Tasmanian Government
2012 Transport Submission to
Infrastructure Australia

Brooker Highway Upgrade Package

August 2012

Department *of* Infrastructure, Energy *and* Resources

Tasmania
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Proposal Summary

Initiative Name:	Burnie to Hobart Freight Corridor: Brooker Highway Upgrade Package
Location (State/Region(or City)/ Locality):	Hobart/Glenorchy, Southern Tasmania
Name of Proponent Entity:	Tasmanian Department of Infrastructure, Energy and Resources (DIER)
Contact (Name, Position, phone/e-mail):	David Spence, General Manager Infrastructure Strategy Department of Infrastructure, Energy and Resources Tel: (03) 6233 2089 Email: david.spence@dier.tas.gov.au
Executive summary	

The proposal is for targeted capacity and efficiency improvements at two key locations on the southern section of the Brooker Highway – between Risdon Road and the Domain Highway Interchange and the intersections at Goodwood, Elwick and Howard Roads.

The Brooker Highway is a critical link in Tasmania's key north-south freight and passenger corridor. The Brooker Highway is also part of Tasmania's National Network, an integrated network of land transport links within national and inter-regional land transport corridors that are of critical importance to national and regional growth.

The Highway facilitates access to the State's northern ports (Burnie, Bell Bay and Devonport), through which 86% of the exports and 99% of imports from the Southern Region are moved. The Highway is one of the highest tonnage roads on the Tasmanian road network, carrying 2.3 million tonnes in 2008/09. It is also one of the highest volume roads on the State Road network, and is forecast to remain so.

The Highway is the key transport link into the Glenorchy industrial area, the Southern region's largest and most significant industrial centre. Along with a new Bridgewater Bridge, it will be the key transport link supporting efficient freight movements between the Glenorchy industrial area and the Brighton Transport Hub.

Analysis commissioned by DIER comparing observed and predicted future conditions on the Brooker Highway indicates that intersection operation is the main capacity constraint in the corridor, and this has a direct impact on freight efficiency and access to key local government freight roads. Future travel times are forecast to increase significantly above existing conditions, largely due to constraints at key locations which will be unable to cater for future levels of demand.

The key locations where future capacity issues will be most pronounced are the Risdon Road to Domain Highway intersection and the Elwick Road-Goodwood to Howard Roads section. Both are at Level of Service D. The proposal seeks to address these two key constraints, delivering improved traffic flows for freight and passenger vehicles, and improved access to/from key local government freight roads:

1) **Goodwood-Elwick to Howard Road:** the Goodwood, Elwick and Howard Roads are urban arterial and collector roads providing access to residential, commercial and industrial areas of Glenorchy, which have junctions with the Brooker Highway in very close proximity. The proximity and layout of these junctions impose capacity and efficiency constraints on the Highway. To address these issues, it is proposed to consolidate the existing staggered T-intersections at Goodwood and Elwick Roads, and to replace the existing Howard Road roundabout with a signalised intersection.
2) **Risdon Road to Domain Highway Interchange** - Risdon Road and the Domain Highway interchange are high volume intersections, providing access to adjacent industrial areas and providing the key connection to the Domain Highway and eastern Hobart. There is insufficient capacity at the Domain Interchange, with significant traffic queuing and delays on approaches to and from the Interchange. The Interchange itself has significant constraints.

Funding is being sought under National Building 2 for both project development and construction of the Elwick/Goodwood/Howard Road intersections. For the Risdon to Domain Highway and Interchange, planning and project development funding only is sought at this stage.	
Is this a new submission?	Tasmania submitted a larger Brooker Highway Upgrade Package (which included the two projects contained in this proposal) to Infrastructure Australia in 2011. IA recommended that any Brooker Highway projects should be situated within a higher-level Hobart to Launceston corridor strategy. The Tasmanian Government has endorsed this Strategy but has sought to expand the scope to include the strategic road and rail transport corridor from Hobart to Burnie, key feeder links, and the Launceston to Bell Bay Port corridor.
Estimated cost of problems?	The strategic framework and transport system problems to which this project responds are outlined in the Overview document and within this submission. Detailed information on project costs and benefits, to the extent that they can be quantified, is contained in the Stage 7 template.
Estimated Capital Cost of Initiative by Proponent ($M, nominal, undiscounted):	$37M • $32M upgrades, Elwick-Goodwood to Howard Road • $5M planning, Domain Highway
Commonwealth contribution sought by Proponent ($M, nominal, undiscounted):	$37M
Other funding (source/amount/cash flow) ($M, nominal, undiscounted):	Cost reflective pricing for heavy vehicle access to the road network and road funding reform is being considered as part of the national Heavy Vehicle and Investment Reform agenda, and the Tasmanian government will continue to actively participate in this reform process. Tasmania has many attributes for a pilot study of approaches developed through national processes. It is considered that a national approach to funding and financing transport infrastructure, supported by all levels of government, is critical to effectively address long term transport infrastructure needs. In this context, the recent Infrastructure Australia's Finance Working Group's report "Infrastructure Finance and Funding Reform" is an important lead for national discussion. Tasmania is not in a position currently to adopt a unilateral approach. Further work is required on project financing and the issue of cost reflective pricing in small regional economies.
BCR by Proponent excluding Wider Economic Benefits	0.9
Estimated program	• Elwick-Goodwood to Howard Road: project planning and development from 2013/16; construction 2016/17; • Domain Highway to Risdon Road planning: 2014/15 to 2015/2016

Goal Definition

The goal of the proposed project is to enhance freight efficiency, connectivity and access on the Brooker Highway at key locations on the Northern approaches to Hobart.

The Brooker Highway is part of the National Network and a critical urban arterial road, classified as a Category 1 Trunk road in the Tasmanian State Road Hierarchy. The Highway is a critical link in Tasmania's north-south freight corridor, facilitating access to the State's northern ports, through which 86% of the exports and 99% of imports from the Southern Region are moved.

The Highway is one of the highest tonnage roads on the Tasmanian road network, and is also one of the highest volume roads in Tasmania, and forecast to remain so. It is the key connection into the southern region's largest industrial centre at Glenorchy, and will be the key transport link between this centre and the future Brighton Transport Hub.

Positive contribution to Infrastructure Australia's strategic priorities

The project aligns with a number of Infrastructure Australia's strategic objectives, including:

- ***Improving the efficiency of connections to major road and rail freight corridors to facilitate domestic trade and international exports*** – the Brooker Highway is a critical link in Tasmania's key north-south freight and passenger corridor. Sections of the Brooker Highway carry over 50,000 vehicles a day, moving an average of 2.2 million tonnes of freight at a value of over $2 billion per annum. The Highway is a critical freight connection facilitating access to the State's northern ports (Burnie, Bell Bay and Devonport), through which 86% of the exports and 99% of imports from the Southern Region are moved.
- ***Achieving better utilisation of existing infrastructure*** – capacity and efficiency improvements to the Brooker Highway, which connects Hobart to the State's major North-South freight link – the Midland Highway - will ensure that the anticipated benefits from the significant investment already made in the Brighton Transport Hub and the Brighton Bypass are fully realised. Development of the Brighton Transport Hub will see heavy freight movements shift to the northern section, with reduced freight movements south of Risdon Road. However, the long-term forecast is for significant freight growth through the Domain Highway interchange and onto the Domain Highway east. The role of the Highway as a major freight route for heavy and light commercial vehicles is expected to continue over the long-term, consistent with the current and future location of industrial-zoned land around Glenorchy and the Brighton Transport Hub. The Highway will remain the key connection between these two centres.
- ***Developing our cities*** **-** the Brooker Highway is the northern gateway to Hobart. Greater Hobart holds around 40% of Tasmania's population and is the administrative base for the State. The Highway is the critical freight and passenger linkage between Hobart and the state's North, including ports and other key population centres. It is critical for Hobart's future economic growth that the capacity of the Brooker Highway can meet forecast demand increases.

National Freight Strategy

The proposed capacity and efficient improvements are consistent with the key strategic priorities contained in the draft National Freight Strategy, including reducing freight bottlenecks and creating efficiencies on the National Freight Network.

Alignment with State/regional strategic plans

Brooker Highway Partnership Agreement and Brooker Highway Transport Plan

In 2011 the Tasmanian Government joined with Local Government Authorities along the Brooker Highway under a Partnership Agreement to develop the *Brooker Highway Transport Plan* (provided at **Appendix A**). The Plan provides a long-term framework to plan, manage and target investment on this strategic freight route.

The Development of the Brooker Highway Transport Plan has occurred in parallel with other initiatives being investigated or undertaken by the Tasmanian Government, including the *Midland Highway Partnership Agreement*, *Southern Tasmania Regional Land Use Strategy*, *Southern Integrated Transport Plan* and *Southern Tasmanian National Network Investment Program*.

The Plan is also informed by the objectives and analysis of the *Tasmanian Urban Passenger Transport Framework*, the Tasmanian Government's previous submissions to Infrastructure Australia and past travel demand and traffic modelling in support of specific initiatives on the Highway (determination of options at Elwick-Goodwood intersection and whole-of-corridor modelling of bus priority measures).

The Plan identifies as short to medium-term priorities capacity and efficiency upgrades to improve LOS on the southern section of the Highway, with two priority areas:

1) At the intersections between Berriedale Road and Howard Road Roundabout; and

2) Between Howard Road Roundabout and the Domain Highway interchange

The two projects that comprise this proposal are located within these priority areas.

Southern Integrated Transport Plan

The *Southern Integrated Transport Plan* – released in 2010 - is a collaborative initiative between the Tasmanian Government, Southern Tasmanian Councils Authority, and twelve member councils. It provides a coordinated and strategic framework to recognise and address transport issues within the Southern Region over the next twenty years.

Targeted infrastructure upgrades to sections of road with high freight volumes and forecasts – including the Brooker Highway – are identified as a key strategy to deliver on the Plan's objective to "Improve known infrastructure weaknesses along strategic urban freight routes."

The Plan also identifies targeted improvements to the Brooker as a way of delivering on the Plan's objective to "Improve travel time reliability on key urban transport corridors"

Draft Tasmanian Transport Policy and Draft Tasmanian Freight Strategy

Strategic fit with the State's draft Transport Policy and Draft Freight Strategy is addressed in the Tasmanian Government Submission Overview.

Problem identification, assessment and analysis

The Brooker Highway forms part of the National Network and is a key urban freight and passenger corridor. Its key functions are:

- strategic northern route to/from Hobart, connecting the Southern region to the northern ports and population centres via the Midland Highway and road-rail connections to be provided at the Brighton Transport Hub; and

- major urban freight and passenger road, providing access to the Glenorchy industrial centre, the region's largest and most significant industrial area, and to major residential suburbs and commercial areas to the north of Hobart.

Function and role

Supporting key commercial activities and freight movements

The Brooker Highway is one of Tasmania's highest tonnage freight roads. It facilitates access to the State's northern ports (Burnie, Bell Bay and Devonport), through which 86% of the exports and 99% of imports from the Southern Region are moved, and is the key link to the Region's key industrial centre at Glenorchy.

In 2008/09, the Highway carried an average of 2.2 million tonnes, valued at around $2.6 billion. Key commodities include construction materials (stone, clay and sand), zinc, hardwood logs, fuel, premixed concrete, groceries and alcohol.

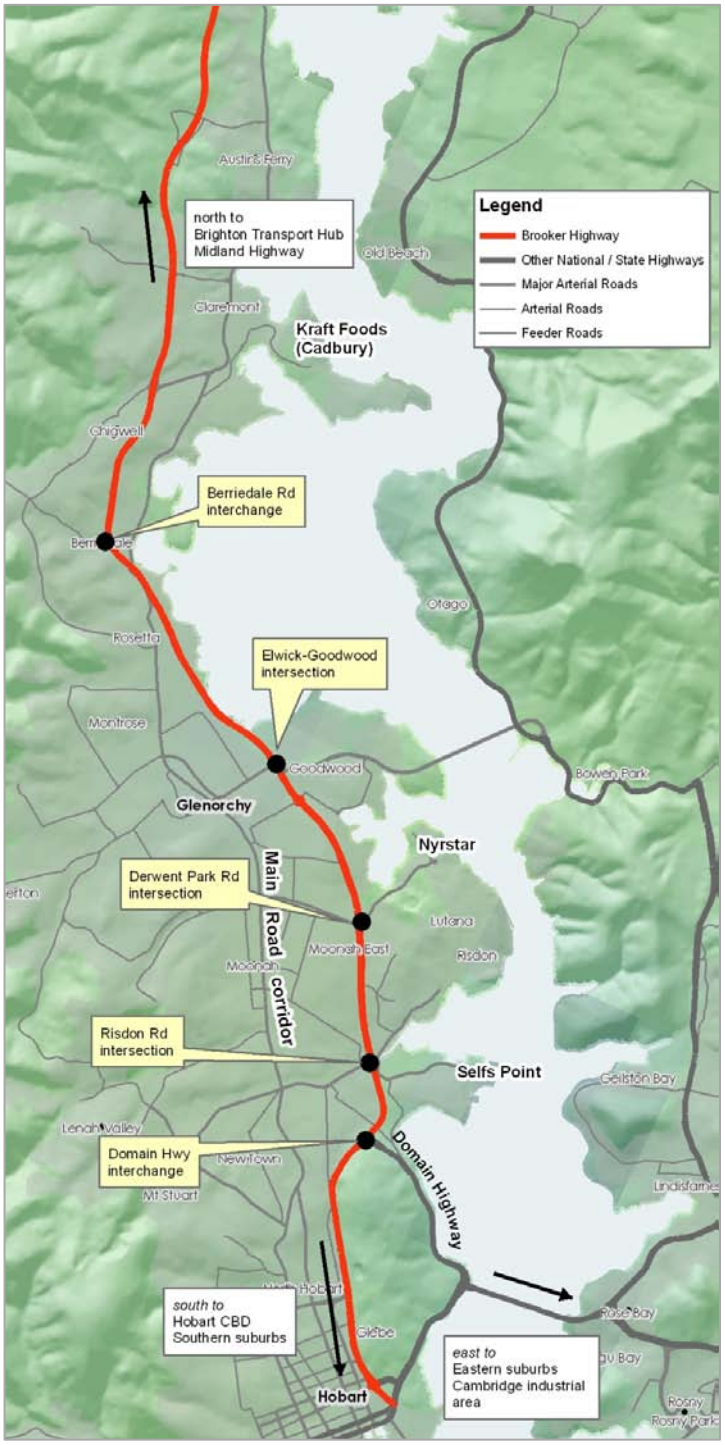
The Glenorchy industrial centre covers 455 hectares of industrial-zoned land. It includes major industrial and manufacturing uses, and a broad range of freight generating industries, including light industrial activities, warehousing and distribution centres, and heavy industry. Major industries located adjacent to the Highway include Nyrstar, Incat and Kraft Foods (Cadbury), with major warehousing, showroom and service industries located west of the Highway in Moonah, Derwent Park and Glenorchy. Hobart's major petrol storage area is located at Self's Point, and much of this traffic uses the Brooker to distribute fuel across Greater Hobart.

Map 1 shows the location of key intersections along the Brooker Highway.

The role of the Glenorchy industrial area in the Southern Region's freight task is significant. 43% of freight moving from the northern ports into the Southern Region is destined for a location in Glenorchy, while 36% of all freight moving from the Southern Region to the Northern Ports originates in Glenorchy. The Brooker Highway is the key corridor for this movement.

The importance of the Glenorchy area for industry is expected to continue over the

Map 1: Key locations, Brooker Highway



long-term reflecting the locational advantages of the area relative to transport networks and consumers, as well as the significant shortfall in available industrial land within the Greater Hobart region. As remaining available land continues to be developed at Brighton (north) and Cambridge (east), the Highway will become the key freight link connecting all three industrial centres.

Facilitating passenger movements within Greater Hobart and its surrounds

The Brooker Highway directly links the Hobart, Glenorchy and Derwent Valley local government areas, and facilitates access to and from Brighton (via the Bridgewater Bridge and the Midland Highway), Clarence (via the Bowen and Tasman Bridges) and Kingborough (via the Southern Outlet and the Huon Highway).

The Glenorchy area is an established residential area, and although forecast to experience low population growth (current population at 44 000), it has the potential to experience higher growth through infill development. Suburbs further north are forecast to experience higher population growth but from a lower base (current population of Brighton at over 15 000). Glenorchy is one of Hobart's key activity centres, and a significant amount of travel is undertaken by people who live and work within the Glenorchy local government area. The Brooker Highway is a key passenger link between these areas, linking residential areas with key activity centres, employment and services.

Through the Tasmanian Urban Passenger Transport Framework, the Tasmanian Government is pursuing initiatives to improve public transport options to/from the northern suburbs, including development of a transit corridor on adjacent Main Road. Main Road and the Brooker Highway are complimentary corridors, serving relatively distinct origins and destinations. The Brooker supports a large amount of freight and commercial travel, including delivery and distribution, travel for work in the Glenorchy industrial area, and customers accessing businesses. It also facilitates access for suburbs east and immediately adjacent to the Highway. It is the preferred route for travel through Glenorchy to the northern and southern regions. The Brooker functions as a key arterial route through the northern suburbs, with limited access to local activities through junctions, and much of its function is for longer distance journeys between different parts of the northern suburbs and other parts of Hobart.

Main Road is a key local road, facilitating access for local trip movements as opposed to through movements. It links residential areas primarily located to the west of the road corridor, and connects activity centres on the corridor, including the Hobart CBD and Glenorchy and minor centres of Moonah, New Town and North Hobart. It is an existing high frequency public transport route, with strong patronage, and is suited to being a key public transport corridor, given the proximity and nature of trip attractors along the route. The Main Road Corridor is well integrated with surrounding land use patterns, such as high residential densities (in terms of Greater Hobart) and mixed use and typically operates as a 'main street' with a slower speed environment. Most of the trips along the Main Road corridor are shorter distance than those on the Brooker, and are related to accessing locally available activities.

Current and future transport demand

In terms of traffic volumes, the Brooker has the second highest volumes of any road on the State Road network. Other major arterials in Hobart experience much more variation between travel times in the peak and off-peak, but travel time surveys have consistently shown that the southern section of the Brooker (between Elwick-Goodwood and the Domain interchange) has the most consistent traffic delays across the entire day of the major

arterials in Greater Hobart. This has a major impact on freight movement, as freight is moved across the entire day and the Brooker has a major proportion of the freight task across Greater Hobart.

By 2031, the section of the Brooker Highway from the Domain interchange to Derwent Park Road is forecast to reach approximately 40,500 vehicles per day during inter-peak periods, a 22.7% increase from 2009 volumes.

Analysis commissioned by DIER comparing observed and predicted future conditions on the Brooker Highway against the objectives of the *Brooker Highway Transport Plan* indicates that intersection operation is the main capacity constraint in the corridor. Future travel times are forecast to increase significantly above existing conditions, largely due to constraints at key locations which will be unable to cater for future levels of demand.

The key locations where future capacity issues will be most pronounced are at the Domain Highway interchange and between Elwick-Goodwood Roads and Howard Road, as well as at these key intersections.

Traffic volumes and Level of Service

The Brooker Highway has two distinct sections:

- the *southern section* between Macquarie Street and Berriedale Road has lower speed limits (60-80km/h); with most major intersections generally at-grade and signalised. This section of the Highway has numerous direct private accesses and on-street parking. It is the key section providing access to industrial areas via major local government freight roads (Derwent Park Road, Lampton Avenue, Risdon Road) and carries the highest traffic volumes on the Highway.
- the *northern section* running northwards from Berridale Road has a higher speed limit (100km/h), generally grade-separated interchanges connecting to residential areas, and very few direct property accesses. Traffic volumes on this section are around half those on the southern section.

Capacity on the northern section is adequate to cater for current and future demand, including the change in freight associated with the Brighton Transport Hub. However, traffic modeling has identified the operation of two major intersections on the southern section as the major constraint on the efficient operation of the Highway. The locations where future capacity and efficiency issues are most pronounced are between:

- Risdon Road and the Domain Highway interchange; and
- Elwick-Goodwood Roads to Howard Road.

For both directions, the section of the Highway between Risdon Road and the Domain Highway experiences the largest traffic volumes during both the AM and PM peaks. However, this section experiences relatively steady volumes across the day, as compared to other major arterials in Greater Hobart. Average speeds on the Brooker Highway during the AM peak between Bridgewater and the CBD is around 40km/h.

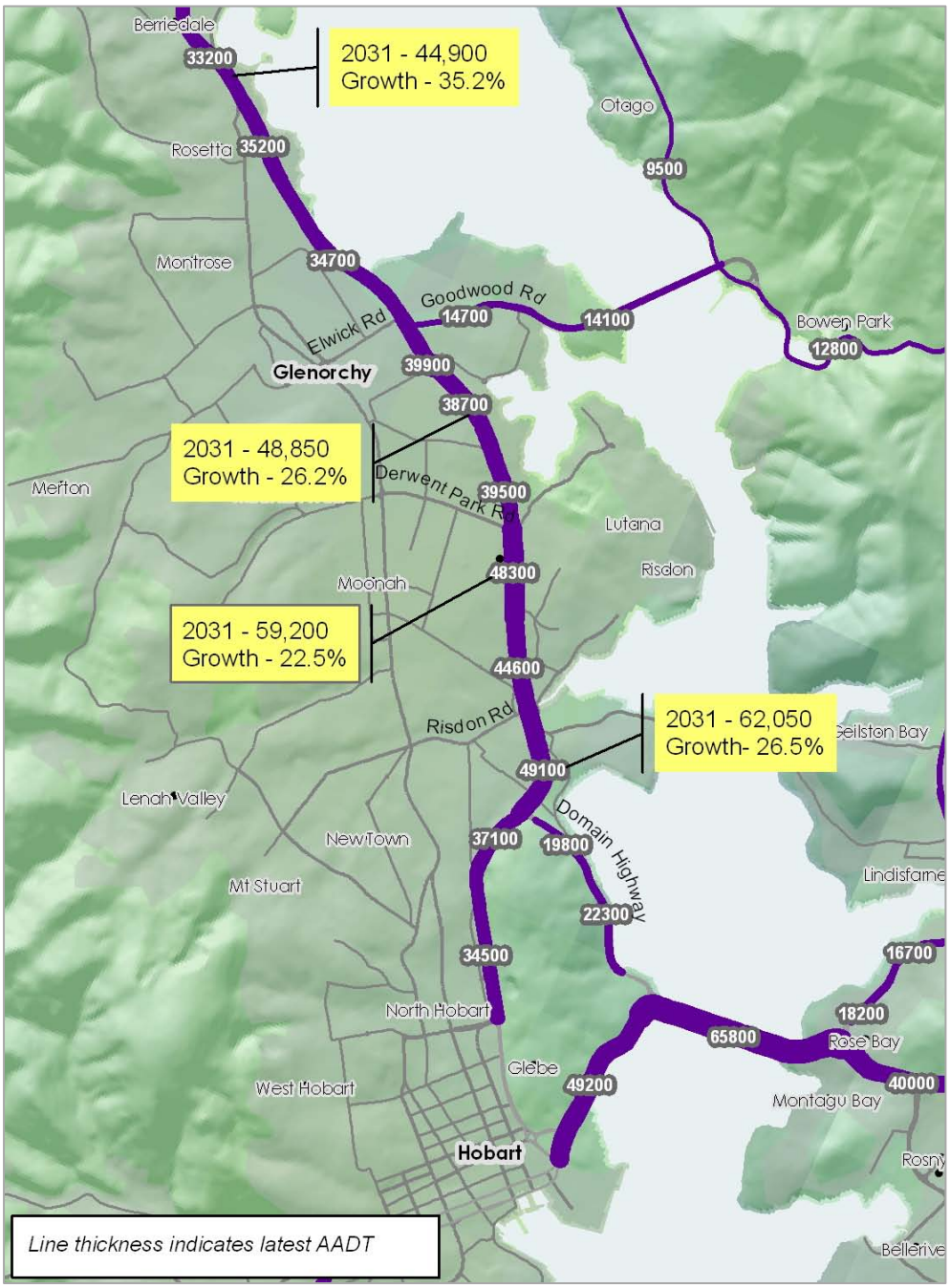
In terms of Level of Service (LOS) the southern section of the Brooker Highway between Berriedale Road and Davey Street is already at LOS D, which signifies severely restricted flow. All major intersections along the urban section of the Highway (Domain Highway, Risdon Road, Derwent Park Road) are at LOS F during the morning and afternoon peaks.

The Brooker Highway also has the highest volume of traffic of all Greater Hobart's major arterial roads in the *inter-peak* periods, with approximately 33,000 vehicles using the section

from the Domain interchange to Derwent Park Road.

Map 2 shows current vehicle traffic for Greater Hobart's road network, as well as forecast growth to 2031 for specific sections of the Brooker.

Map 2: Current and forecast AADT, Brooker Highway



Traffic modelling has identified the Domain Highway at the southern end of the Brooker Highway as the key intersection affecting broader corridor performance. Short exit and entry lanes create traffic banking, significantly impacting on network flows along the remainder of the Brooker Highway.

The Domain Highway is a key link in Greater Hobart's strategic road network. It links the northern suburbs (via the Brooker) to the eastern suburbs, including Hobart International Airport. One of Hobart's key industrial areas, with significant capacity for future expansion, is located at Cambridge adjacent to Hobart Airport. This area will generate significant freight volumes in the future, which will require a good connection to the industrial areas in northern suburbs and the Brighton Transport Hub, via the Domain Highway, Domain interchange and Brooker Highway.

The Goodwood, Elwick and Howard Road intersections are a significant source of existing and future delays. The proximity of the Goodwood and Elwick Road intersections causes the mid-block between the intersections to become oversaturated, creating delays on both traffic flows along the Highway and on the approaches from Goodwood and Elwick Roads.

The requirement for all vehicles to give way at the Howard Road roundabout causes additional delays at this intersection, and makes signal co-ordination along the corridor more difficult. Given the significant volume of traffic on the Brooker Highway, this delay causes the 'knock-on' effect of queuing on both the north and southbound movements that propagate back to the next intersection.

Freight

The Brooker Highway is one of Tasmania's highest tonnage freight corridors, with around 2.7 million tonnes of freight carried in 2012. Future growth will see volumes almost double by 2030.

The section between Elwick and Domain incorporates all major local freight roads, connecting to major industrial areas either side of the Brooker Highway. Volumes on some of these roads are significant, with Derwent Park Road carrying the highest volumes at almost 860 000 tonnes in 2008/09 (see Table 1).

Table 1. Key local freight road tonnages (2008/09), Brooker Highway

Road	Tonnage
Risdon Road	594,800
Dewent Park Road	858,000
Lampton Avenue	255,000
Elwick Road	151,000

Overall freight flows along the Brooker Highway are forecast to grow strongly in future, growing by nearly 2.5 times current flows by 2050. The strongest growth is expected on the section between the Elwick-Goodwood junction and the Domain interchange, as detailed in Map 3.

Completion of the Brighton Intermodal Transport Hub, in addition to growth in industrial and commercial development at Cambridge on Hobart's eastern shore, will impact on freight movements on the Brooker Highway. Projected changes in freight flows from the hub are shown in Map 4.

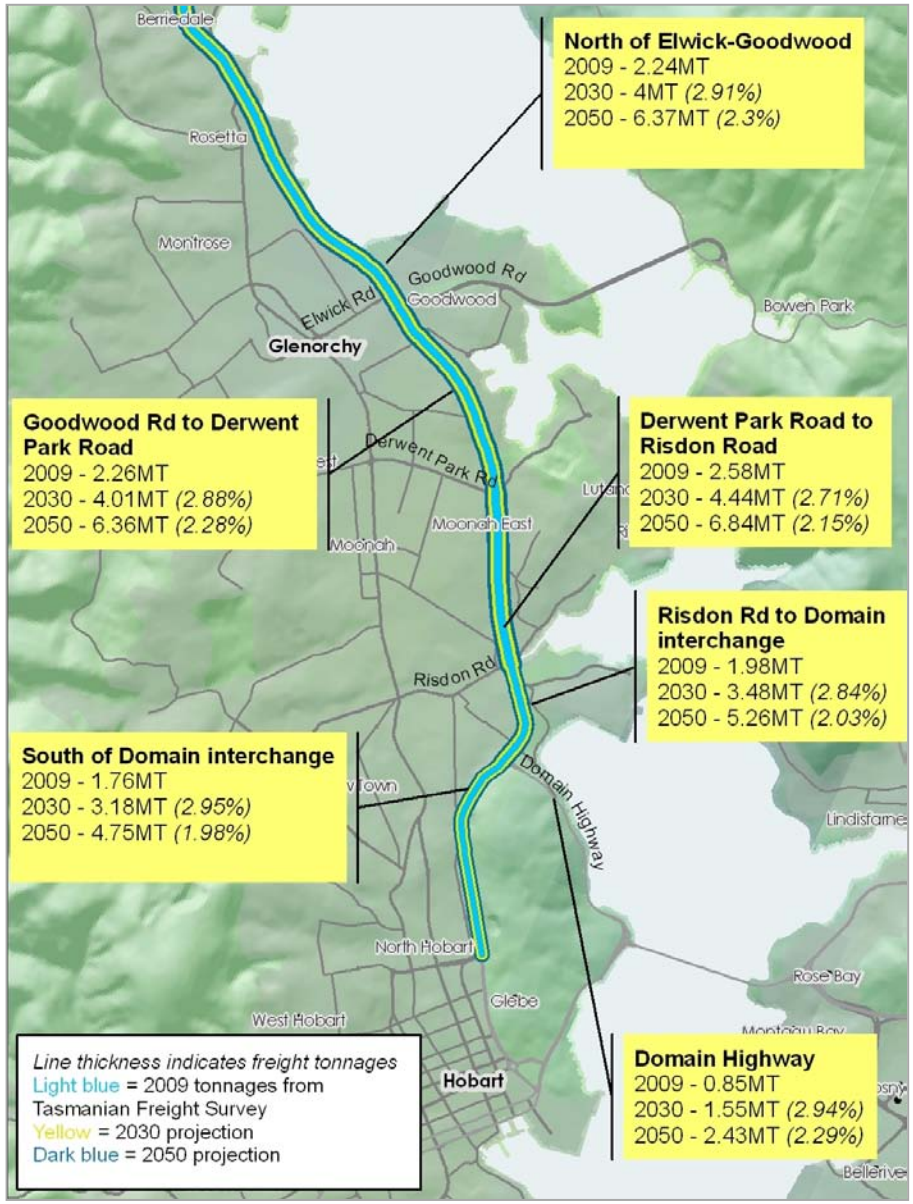
In the short term, freight is expected to reduce on the southern section of the Highway. This is because the major users of the intermodal operations that are currently located in Hobart are generally based in Glenorchy. With the movement of intermodal operations to Brighton, the need for these users to travel south into the Hobart CBD will be reduced, with freight flows increasing on the northern section of the Highway between Glenorchy and the Hub.

This section is a high standard four lane dual carriageway, with grade separated interchanges. While this section will see the largest increase in freight volumes associated with the Hub, it is currently under-capacity and can cater for this higher task.

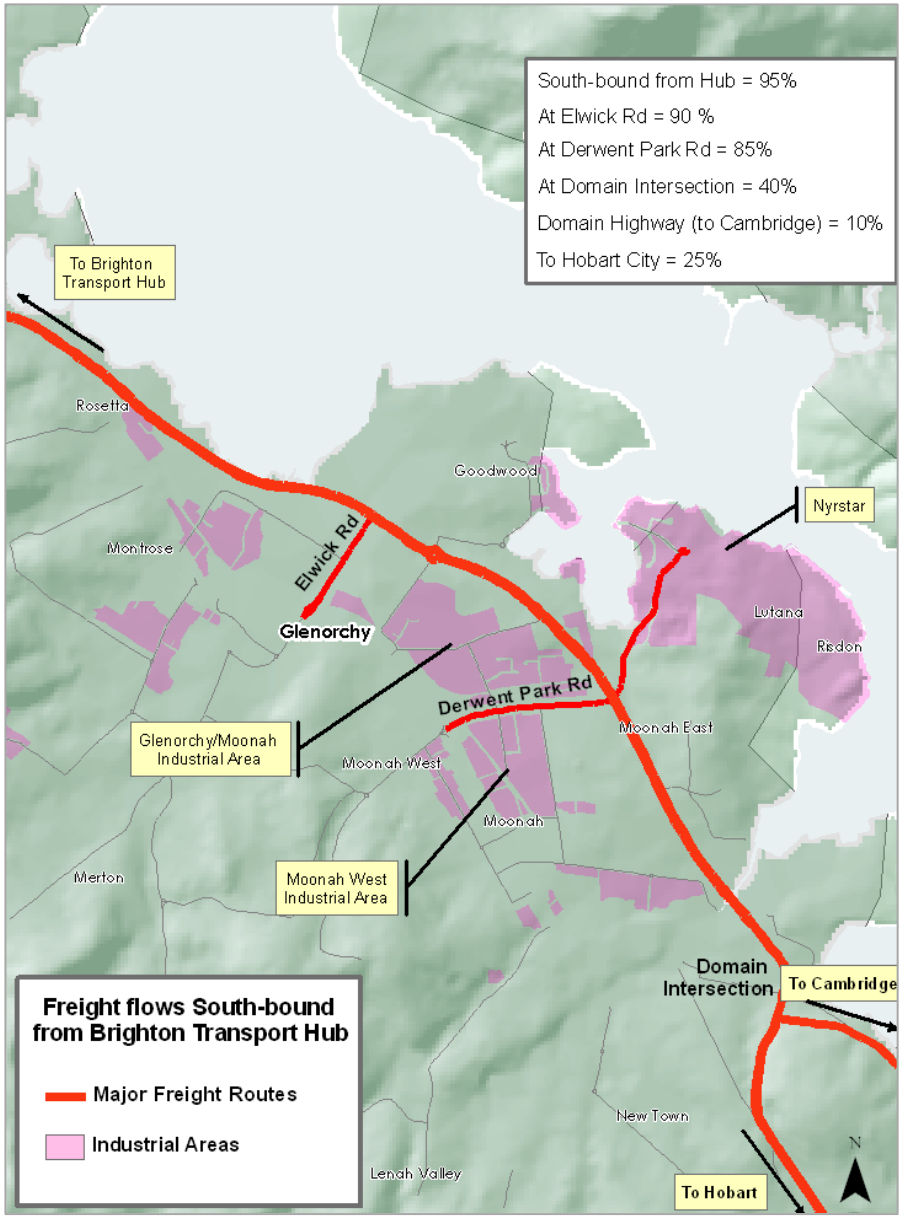
On the southern section of the Highway, changes to the current Elwick/Goodwood/Howard Road intersections have been identified as providing the most beneficial improvement to traffic flows along the Highway, enabling improved co-ordination of traffic signals along the full length of the Highway to improve through freight flows.

Over the medium to long term, continued expansion in industrial and commercial development on the eastern shore at Cambridge and Hobart Airport will see freight volumes increase on the southern section of the Brooker, connecting to the Domain Highway. Improvements to the Domain Highway interchange target this future freight growth in combination with forecast passenger vehicle growth.

Map 3: Forecast freight flows, Brooker Highway



Map 4: Forecast freight flows from Brighton Transport Hub



Option Generation and Assessment

Over the past five years, DIER has undertaken a significant amount of strategic and detailed analysis on the Brooker Highway to identify problems and options along the corridor. The scope and outcomes of this work has included:

- bus priority modelling
- changes to traffic signalisation
- reduced speed limits
- corridor modelling, 2012

Where shown to be effective and feasible, these solutions have been implemented, including improvements to traffic signalisation and timing; reduced speed limits. However, due to the significant growth in traffic flows, these non-infrastructure solutions are not enough on their own to maintain the efficient operation of key intersections. This has a direct impact on freight efficiency and access to key local government freight roads.

The options pursued here will deliver improved traffic flows along the corridor, supporting through freight movements, and facilitate improved access to/from key local government freight roads to reduce travel times and delays for freight vehicles.

The Preferred Option

From existing planning work, DIER has identified the Goodwood-Elwick intersection (including the Howard Road roundabout), and the Domain interchange as being two of the key capacity bottlenecks on the Brooker Highway. Using the Brooker micro-simulation model, and the Greater Hobart Urban Travel Demand Model, DIER has analysed the impact of two key projects on the Brooker on future traffic movement along the corridor.

Table 2 indicates the key benefits to travel time for all vehicle classes, including passengers and freight, of improvements at these two intersections. While economic analysis is only presented for the Goodwood-Elwick-Howard Road project, as this is the only project being proposed for delivery, initial analysis indicates that the benefit-cost ratio of undertaking both projects together would be around 0.9.

Table 2. Change in travel time from current conditions (2011) under different scenarios

Scenario	No intervention	Elwick only	Both Goodwood-Elwick and Domain	No intervention	Both Goodwood-Elwick and Domain
Year	*2021*	*2021*	*2021*	*2036*	*2036*
All vehicles	28%	17%	9%	50%	34%
Passenger and light commercial vehicles	28%	17%	9%	50%	34%
Heavy freight vehicles	26%	14%	14%	43%	33%

1) Goodwood/Elwick/Howard Roads (delivery)

Goodwood, Elwick and Howard Roads are urban arterial and collector roads providing access to commercial, residential and industrial areas of Glenorchy, which have junctions with the Brooker Highway in very close proximity. The proximity and layout of these junctions impose capacity and efficiency constraints on the Highway. To address these issues, it is proposed to consolidate the existing staggered T-intersections at Goodwood and Elwick Roads, and to replace the existing Howard Road roundabout with a signalised intersection.

DIER has investigated a number of potential solutions at this interchange, including improvements to the existing staggered-T arrangement and grade separation, but the improvements outlined in the attached plan offer the best balance between project cost and the benefits to the Brooker corridor.

2) Risdon Road to Domain Interchange (planning)

Risdon Road and the Domain Highway interchange are high volume intersections, providing access to adjacent industrial areas and providing the key connection to the Domain Highway and eastern Hobart. There is insufficient capacity at the Domain Interchange, with significant traffic queuing and delays on approaches to and from the Interchange. The Interchange itself has significant constraints.

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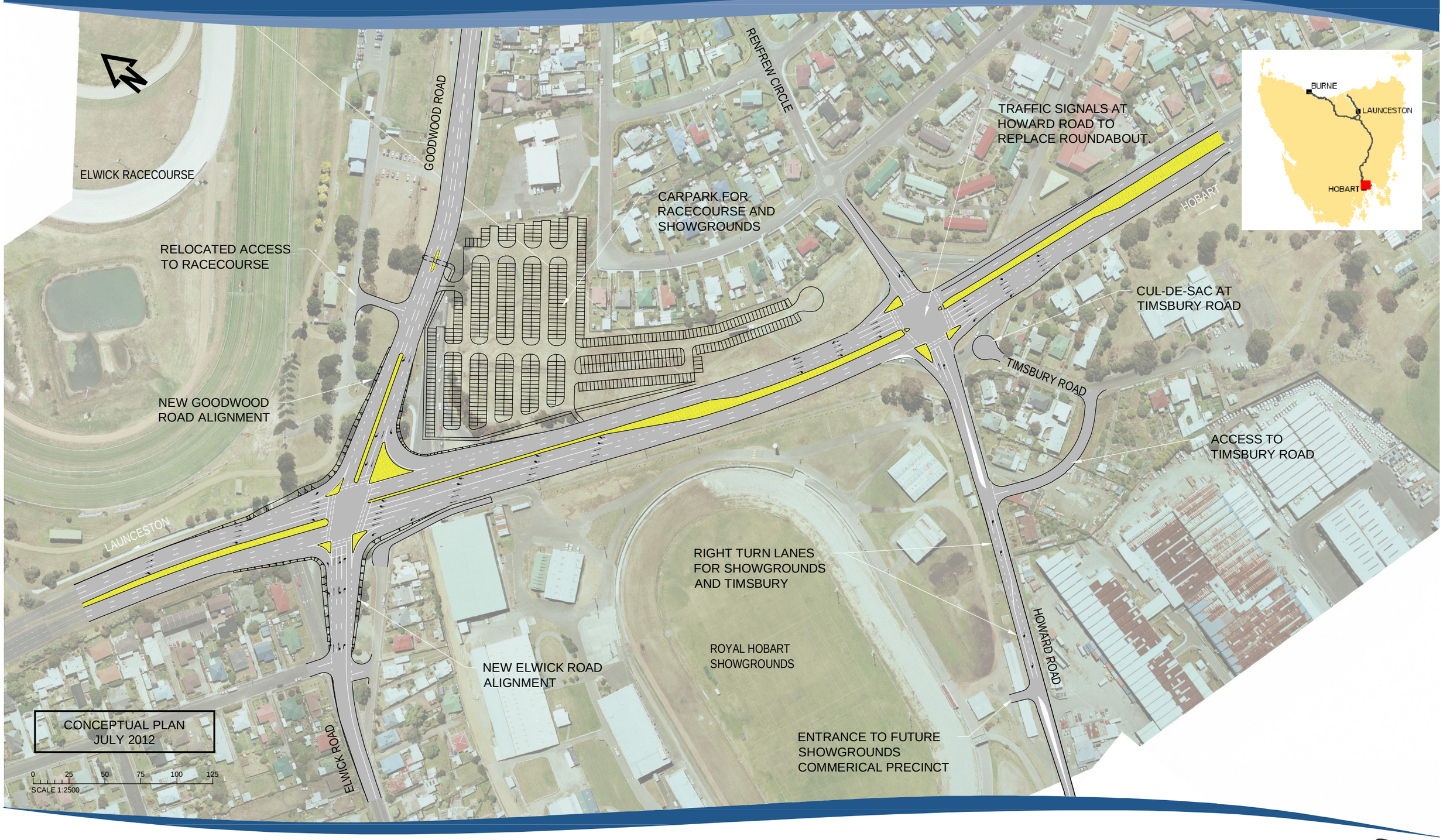
BROOKER HIGHWAY UPGRADE PACKAGE
Elwick Road to Howard Road Project Site



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