	*11*	*1*	*-3*	*23*	*33*
Car – Route A	15	25	18	5	62
Car – Route B	17	26	15	7	64
Car Savings (Route B – Route A)	*2*	*1*	*-3*	*2*	*2*

There is a clear benefit for trucks using the Southern Explorer route from Huonville to New Norfolk as opposed to the route via Hobart. This is mostly attributable to the environmental cost component. This is discussed further in section 5.3.4. Benefits for cars are comparatively low.

In order to attract heavy vehicles away from Route B (via Hobart) to use Route A (via Southern Explorer), there needs to be a level of investment to provide safe access for heavy vehicle traffic.

High level cost estimates provide a construction cost estimate of upgrades in the order of $48M.

For a substantial investment of this magnitude, the user benefits need to be greater than this over the 30 year evaluation period.

The break-even point for the project where the cost of upgrade balances the monetary benefits for the users, i.e. to achieve a Cost Benefit Ratio of 1.0, the Southern Explorer route would need to attract 250 heavy vehicles per day from the route via Hobart.

A summary of the BCA for the scenario of redirecting 250 trucks is shown below.

The evaluation period for the project investment is 30 years with the start year for project benefits being 2019. The price year is 2014 and a discount rate of 7% has been used.

Economic Evaluation of Proposed Project

Base Case Scenario:	Expenditure	$	19.4 M
	User Costs	$	9,251.8 M
Project Case Scenario	Expenditure	$	61.5 M
	User Costs	$	9,209.7 M

Present Value of Costs:

PVC = [Scheme Expenditure Costs for Project Case] - [Scheme Expenditure Costs for Base Case]

PVC = $ 42.1 M

Present Value of Benefits:

PVB = [Scheme User Costs for Base Case] - [Scheme User Costs for Project Case]

PVB = $ 42.1 M

Net Present Value:

NPV = PVB - PVC = $ 0 M

Benefit Cost Ratio:

BCR = PVB / PVC = 1.00

The Project Case is defined as follows:

- The Southern Explorer is upgraded as far as practicable to provide an 8m seal width that is compliant with the Department of State Growth HPV standards. The improvements in horizontal alignment are discrete along the length of the Southern Explorer and provided nominally 10% increase in curve radius
- Relocated truck traffic volume from Route B to Route A is 250 trucks per day
- The improvement in average vehicle speed on the Southern Explorer is 10km/h

5.2 Key model input variables

Key modelling inputs include the following:

- Road geometry (width, radius and grade)
- Traffic volume
- Vehicle speed

5.2.1 Road geometry

Road geometry affects the following user costs:

- Travel time
- VOC
- Accident costs

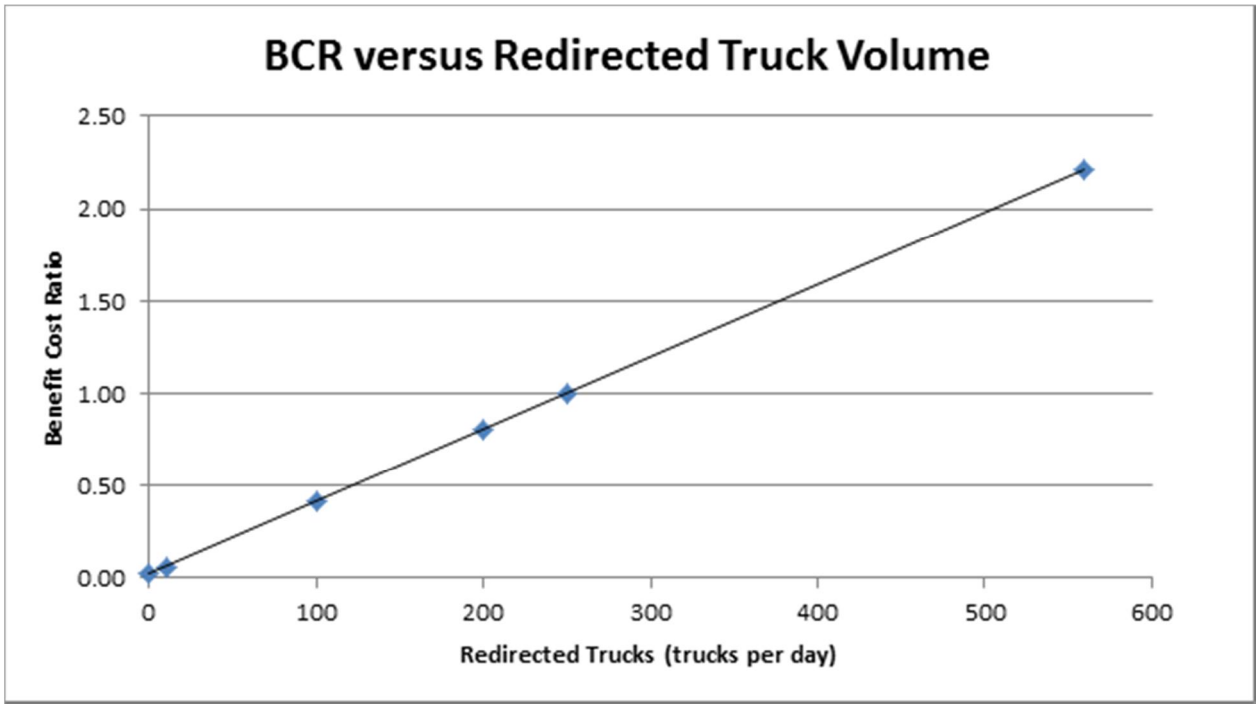
For the purposes of this feasibility study, the existing road alignment for the Southern Explorer is to be maintained. It is foreseen that any upgrade of the road would include local road geometry improvements such as adjustments to horizontal and vertical curves and superelevation.

The BCA model has taken account of this by improving the curve radii by nominally 10% and providing a minimum horizontal curve radius of 100 metres.

5.2.2 Traffic volumes

To see a positive return on investment for the upgrade to the Southern Explorer, a clear benefit of redirecting truck traffic from Route B to Route A is required. The sensitivity of traffic volumes is illustrated in Figure 14. The upper limit for relocated commercial vehicles is 560 commercial vehicles per day. This is the current average daily truck volume on the Lyell Highway between Bridgewater Bridge and New Norfolk.

Figure 14 Relationship between trucks redirected from Route B to Route A and Benefit Cost Ratio

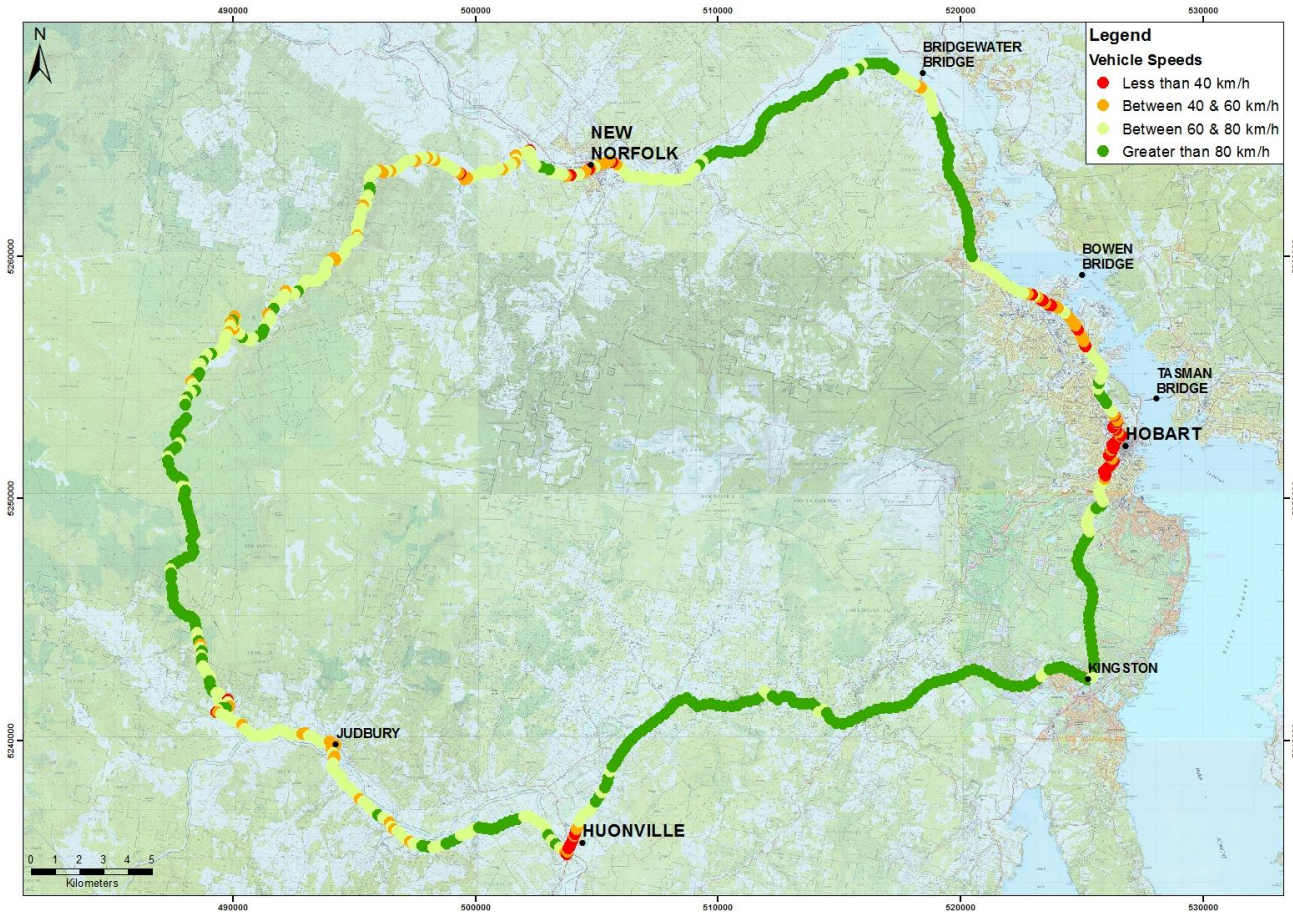


5.2.3 Vehicle speeds

The GPS data logger for speed is assumed to be representative of the 85th percentile speed of the traffic. There has been no adjustment for various vehicle types.

Current vehicle speeds based on the GPS data logger are shown in Figure 15.

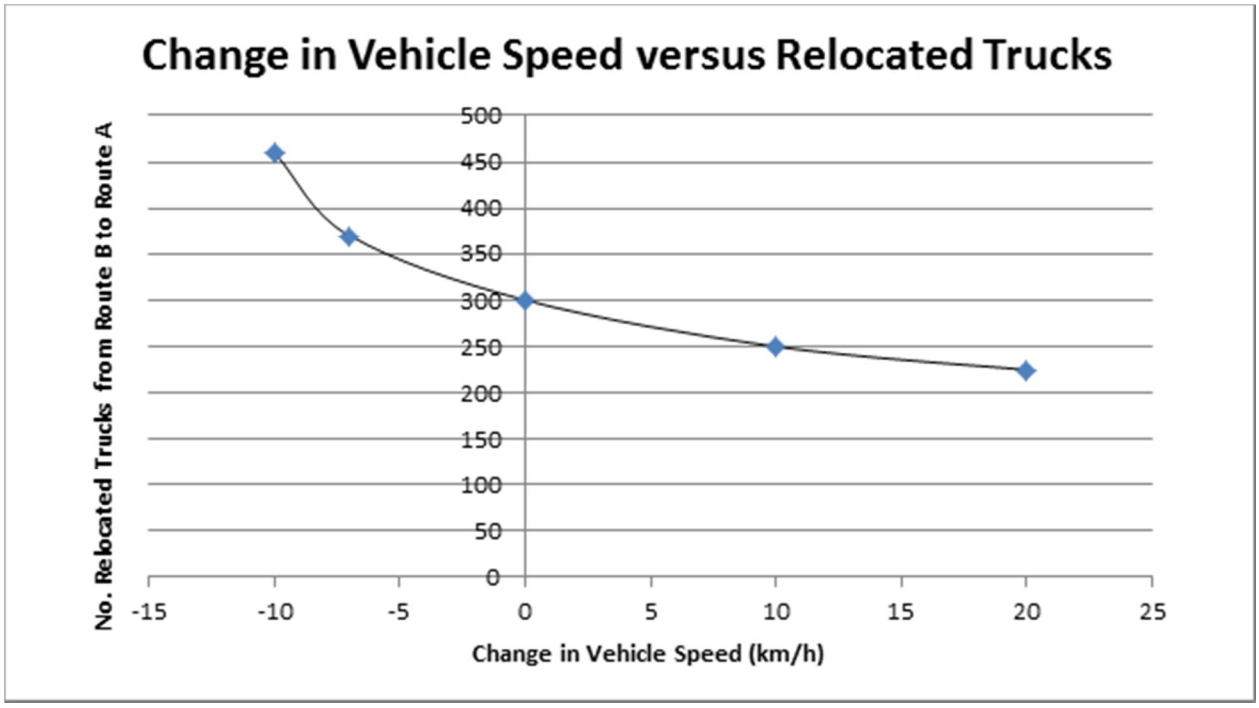
Figure 15 Vehicle speed heat map



It is assumed that upgrading the Southern Explorer will provide a nominal 10km/h average speed increase over the length of the upgraded road. This would provide travel time savings as well as adjustments to the vehicle operating costs.

Whilst the 10km/h speed adjustment is an estimate of the benefit of the road improvement, a sensitivity analysis of the BCR to changes in this speed is illustrated in Figure 16. To explain the graph by way of example; if the average vehicle speed is 20km/h faster following an upgrade to the Southern Explorer, then the user cost savings (e.g. travel time savings) would mean that the breakeven point (BCR = 1.00) is when 225 trucks per day are relocated from Route B to Route A.

Figure 16 Sensitivity of vehicle speed change with relocated trucks to maintain a BCR = 1.00



5.3 Road user costs

For this project the benefits include:

- travel time savings
- crash cost reduction
- savings in vehicle operating costs
- environmental cost reduction

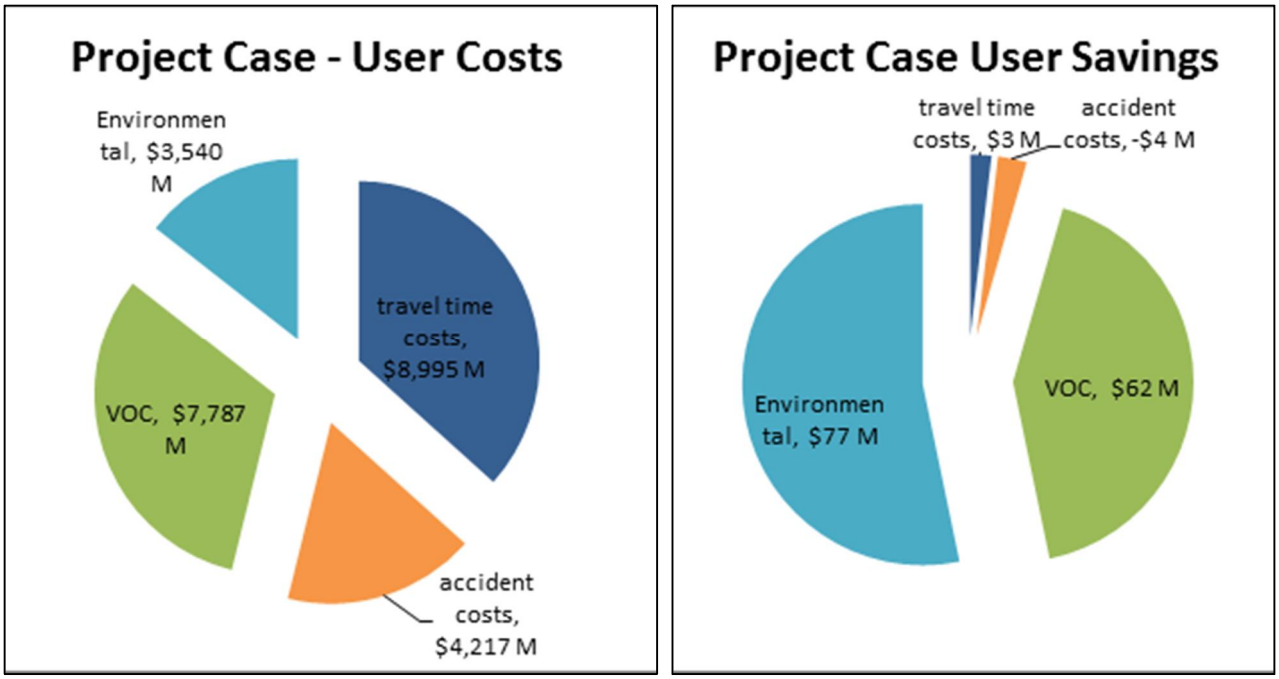
These benefits are discussed in more detail in the following sections.

The benefits are determined based on the difference in cost between the Base Case and Project Case. User costs for the Base Case and Project Case scenarios are provided in Table 16 and are the accumulative cost over the 30 year project evaluation period.

Table 16 Summary of user costs for the Base Case and Project Case

User Cost	Base Case ($M)	Project Case ($M)	Savings ($M)
Travel time costs	8,998	8,995	3
Accident costs	4,214	4,217	-4
VOC	7,848	7,787	62
Environmental costs	3,617	3,540	77
Total:	24,677	24,539	138

Figure 17 Distribution of user costs for the Project Case



5.3.1 Travel time costs

Travel time costs represent the majority of the user costs. However, the travel time saving (benefit) for the Project Case is relatively minor, providing only $3M in savings over a thirty year assessment period.

A breakdown of the link travel time costs are shown in Table 17.

Table 17 Link travel time costs

Route	Link	Base Case ($M)	Project Case ($M)	Savings ($M)	Total Route Savings ($M)
A	Glenora Rd	19	23	-4	-94
	Southern Explorer	14	77	-61	
	Lonnavale Rd	34	42	-8	
	Glen Huon Rd	153	171	-18	
B	Huon Hwy	953	923	29	97
	Southern Outlet	1,420	1,409	10	
	Macquarie St/ Davey St	2,053	2,042	10	
	Brooker Hwy Sth of Bowen Bridge	2,237	2,226	11	
	Brooker Hwy Nth of Bowen Bridge	1,461	1,447	13	
	Lyell Hwy	655	635	19	
	Total Cost	*8,998*	*8,995*	*3*	
	Present Value	*3,373*	*3,373*	*1*	

The most significant contributing factor to the apportioning of the travel time costs to each link is the volume of traffic using the link. This explains the relative higher costs of the Brooker Highway, Macquarie St/ Davey St and Southern Outlet links.

5.3.2 Crash costs

The crash rate is determined using the relationship derived by Chouairi et al 1994 (refer section 4.3.2 of this report). The geometric variables used to determine the crash rate are:

- Lane width
- Radius of curve
- Grade

It is found that improvements to these three variables make little impact on the BCR due to the relatively low vehicle numbers on the Southern Explorer.

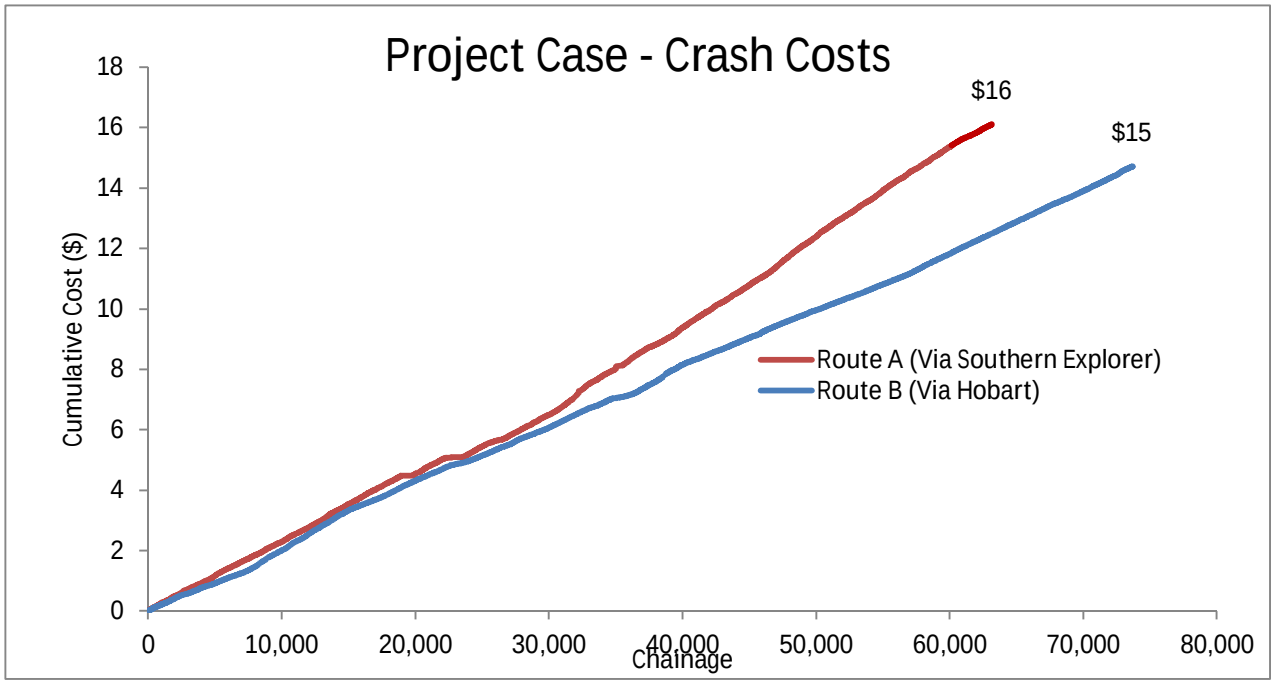
The crash cost of each link is shown in Table 18.

Table 18 Link crash costs

Route	Link	Base Case ($M)	Project Case ($M)	Savings ($M)	Total Route Savings ($M)
A	Glenora Rd	11	13	-2	-53
	Southern Explorer	9	45	-36	
	Lonnavale Road	21	25	-5	
	Glen Huon Rd	95	106	-10	
B	Huon Hwy	643	624	19	50
	Southern Outlet	818	813	6	
	Macquarie St/ Davey St	606	603	3	
	Brooker Hwy Sth of Bowen Bridge	830	826	4	
	Brooker Hwy Nth of Bowen Bridge	755	748	7	
	Lyell Hwy	425	413	12	
	Total Cost	*4214*	*4217*	*-4*	
	Present Value	*1580*	*1581*	*-1*	

The single vehicle crash cost comparison between Route A and Route B is represent in Figure 18.

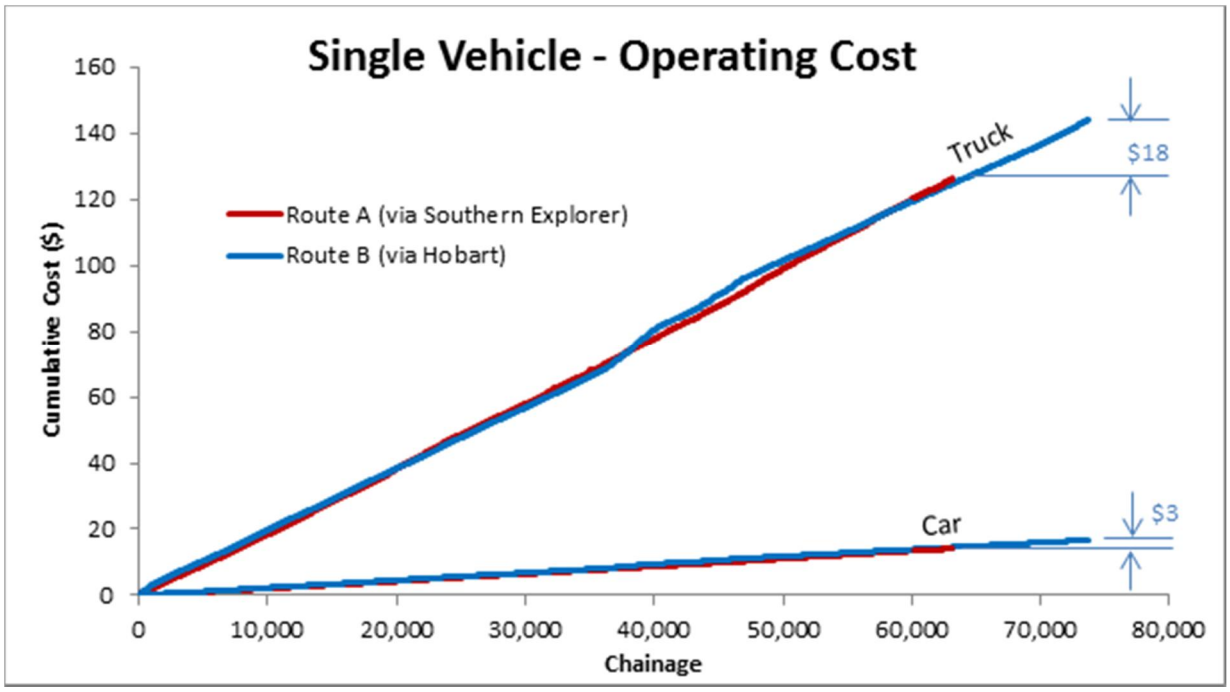
Figure 18 Crash cost comparison for a single vehicle unit via Route A and Route B for the Project Case



5.3.3 Vehicle operating costs

In order to better understand the vehicle operating cost on the upgraded Southern Explorer, a comparison of single vehicle operating costs for the alternative routes has been undertaken. Figure 19 shows the modelled vehicle operating costs for both a single truck and a car to travel a single trip from Huonville to New Norfolk via Route A and Route B.

Figure 19 Vehicle operating cost comparison for a single vehicle unit via Route A and Route B (Project Case)



The vehicle operating cost model as defined in Austroads 2012 only accounts for speed as a variable input. The BCA model undertaken has introduced a grade adjustment to the cost as discussed in section 4.3.3. The

grade has not been varied in the model as the existing alignment has been adopted in the Project Case for the Southern Explorer. Significant deviation from the alignment of the Southern Explorer is beyond the scope of this consultancy.

The vehicle operating cost for each link is shown in Table 19.

Table 19 Link vehicle operating costs

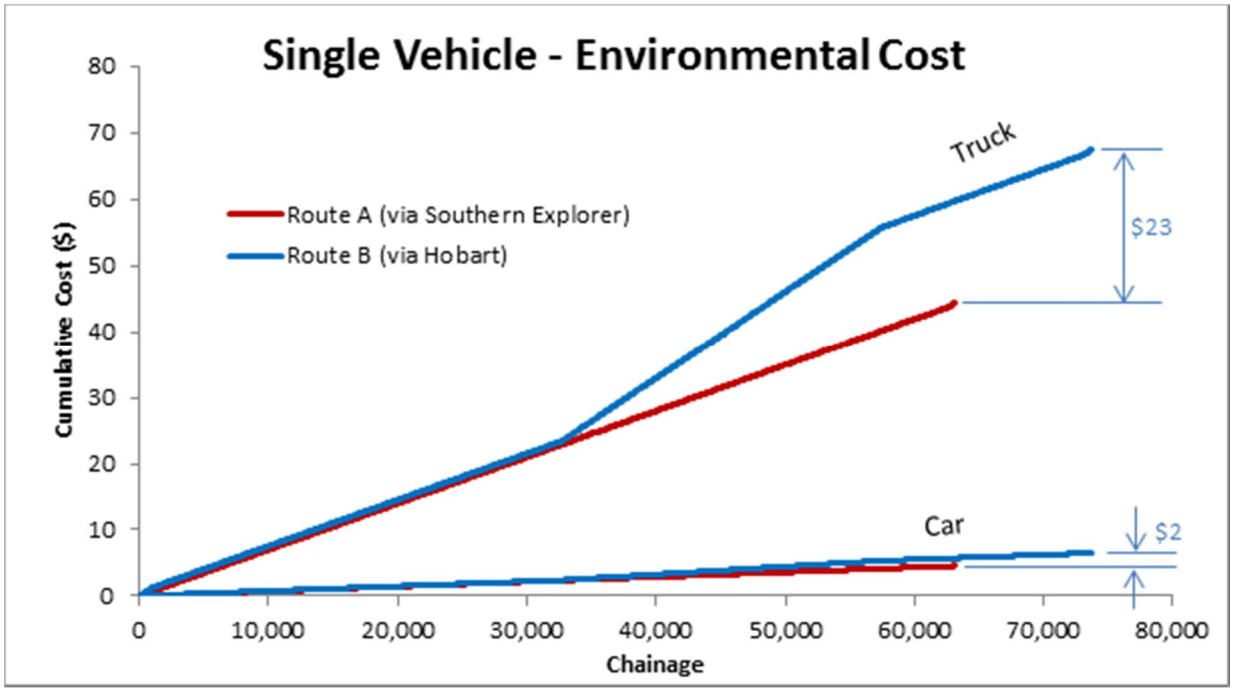
Route	Link	Base Case ($M)	Project Case ($M)	Savings ($M)	Total Route Savings ($M)
A	Glenora Rd	20	39	-19	-406
	Southern Explorer	30	313	-284	
	Lonnavale Rd	47	83	-36	
	Glen Huon Rd	167	250	-84	
B	Huon Hwy	1146	970	176	465
	Southern Outlet	1467	1407	59	
	Macquarie St/ Davey St	1177	1142	35	
	Brooker Hwy Sth of Bowen Bridge	1678	1632	46	
	Brooker Hwy Nth of Bowen Bridge	1480	1411	70	
	Lyell Hwy	637	539	99	
	Total Cost	*7848*	*7787*	*62*	
	Present Value	*2943*	*2924*	*19*	

5.3.4 Environmental and other externalities

There is significant uncertainty in the use of environmental factors as identified in section 4.3.4. The values published in Austroads (2012) and adjusted to 2014 values have been adopted in the BCA model.

To better understand the impact of the environment and other externalities, a comparison of single vehicle costs for the alternative routes has been undertaken and the results shown in Figure 20.

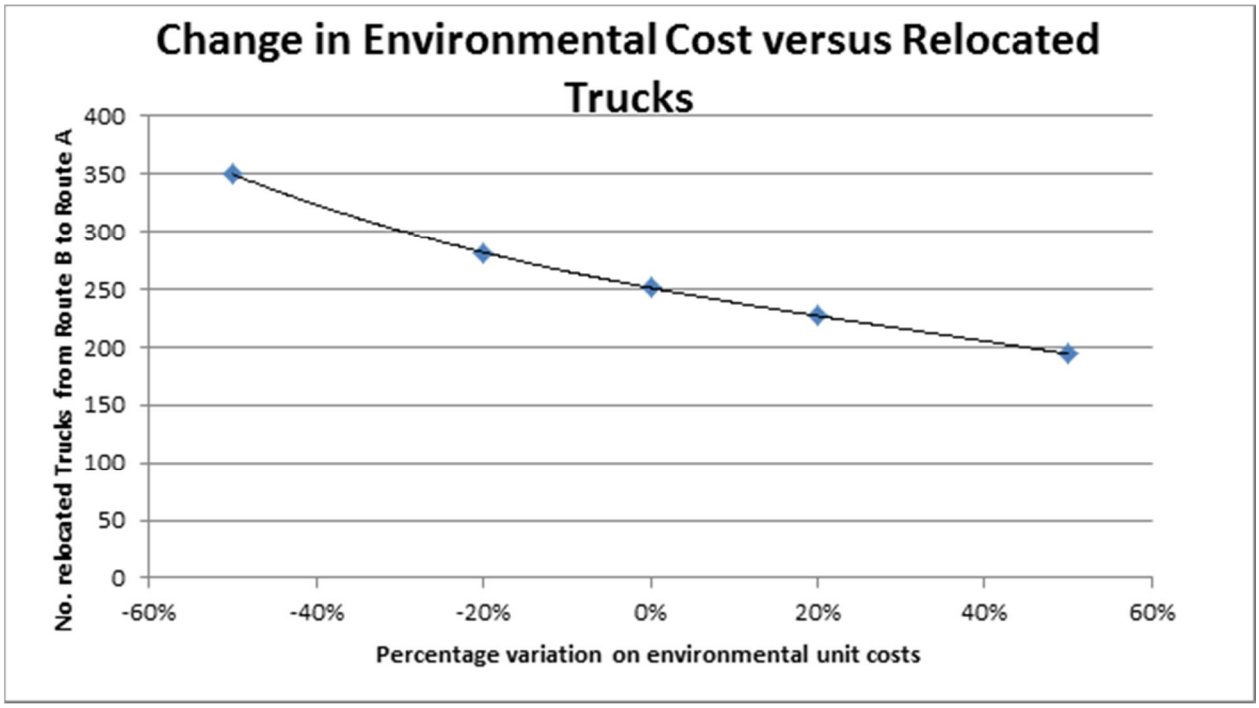
Figure 20 Environmental and other externality costs comparison for a single vehicle unit via Route A and Route B



A significant divergence of cumulative cost for a single truck is evident when comparing the two routes. This divergence is attributable to the higher environmental costs associated with truck movements in the urban environment of Hobart, in particular air pollution, noise and urban separation.

A sensitivity analysis of environmental unit costs has been undertaken to better understand its effect on the project BCR. The results are shown in Figure 21.

Figure 21 Sensitivity of variation in environmental unit costs with relocated trucks to maintain a BCR = 1.00



The environmental cost of each link is shown in Table 20.

Table 20 Link environmental costs

Route	Link	Base Case ($M)	Project Case ($M)	Savings ($M)	Total Route Savings ($M)
A	Glenora Rd	8	16	-8	-149
	Southern Explorer	9	106	-97	
	Lonnavale Rd	17	30	-13	
	Glen Huon Rd	60	92	-31	
B	Huon Hwy	394	328	66	227
	Southern Outlet	654	624	30	
	Macquarie St/ Davey St	429	415	14	
	Brooker Hwy Sth of Bowen Bridge	895	867	28	
	Brooker Hwy Nth of Bowen Bridge	913	864	49	
	Lyell Hwy	238	199	40	
	Total Cost	*3617*	*3540*	*77*	
	Present Value	*1356*	*1332*	*24*	

5.4 Expenditure

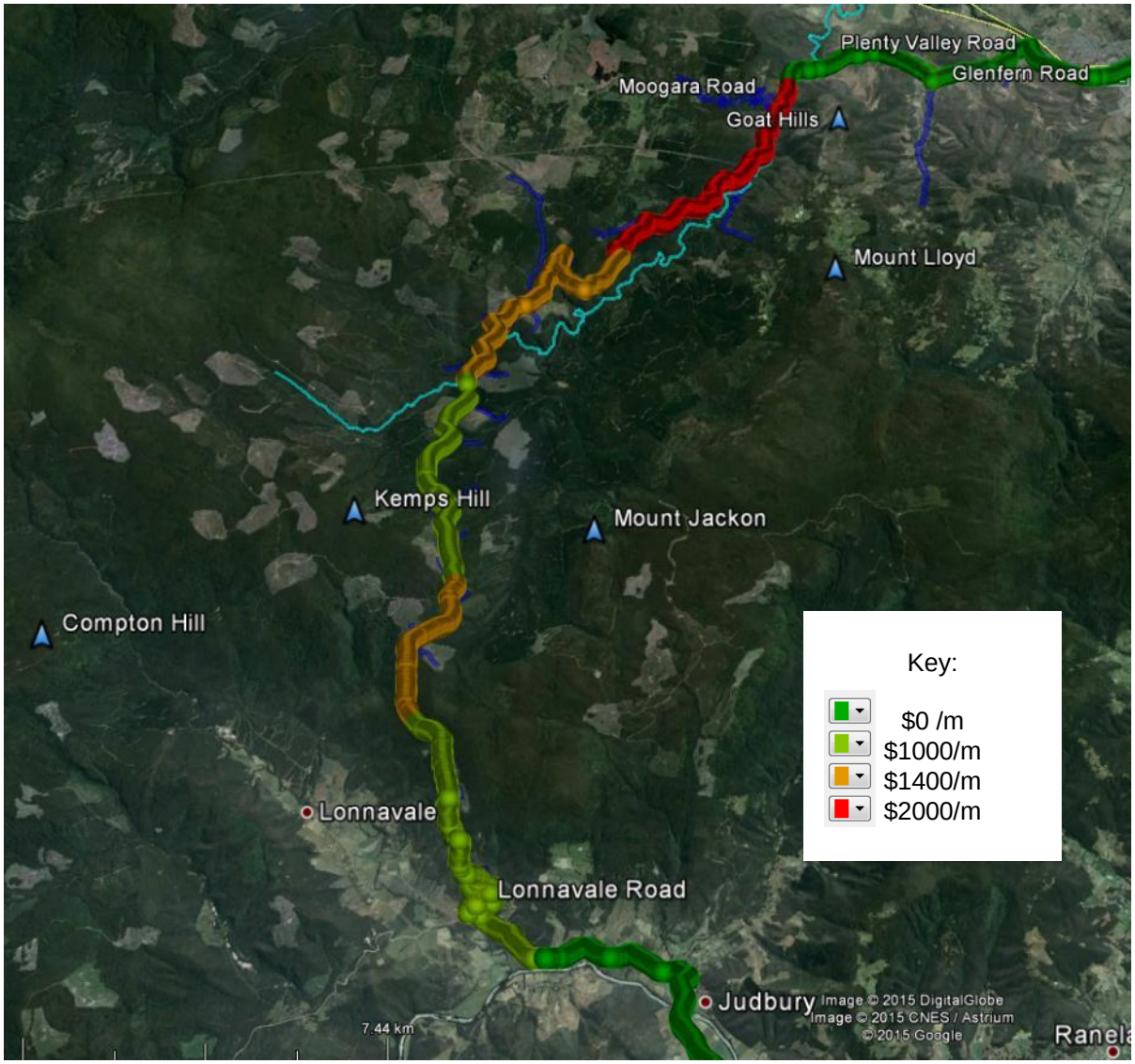
5.4.1 Construction costs

The estimated construction cost for upgrading the Southern Explorer to an 8m seal width is $48 million. The calculation of construction costs is shown in Table 21. Figure 22 shows the construction rate applied to sections of the Southern Explorer.

Table 21 Construction costs- Project Case

Road Section	Rate ($/m)	Length (km)	Cost ($M)
Existing pavement width is relatively narrow, terrain is challenging with steep side slopes and land slip potential. Road upgrades includes significant pavement widening and overlay, retaining structures, safety barriers, significant cut / fill volumes, drainage improvements.	2,000	8.41	16.8
Existing pavement width is less than desirable, moderate terrain grades. Road upgrade includes pavement widening and overlay, some retaining structures and safety barriers may be required, drainage improvements and roadside hazard clearing.	1,400	12.00	16.8
Existing pavement width greater than 7 metres wide. Road upgrade includes overlay, drainage improvements and roadside hazard clearing.	1,000	14.65	14.6
Total		35.06	48.2

Figure 22 Construction rate



5.4.2 Operations and maintenance costs

The calculation of operations and maintenance costs for the Base Case and Project Case are shown in Table 22. The annual operations and maintenance cost for the Base Case is $338,000. The annual operations and maintenance cost for the project case is $387,000.

Table 22 Operations and maintenance costs

Road Section	Annual operations and maintenance costs ($/km)	Length Base Case (km)	Cost per Annum for Base Case ($)	Length Project Case (km)	Cost per Annum for Project Case ($)
Unsealed road	1,000	35.1	35,060	0	0
Sealed rural road	2,399	75.0	180,087	110.1	264,196
Sealed urban road	4,576	26.8	122,438	26.8	122,438
Total		136.9	338,000	136.9	387,000

5.5 Benefit Cost Ratio

The evaluation period for the project investment is 30 years with the start year for project benefits being 2019. The price year is 2014 and a discount rate of 7% has been used.

All identified benefits and costs are properly measured and monetised to produce aggregate estimates for each year over the evaluation period. The discount rate has been applied to express all costs and benefits included in the evaluation in present value terms.

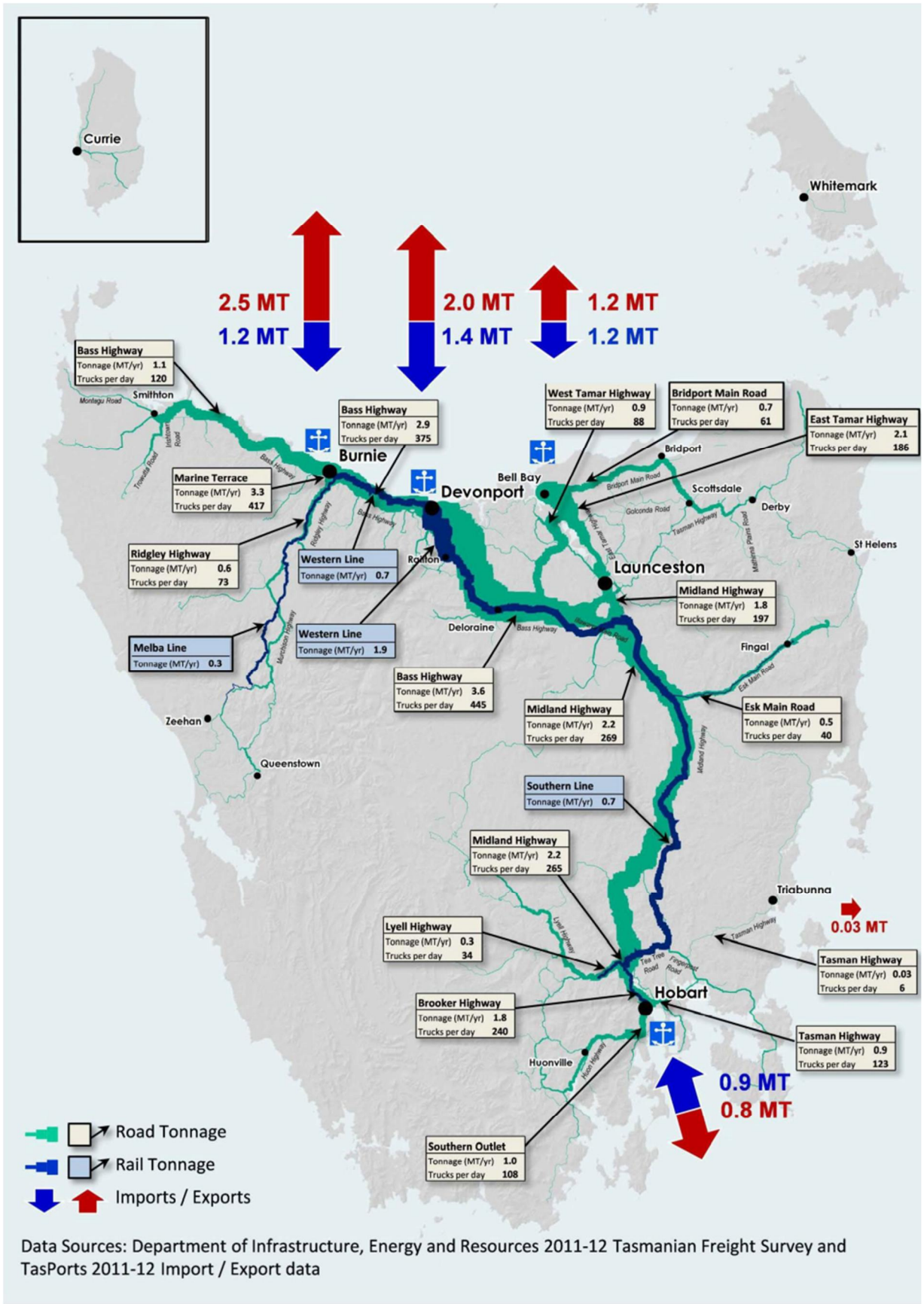
The break-even point for which the project would become viable is when 250 heavy vehicles per day (on average) would use the Southern Explorer route instead of the route via Hobart. This is based on the average load (nett) being 20 tonnes. This is generally commensurate with Class 6 vehicles and above. For more information on vehicle classifications, refer to Appendix A.

It is evident from the stakeholder consultation that industry is very unlikely to use the Southern Explorer at the level required to break-even.

Figure 23 shows the Statewide Freight Movements in 2011-2012, extracted from the Tasmanian Freight Survey Data Summary. In 2011-2012 the Lyell Highway carried 0.3MT per year, or 34 trucks per day. The Southern Outlet carried 1MT per year, or 108 trucks per day. The required demand of 250 trucks per day (or 1.8MT per year) represents the volume of trucks on the Brooker Highway in 2011-2012.

The CBA results for the scenario of 250 trucks redirected from route B (via Hobart) to route A (via Southern Explorer) are attached as Appendix B.

Figure 23 Statewide Freight Movements 2011-2012 (Department of Infrastructure, Energy and Resources 2013)



Excludes shipping movements from minor/private ports e.g. Port Latta

6. Potential Funding Sources

Research has been undertaken to identify potential funding sources for upgrading the Southern Explorer. Two potential funding programs have been identified- the Heavy Vehicle Safety and Productivity Programme and the National Stronger Regions Fund. Details of the programs are provided in Table 23.

Table 23 Potential Funding Programs

Program Name	Organisation	Description	Eligible Applicants	Funding Amount	Applications Due
Heavy Vehicle Safety and Productivity Programme	Australian Government Department of Infrastructure and Regional Development	The Heavy Vehicle Safety and Productivity Programme (HVSPP) is an Australian Government initiative to improve productivity and safety outcomes of heavy vehicle operations across Australia, through funding infrastructure projects. The Australian Government has committed $200 million in new funding over five years from 2014-15. The specific HVSPP objectives are to: ▪ Increase productivity of heavy vehicles by enhancing the capacity of existing roads and improving connections to freight networks; and ▪ Improve the safety environment for heavy vehicles. Website: http://investment.infrastructure.gov.au/funding/Heavyvehicles/	State, Territory and Local Governments are eligible to apply	The programme will contribute a maximum of 50 per cent of the total project cost	Round Five of the program is expected to be announced in late 2015.
National Stronger Regions Fund	Australian Government Department of Infrastructure and Regional Development	This programme will provide funding of $1 billion over 5 years, commencing in 2015-16, to fund priority infrastructure in regional communities. Funding will be provided for capital projects which involve construction of new infrastructure, or the upgrade, extension or enhancement of existing infrastructure. The project must deliver an economic benefit to the region beyond the period of construction. Projects should support disadvantaged regions or areas of disadvantage within a region. The NSRF funded part of the project must be completed on or before 31 December 2019. Website: http://investment.infrastructure.gov.au/funding/NSRF/index.aspx	Local government and incorporated not-for-profit organisations are eligible to apply.	Grants must be between $20,000 and $10 million. Grant funding must be matched in cash on at least a dollar for dollar basis.	Round Two of NSRF will open on 1 May 2015 and close on 31 July 2015.

7. Conclusions and Recommendations

The CBA assessed the feasibility of upgrading the Southern Explorer to provide a transport link between Huonville and New Norfolk.

The Southern Explorer provides some benefits over the alternative route through Hobart CBD, particularly for heavy vehicles. Vehicle operating costs and environmental costs are the major road user costs contributing to savings. The Southern Explorer provides minor travel time savings. Due to the difficult geometry, accident rates are higher on the Southern Explorer than the alternative route.

Benefits for light vehicles are comparatively low. The feasibility of upgrading the Southern Explorer is dependent on heavy vehicle demand.

The cost benefit analysis investigated the impact of relocating heavy vehicles from Route B (via Hobart) to Route A (via the Southern Explorer). Construction costs were determined for upgrading the Southern Explorer to an 8m seal width to meet the Department of State Growth HPV standards. Results showed that upgrading the Southern Explorer is not viable for relocating less than 250 trucks per day.

Potential traffic demand for the Southern Explorer was investigated through consultation with industry. Some agriculture products are currently being transported between the Huon Valley and the Derwent Valley via Hobart CBD. Smolt is being transported from the Huon Valley to the West Coast via Hobart CBD.

In consultation undertaken for this project a number of producers reported that they are unlikely to use the Southern Explorer even if the road was upgraded. Concerns with using the road include fire safety, remoteness, low traffic volumes and lack of mobile coverage.

Stakeholders reported that the key destination for the majority of aquaculture and agriculture products from southern Tasmania is northern Tasmania via Bridgewater Bridge. The Southern Explorer does not provide a shorter route to the Bridgewater Bridge.

The Southern Explorer could potentially be promoted as a tourism link between the Derwent Valley and the Huon Valley. The expected benefits are mainly from the opportunity for cross promotion of tourist attractions in the two regions. Tourist traffic is expected to be relatively low and not enough to justify upgrading the road.

In 2011-2012 the Lyell Highway carried 0.3MT per year, or 34 trucks per day. The Southern Outlet carried 1MT per year, or 108 trucks per day. The required demand of 250 trucks per day (or 1.8MT per year) represents the volume of trucks on the Brooker Highway in 2011-2012.

In addition to the limited demand, there are a number of other concerns associated with upgrading the Southern Explorer. The Southern Explorer is critical for the transport of forest products in Tasmania. The forestry industry has a number of concerns about the impact on forestry operations if the road was to become a public road. Major concerns include the loss of forestry coupes and the loss of flexibility for operations.

There are significant safety concerns associated with opening up this road for public use. The road traverses challenging terrain and has tight horizontal curves and some steep grades. It is anticipated an upgraded road would maintain the existing alignment with some local road geometry improvements.

With Forestry Tasmania using large HPVs on the route, conflict between light and heavy vehicles is a major safety concern. The CBA showed that relocating vehicles from Route B to Route A (Southern Explorer) would increase crash costs, even with upgrades to the Southern Explorer.

There are particular concerns with opening up the road to tourists and drivers who are not familiar with the road. The road is also subject to ice and can be particularly dangerous in winter.

DVC and HVC have indicated that they would prefer that the Department of State Growth take over ownership of the Southern Explorer if it was upgraded. Currently the Southern Explorer does not connect to the State road

network. Further upgrades and ownership transfers may be made be required to connect the road to the State road network.

In addition to the construction costs associated with upgrading the Southern Explorer, a number of other costs are likely to be required, including:

- Land acquisition costs
- Compensation for loss of forestry coupes
- Gates on forestry spur roads
- Mobile phone coverage infrastructure
- Upgrades to surrounding roads, in particular sealing Lonnavale Road

These potential costs make the BCR less favourable.

The results of the feasibility study show that upgrading the Southern Explorer is not feasible based on current demand.

8. References

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Department of Infrastructure, Energy and Resources 2012, *Professional Services Specification T3 Road Design Standards*

Department of Infrastructure, Energy and Resources 2011, *Review of Gazetted High Productivity Vehicle Route Network*

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Jeff Roorda & Associates 2012, *Tasmanian Grants Commission Report, Review of Road Maintenance Costs, February 2012, Ver 1.3*.

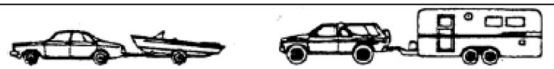
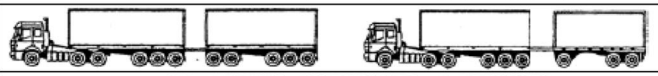
Mineral Resources Tasmania, *Tasmanian Landslip Database*, viewed 5/3/2015, http://www.mrt.tas.gov.au/portal/page?_pageid=35,840238&_dad=portal&_schema=PORTAL

Thoresen, T & Roper, R 1996, *Review & enhancement of Vehicle Operating Cost models: Assessment of non urban evaluation models,* ARRB Transport Research Ltd, Melbourne

Tourism Tasmania 2014, *Tasmanian Visitor Survey*, viewed 7 January 2015, http://www.tvsanalyser.com.au/

Appendix A. Vehicle Classification

AUSTROADS Vehicle Classification System

Level 1 Length (indicative) Type	Level 2 Axles and Axle Groups Axles	Groups	Level 3 Vehicle Type Typical Description	Class	AUSTROADS Classification Parameters	Typical Configuration
	LIGHT VEHICLES					
Short up to 5.5m		1 or 2	Short Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc	1	d(1) ≤ 3.2m and axles = 2	
	3, 4 or 5	3	Short - Towing Trailer, Caravan, Boat, etc	2	groups = 3 d(1) ≥ 2.1m, d(1) ≤ 3.2m, d(2) ≥ 2.1m and axles = 3, 4 or 5	
	HEAVY VEHICLES					
Medium 5.5m to 14.5m	2	2	Two Axle Truck or Bus	3	d(1) > 3.2m and axles = 2	
	3	2	Three Axle Truck or Bus	4	axles = 3 and groups = 2	
	> 3	2	Four Axle Truck	5	axles > 3 and groups = 2	
Long 11.5m to 19.0m	3	3	Three Axle Articulated Three axle articulated vehicle, or Rigid vehicle and trailer	6	d(1) > 3.2m, axles = 3 and groups = 3	
	4	> 2	Four Axle Articulated Four axle articulated vehicle, or Rigid vehicle and trailer	7	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 4 and groups > 2	
	5	> 2	Five Axle Articulated Five axle articulated vehicle, or Rigid vehicle and trailer	8	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 5 and groups > 2	
	≥ 6	> 2	Six Axle Articulated Six axle articulated vehicle, or Rigid vehicle and trailer	9	axles = 6 and groups > 2 or axles > 6 and groups = 3	
Medium Combination 17.5m to 36.5m	> 6	4	B Double B Double, or Heavy truck and trailer	10	groups = 4 and axles > 6	
	> 6	5 or 6	Double Road Train Double road train, or Medium articulated vehicle and one dog trailer (M.A.D.)	11	groups = 5 or 6 and axles > 6	
Large Combination Over 33.0m	> 6	> 6	Triple Road Train Triple road train, or Heavy truck and three trailers	12	groups > 6 and axles > 6	

Definitions:
Group: Axle group, where adjacent axles are less than 2.1m apart
Groups: Number of axle groups
Axles: Number of axles (maximum axle spacing of 10.0m)

d(1): Distance between first and second axle
d(2): Distance between second and third axle

Light to medium trucks (class 3-5)

Heavy Trucks (class 6-9)

B-doubles (class 10-11)

Appendix B. Cost Benefit Analysis Results

Economic Evaluation of Proposed Project

Base Case Scenario:	Expenditure	$	19.4 M
	User Costs	$	9,251.8 M
Project Case Scenario	Expenditure	$	61.5 M
	User Costs	$	9,209.7 M

Present Value of Costs:

PVC = [Scheme Expenditure Costs for Upgrade] - [Scheme Expenditure Costs for "Base Case"]

PVC = $ 42.1 M

Present Value of Benefits:

PVB = [Scheme User Costs for "Base Case"] - [Scheme User Costs for Upgrade]

PVB = $ 42.1 M

Net Present Value:

NPV = PVB - PVC = $ 0 M

Benefit Cost Ratio:

BCR = PVB / PVC = 1.00

		Present Value Index =			7%	Years in Evaluation Period																																
		0 2015	1 2016	2 2017	3 2018	4 2019	5 2020	6 2021	7 2022	8 2023	9 2024	10 2025	11 2026	12 2027	13 2028	14 2029	15 2030	16 2031	17 2032	18 2033	19 2034	20 2035	21 2036	22 2037	23 2038	24 2039	25 2040	26 2041	27 2042	28 2043	29 2044	30 2045	31 2046	32 2047	33 2048	Present Value
1	**Expenditure**																																					
1.1	**Construction Cost**																																					
	a ***Plenty Valley Road*** upgrade																																					
	Annual Cost	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*			
	Present Value	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*		
1.2	**Road Maintenance**																																					
	a Southern Explorer	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	8		
	b Lonnavale Road	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2		
	c Glen Huon Rd	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	5		
	d Huon Hwy	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	10		
	e Southern Outlet	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	5		
	f Macquarie St/Davey St	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2		
	g Brooker Sth of Bowen Bridge	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	4		
	h Brooker Nth of Bowen Bridge	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	8		
	i Lyell Hwy	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	6		
	j Glenora Rd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1		
	Annual Cost	*1.2*	*1.2*	*1.3*	*1.3*	*1.3*	*1.3*	*1.3*	*1.3*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*	*1.6*	*1.6*	*1.6*	*1.6*	*1.6*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.8*	*1.8*	*1.8*	*1.8*	*1.9*	*52*		
	Present Value	*1.2*	*1.2*	*1.1*	*1.0*	*1.0*	*0.9*	*0.9*	*0.8*	*0.8*	*0.7*	*0.7*	*0.7*	*0.6*	*0.6*	*0.6*	*0.5*	*0.5*	*0.5*	*0.5*	*0.4*	*0.4*	*0.4*	*0.4*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*19*		
	Annual Expenditure Costs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
	Present Value	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**19**		
2	**User Costs**																																					
2.1	**Accidents**																																					
	Links																																					
	Southern Explorer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9		
	Lonnavale Road	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21		
	Glen Huon Rd	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	95		
	Huon Hwy	15	15	16	16	16	16	16	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	22	23	23	643		
	Southern Outlet	19	20	20	20	20	21	21	21	21	22	22	22	23	23	23	23	24	24	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	29	818		
	Macquarie St/Davey St	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	606		
	Brooker Sth of Bowen Bridge	20	20	20	20	21	21	21	22	22	22	22	23	23	23	23	24	24	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	29	30	830		
	Brooker Nth of Bowen Bridge	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	22	23	23	23	24	24	24	24	25	25	25	26	26	26	27	27	755		
	Lyell Hwy	10	10	10	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	12	13	13	13	13	13	13	14	14	14	14	14	14	15	15	15	425		
	Glenora Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11		
	Annual Cost	*100*	*101*	*103*	*104*	*105*	*107*	*108*	*109*	*111*	*112*	*113*	*115*	*116*	*118*	*119*	*121*	*122*	*124*	*125*	*127*	*128*	*130*	*132*	*133*	*135*	*137*	*138*	*140*	*142*	*144*	*145*	*147*	*149*	*151*	*4214*		
	Present Value	*100*	*95*	*90*	*85*	*80*	*76*	*72*	*68*	*64*	*61*	*58*	*55*	*52*	*49*	*46*	*44*	*41*	*39*	*37*	*35*	*33*	*31*	*30*	*28*	*27*	*25*	*24*	*23*	*21*	*20*	*19*	*18*	*17*	*16*	*1580*		
2.2	**Value of Time**																																					
	Links - travel time																																					
	Southern Explorer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14		
	Lonnavale Road	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34		
	Glen Huon Rd	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	153		
	Huon Hwy	23	23	23	24	24	24	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	29	30	30	31	31	31	32	32	33	33	33	34	34	953		
	Southern Outlet	34	34	35	35	35	36	36	37	37	38	38	39	39	40	40	41	41	42	42	43	43	44	44	45	46	46	47	47	48	48	49	50	50	51	1420		
	Macquarie St/Davey St	49	49	50	51	51	52	53	53	54	55	55	56	57	57	58	59	60	60	61	62	63	63	64	65	66	67	67	68	69	70	71	72	73	74	2053		
	Brooker Sth of Bowen Bridge	53	54	55	55	56	57	57	58	59	60	60	61	62	63	63	64	65	66	67	67	68	69	70	71	72	73	73	74	75	76	77	78	79	80	2237		
	Brooker Nth of Bowen Bridge	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	42	43	43	44	45	45	46	46	47	47	48	49	49	50	50	51	52	1461		
	Lyell Hwy	16	16	16	16	16	17	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	22	22	22	22	23	23	23	23	655		
	Glenora Rd	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19		
	Annual Cost	*214*	*217*	*219*	*222*	*225*	*228*	*231*	*233*	*236*	*239*	*242*	*245*	*248*	*252*	*255*	*258*	*261*	*264*	*268*	*271*	*274*	*278*	*281*	*285*	*288*	*292*	*296*	*299*	*303*	*307*	*311*	*315*	*318*	*322*	*8998*		
	Present Value	*214*	*202*	*192*	*181*	*172*	*162*	*154*	*145*	*138*	*130*	*123*	*117*	*110*	*104*	*99*	*93*	*88*	*84*	*79*	*75*	*71*	*67*	*63*	*60*	*57*	*54*	*51*	*48*	*46*	*43*	*41*	*39*	*37*	*35*	*3373*		
2.3	**Vehicle Operating Costs**																																					
	Links																																					
	Southern Explorer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30		
	Lonnavale Road	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	47		
	Glen Huon Rd	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	167		
	Huon Hwy	27	28	28	28	29	29	29	30	30	30	31	31	32	32	32	33	33	34	34	35	35	35	36	36	37	37	38	38	39	39	40	40	41	41	1146		
	Southern Outlet	35	35	36	36	37	37	38	38	39	39	39	40	40	41	42	42	43	43	44	44	45	45	46	46	47	48	48	49	49	50	51	51	52	53	1467		
	Macquarie St/Davey St	28	28	29	29	29	30	30	31	31	31	32	32	32	33	33	34	34	35	35	35	36	36	37	37	38	38	39	39	40	40	41	41	42	42	1177		
	Brooker Sth of Bowen Bridge	40	40	41	41	42	42	43	44	44	45	45	46	46	47	47	48	49	49	50	51	51	52	52	53	54	54	55	56	57	57	58	59	59	60	1678		
	Brooker Nth of Bowen Bridge	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43	43	44	45	45	46	46	47	47	48	49	49	50	50	51	52	52	53	1480		
	Lyell Hwy	15	15	16	16	16	16	16	17	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	23	23	637		
	Glenora Rd	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20		
	Annual Cost	*187*	*189*	*191*	*194*	*196*	*199*	*201*	*204*	*206*	*209*	*211*	*214*	*217*	*219*	*222*	*225*	*228*	*231*	*233*	*236*	*239*	*242*	*245*	*248*	*252*	*255*	*258*	*261*	*264*	*268*	*271*	*274*	*278*	*281*	*7848*		
	Present Value	*187*	*177*	*167*	*158*	*150*	*142*	*134*	*127*	*120*	*114*	*107*	*102*	*96*	*91*	*86*	*82*	*77*	*73*	*69*	*65*	*62*	*59*	*55*	*52*	*50*	*47*	*44*	*42*	*40*	*38*	*36*	*34*	*32*	*30*	*2943*		
2.4	**Environmental Costs**																																					
	Links																																					
	Southern Explorer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9		
	Lonnavale Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17		
	Glen Huon Rd	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	60		
	Huon Hwy	9	9	10	10	10	10	10	10	10	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	13	13	13	13	13	13	14	14	14	14	394		
	Southern Outlet	16	16	16	16	16	17	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	23	23	23	23	654		
	Macquarie St/Davey St	10	10	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	13	13	13	13	13	13	14	14	14	14	14	14	15	15	15	15	15	429		
	Brooker Sth of Bowen Bridge	21	22	22	22	22	23	23	23	24	24	24	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	29	30	30	31	31	31	32	32	895		
	Brooker Nth of Bowen Bridge	22	22	22	23	23	23	23	24	24	24	25	25	25	26	26	26	26	27	27	27	28	28	29	29	29	30	30	30	31	31	32	32	32	33	913		
	Lyell Hwy	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	9	238		
	Glenora Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8		
	Annual Cost	*86*	*87*	*88*	*89*	*90*	*92*	*93*	*94*	*95*	*96*	*97*	*99*	*100*	*101*	*102*	*104*	*105*	*106*	*108*	*109*	*110*	*112*	*113*	*114*	*116*	*117*	*119*	*120*	*122*	*123*	*125*	*126*	*128*	*130*	*3617*		
	Present Value	*86*	*81*	*77*	*73*	*69*	*65*	*62*	*58*	*55*	*52*	*50*	*47*	*44*	*42*	*40*	*38*	*36*	*34*	*32*	*30*	*29*	*27*	*26*	*24*	*23*	*22*	*20*	*19*	*18*	*17*	*16*	*16*	*15*	*14*	*1356*		
	Annual User Costs	587	594	602	609	617	625	632	640	648	656	665	673	681	690	698	707	716	725	734	743	752	762	771	781	791	801	811	821	831	841	852	863	873	884	24677		
	Present Value	587	555	526	497	471	445	421	399	377	357	338	320	302	286	271	256	243	229	217	205	194	184	174	165	156	148	140	132	125	118	112	106	100	95	**9252**		
	Total Annual Costs	588	595	603	610	618	626	634	642	650	658	666	674	683	691	700	709	717	726	736	745	754	763	773	783	792	802	812	823	833	843	854	864	875	886	24729		
	Present Value	588	557	527	498	472	446	422	400	378	358	339	320	303	287	271	257	243	230	218	206	195	184	174	165	156	148	140	132	125	119	112	106	100	95	**9271**		

		Present Value Index =			7%	Years in Evaluation Period																																
		0 2015	1 2016	2 2017	3 2018	4 2019	5 2020	6 2021	7 2022	8 2023	9 2024	10 2025	11 2026	12 2027	13 2028	14 2029	15 2030	16 2031	17 2032	18 2033	19 2034	20 2035	21 2036	22 2037	23 2038	24 2039	25 2040	26 2041	27 2042	28 2043	29 2044	30 2045	31 2046	32 2047	33 2048	Present Value
1	**Expenditure**																																					
1.1	**Construction Cost**																																					
	a ***Plenty Valley Road***																																					
	upgrade			16	16	16																																
	Annual Cost	*0*	*0*	*16*	*16*	*16*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*			
	Present Value	*0*	*0*	*14*	*13*	*12*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*39*		
1.2	**Road Maintenance**																																					
	a Southern Explorer	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	15		
	b Lonnavale Road	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2		
	c Glen Huon Rd	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	5		
	d Huon Hwy	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	10		
	e Southern Outlet	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	5		
	f Macquarie St/Davey S	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2		
	g Brooker Sth of Bower	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	4		
	h Brooker Nth of Bowe	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	8		
	i Lyell Hwy	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	6		
	j Glenora Rd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1		
	Annual Cost	*1.4*	*1.4*	*1.4*	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*	*1.6*	*1.6*	*1.6*	*1.6*	*1.6*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.8*	*1.8*	*1.8*	*1.8*	*1.9*	*1.9*	*1.9*	*1.9*	*1.9*	*2.0*	*2.0*	*2.0*	*2.0*	*2.1*	*2.1*	*2.1*	*59*		
	Present Value	*1.4*	*1.3*	*1.3*	*1.2*	*1.1*	*1.1*	*1.0*	*1.0*	*0.9*	*0.9*	*0.8*	*0.8*	*0.7*	*0.7*	*0.7*	*0.6*	*0.6*	*0.6*	*0.5*	*0.5*	*0.5*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.2*	*22*		
	Annual Expenditure	1	1	17	17	17	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
	Present Value	1	1	15	14	13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**61**		
2	**User Costs**																																					
2.1	**Accidents**																																					
	Links																																					
	Southern Explorer	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	45			
	Lonnavale Road	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25			
	Glen Huon Rd	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	106			
	Huon Hwy	15	15	16	16	16	16	16	16	16	17	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	624		
	Southern Outlet	19	20	20	20	20	21	21	21	21	22	22	22	22	22	23	23	23	24	24	24	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	813	
	Macquarie St/Davey S	14	15	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	603	
	Brooker Sth of Bower	20	20	20	20	21	21	21	21	22	22	22	23	23	23	23	24	24	24	25	25	25	25	26	26	26	27	27	27	28	28	28	29	29	30	826		
	Brooker Nth of Bowe	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	23	23	23	23	24	24	24	25	25	25	25	26	26	26	27	748		
	Lyell Hwy	10	10	10	10	11	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	13	13	13	13	13	13	14	14	14	14	14	14	15	15	413		
	Glenora Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13		
	Annual Cost	*100*	*101*	*103*	*104*	*105*	*107*	*108*	*109*	*111*	*112*	*114*	*115*	*116*	*118*	*119*	*121*	*122*	*124*	*125*	*127*	*129*	*130*	*132*	*133*	*135*	*137*	*139*	*140*	*142*	*144*	*146*	*147*	*149*	*151*	*4217*		
	Present Value	*100*	*95*	*90*	*85*	*80*	*76*	*72*	*68*	*64*	*61*	*58*	*55*	*52*	*49*	*46*	*44*	*41*	*39*	*37*	*35*	*33*	*31*	*30*	*28*	*27*	*25*	*24*	*23*	*21*	*20*	*19*	*18*	*17*	*16*	*1581*		
2.2	**Value of Time**																																					
	Links - travel time																																					
	Southern Explorer	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	$ 77			
	Lonnavale Road	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	$ 42			
	Glen Huon Rd	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	$ 171			
	Huon Hwy	23	23	23	24	24	23	24	24	24	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	29	30	30	31	31	31	32	32	33	$ 923			
	Southern Outlet	34	34	35	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43	43	44	45	45	46	46	47	47	48	49	49	50	$ 1,409			
	Macquarie St/Davey S	49	49	50	51	51	52	52	53	54	54	55	56	56	57	58	58	59	60	61	61	62	63	64	65	65	66	67	68	69	70	71	72	73	$ 2,042			
	Brooker Sth of Bower	53	54	55	55	56	56	57	58	58	59	60	61	61	62	63	64	65	65	66	67	68	69	70	70	71	72	73	74	75	76	77	78	79	$ 2,226			
	Brooker Nth of Bowe	35	35	36	36	37	37	37	37	38	38	39	39	40	40	41	41	42	42	43	44	44	45	45	46	46	47	47	48	49	49	50	50	51	$ 1,447			
	Lyell Hwy	16	16	16	16	16	16	16	16	17	17	17	17	17	18	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	22	$ 635			
	Glenora Rd	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	$ 23			
	Annual Cost	*214*	*217*	*219*	*222*	*225*	*228*	*230*	*233*	*236*	*239*	*242*	*245*	*248*	*251*	*255*	*258*	*261*	*264*	*268*	*271*	*274*	*278*	*281*	*285*	*288*	*292*	*295*	*299*	*303*	*307*	*311*	*314*	*318*	*322*	*8995*		
	Present Value	*214*	*202*	*192*	*181*	*172*	*162*	*154*	*145*	*138*	*130*	*123*	*117*	*110*	*104*	*99*	*93*	*88*	*84*	*79*	*75*	*71*	*67*	*63*	*60*	*57*	*54*	*51*	*48*	*46*	*43*	*41*	*39*	*37*	*35*	*3373*		
2.3	**Vehicle Operating Costs**																																					
	Links																																					
	Southern Explorer	1	1	1	1	1	9	9	9	9	9	10	10	10	10	10	10	10	10	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	13	313		
	Lonnavale Road	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	83		
	Glen Huon Rd	4	4	4	4	4	7	7	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9	9	250		
	Huon Hwy	27	28	28	28	29	24	24	25	25	25	25	26	26	26	27	27	27	28	28	28	29	29	30	30	30	31	31	31	32	32	33	33	33	34	970		
	Southern Outlet	35	35	36	36	37	35	36	36	37	37	38	38	39	39	40	40	41	41	42	42	43	43	44	44	45	45	46	47	47	48	48	49	50	50	1407		
	Macquarie St/Davey S	28	28	29	29	29	29	29	30	30	30	31	31	31	32	32	33	33	33	34	34	35	35	36	36	36	37	37	38	38	39	39	40	40	41	1142		
	Brooker Sth of Bower	40	40	41	41	42	41	42	42	43	43	44	44	45	45	46	47	47	48	48	49	50	50	51	51	52	53	53	54	55	55	56	57	58	58	1632		
	Brooker Nth of Bowe	35	36	36	37	37	35	36	36	37	37	38	38	39	39	40	40	41	41	42	42	43	43	44	44	45	45	46	47	47	48	48	49	50	50	1411		
	Lyell Hwy	15	15	16	16	16	13	13	14	14	14	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	18	18	18	18	19	19	539		
	Glenora Rd	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	39		
	Annual Cost	*187*	*189*	*191*	*194*	*196*	*197*	*199*	*202*	*204*	*207*	*209*	*212*	*215*	*217*	*220*	*223*	*226*	*228*	*231*	*234*	*237*	*240*	*243*	*246*	*249*	*252*	*256*	*259*	*262*	*265*	*269*	*272*	*275*	*279*	*7787*		
	Present Value	*187*	*177*	*167*	*158*	*150*	*140*	*133*	*126*	*119*	*113*	*106*	*101*	*95*	*90*	*85*	*81*	*76*	*72*	*68*	*65*	*61*	*58*	*55*	*52*	*49*	*46*	*44*	*42*	*39*	*37*	*35*	*33*	*32*	*30*	*2924*		
2.4	**Environmental Costs**																																					
	Links																																					
	Southern Explorer	0	0	0	0	0	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	106			
	Lonnavale Road	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			
	Glen Huon Rd	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	92			
	Huon Hwy	9	9	10	10	10	8	8	8	8	8	9	9	9	9	9	9	9	9	9	10	10	10	10	10	10	10	10	11	11	11	11	11	11	328			
	Southern Outlet	16	16	16	16	16	16	16	16	16	16	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	624		
	Macquarie St/Davey S	10	10	10	11	11	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	13	13	13	13	13	13	14	14	14	14	14	14	15	15	415		
	Brooker Sth of Bower	21	22	22	22	22	22	22	22	23	23	23	24	24	24	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	29	30	30	31	31	867		
	Brooker Nth of Bowe	22	22	22	23	23	22	22	22	23	23	23	23	24	24	24	24	25	25	25	25	25	26	26	26	27	27	27	28	28	28	29	29	30	31	864		
	Lyell Hwy	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	199		
	Glenora Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16		
	Annual Cost	*86*	*87*	*88*	*89*	*90*	*89*	*90*	*92*	*93*	*94*	*95*	*96*	*97*	*99*	*100*	*101*	*102*	*104*	*105*	*106*	*108*	*109*	*110*	*112*	*113*	*114*	*116*	*117*	*119*	*120*	*122*	*123*	*125*	*126*	*3540*		
	Present Value	*86*	*81*	*77*	*73*	*69*	*64*	*60*	*57*	*54*	*51*	*48*	*46*	*43*	*41*	*39*	*37*	*35*	*33*	*31*	*29*	*28*	*26*	*25*	*24*	*22*	*21*	*20*	*19*	*18*	*17*	*16*	*15*	*14*	*14*	*1332*		
	Annual User Costs	587	594	602	609	617	621	628	636	644	652	660	669	677	685	694	703	711	720	729	738	748	757	766	776	786	796	806	816	826	836	847	857	868	879	24539		
	Present Value	587	555	526	497	471	442	419	396	375	355	336	318	301	284	269	255	241	228	216	204	193	183	173	164	155	147	139	131	124	118	111	105	100	94	**9210**		
	Total Annual Costs	588	596	619	627	634	622	630	638	646	654	662	670	679	687	696	704	713	722	731	740	749	759	768	778	788	797	807	818	828	838	849	859	870	881	24646		
	Present Value	588	557	541	512	484	444	420	397	376	356	336	318	301	285	270	255	242	229	216	205	194	183	173	164	155	147	139	132	124	118	111	105	100	94	**9271**		