pitt&sherry

Launceston Eastern Bypass Feasibility Study

Final Report

Prepared for
Department of State Growth

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Rev02

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Executive summary

pitt&sherry was engaged to undertake a feasibility study for an eastern bypass of the City of Launceston. The intent of this report is to present the findings of a strategic merits test and infrastructure needs assessment to determine which option, either the Northern Alignment only or Northern and Southern Alignment combined, is proceeded with to the next stage of the feasibility study.

The relevant state and regional strategies and those of the City of Launceston have common themes of sustainable economic development, improved liveability, and with greater integration of transport with economic and land use planning. The strategies typically focus on:

- increasing the percentage of active transport and public transport trips
- encouraging new developments to be within walking distance of transit nodes or activity centres
- reducing casualties on roads
- utilising existing infrastructure and maximising the use of major existing regional freight corridors.

The Investment Logic Mapping process held at the start of the study distilled the problems the bypass could potentially solve, and the key benefits the proposed bypass would need to deliver. These benefits were used and further refined in the multi criteria analysis later in the study.

The following alignment designs were developed.

- *Northern Alignment* between the Mowbray Connector on the East Tamar Highway and Hoblers Bridge Road.
- *Southern Alignment* involving a common new section from St Leonards Road, crossing the North Esk flood plain, utilising a section of Johnston Road and a new section to the west of the existing rail corridor. The study developed two alignment options connecting to this common section.
  - Option 1 – connecting to the Midland Highway between Breadalbane Roundabout and the Kings Meadows junction including a long section of relatively steep longitudinal grades where the road climbs approximately 100m over 2.5km including 630m at a grade of 5% and 400m at a grade of 8%.
  - Option 2 – connecting to the Midland Highway at Breadalbane Roundabout including a1.5km long length of 8% longitudinal grades where the alignment has been developed to avoid the Josef Chromy winery.
- Northern Alignment - Hoblers Bridge Road to Henry Street.

The locations of these design alignments are shown in Figure 1.

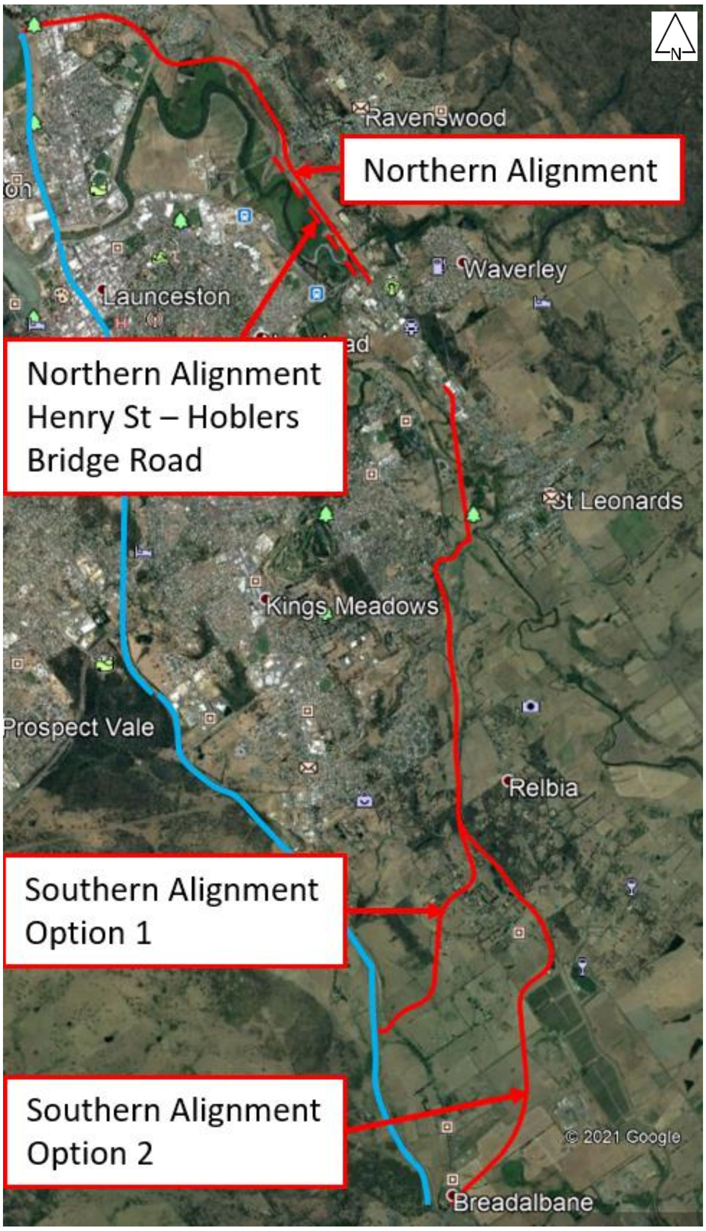

Figure 1: Proposed northern and southern alignments

Strategic traffic modelling was undertaken to assess the impact on traffic for a number of potential bypass options. The modelling identified the following.

- The full bypass with the northern and southern alignments, for both Option 1 and Option 2, would attract around 10,000 vehicles per day with approximately a 5% reduction in traffic on the existing route. There was a small improvement in the existing roads volume to capacity ratio in peak time, but the bypass did not alleviate congestion at the critical sections within the CBD. The travel time for trips between Breadalbane and the Mowbray Connector using the Launceston Eastern Bypass would be 4 minutes slower than the existing route using the Midland and East Tamar Highways.
- If only northern alignment was constructed, it would attract approximately 9,000 vehicles per day but there would be no change to traffic volumes on the existing route when compared to the Base Case. There were reductions in traffic volumes on local roads such as Elphin Road, Vermont and Ravenswood Roads.
- For the Hoblers Bridge Road to Henry Street only scenario, the new road would attract about

4,000 vehicles daily. These vehicles preferentially using the new road over the existing local roads and there is no change to traffic on the main existing arterial routes.

- An examination of origins and destinations for all trips suggests that the Launceston bypass is not an attractive option for longer distance trips. Vehicles travelling between Breadalbane Roundabout and the Mowbray Connector continue to preferentially use the existing route along the East Tamar and Midland Highways. The modelling identified that the southern and northern bypasses mostly benefit local traffic taking shorter trips within the extents of the proposed bypass.

The proposed southern alignment, for both options, passes through the North Esk River floodplain between Johnston Road and St Leonards Road, directly downstream of the Johnston Road Bridge. The proposed bypass would separate part of the flood plain from the main channel with the potential to increase the flood levels on the river side of the bypass. This would reduce the level of service of Johnston Road and would require several bridge or culvert openings to ensure much of the floodplain is useable as agricultural land.

The key geotechnical risks along the route of the proposed bypass include the following.

- The construction of fill embankments over poor ground in the floodplain around the North Esk River between Johnston Road and the industrial area west of St Leonards Road where alluvial depths may exceed 20m. It is likely ongoing consolidation of these soils will continue over a protracted period.
- High groundwater levels in colluvial soils and in cuts in rock in the southern section of the South Alignment.
- Earthworks in medium to high landslip hazard areas reactivating landslips.

Under the current Launceston and Northern Midland planning schemes the proposed alignments would be located in a wide range of planning zones in which the proposed bypass would be considered to be a discretionary use. Preliminary investigations carried out to date indicate:

- no Aboriginal sites located within the study corridor and eight heritage places listed on the Tasmanian Heritage Register situated within a 200m radius with two places appearing to be directly intersected by the proposed corridor
- there is a moderate to high likelihood of State-listed threatened vegetation, flora species, fauna species and weeds being present within the study area.

The following project cost estimates were developed:

1.	Northern Alignment	$59 million
2.	Southern Option 1 + Northern	$157 million
3.	Southern Option 2 + Northern	$158 million; and
4.	Hoblers Bridge Road to Henry Street	$10 million.

A Cost-Benefit Analysis was undertaken to compare the benefits and costs of each option against the base case of continuing to rely on current infrastructure. The economic assessment recommended:

- the major bypass options have weak economic feasibility
- the Hoblers Bridge Road -Henry Street link has borderline economic feasibility providing largely localised benefits.

Following completion of the traffic modelling, engineering, environmental and economic assessment a multi criteria assessment (MCA) workshop was held to evaluate the Launceston Bypass alignment options. The MCA scoring identified that the preferred option is the current Base Case followed by the Hoblers Bridge to Henry Street only option. The combined Northern and Southern Alignment option was the least preferred by a significant margin.

Based on feedback from stakeholders, it is apparent that the current freight handling facility located close to the centre of Launceston conflicts with the long term transport strategies of the State Government and the City of Launceston as:

- there are inefficiencies in the road based regional freight task with the requirement for heavy trucks to use local roads to access the existing freight handling facility
- there are inefficiencies with the intermodal freight task located in central Launceston when compared with other similar facilities in southern and north western Tasmania
- the relatively high use of large freight vehicles in central Launceston negatively affects the liveability and amenity of the city.

Based on the findings above, it is recommended:

- none of the bypass options warrant progression to Stage 2 of the feasibility assessment
- a further study is warranted to investigate options of locating the primary freight handling facility to outside of central Launceston.

1. Introduction

pitt&sherry was engaged to undertake a feasibility study for an eastern bypass of the City of Launceston. The feasibility study considers the warrants for an eastern bypass, investigates constructability issues and aimed to determine a preferred alignment and develop concept designs and cost estimates.

The intent of this report is to present the findings of Stage 1 of the study - a strategic merits test and infrastructure needs assessment to determine which bypass alignment option to proceed to the next stage of the feasibility study. The Project Brief assumed one of the following two options would proceed to the next stage.

- Option 1 – Northern Alignment Only.
- Option 2 – Northern and Southern Alignment Combined.

1.1 Northern alignment

1.1.1 Background

In 2013, a study by GHD identified an eastern bypass of Launceston to be a preferred option to address growing pressure on existing infrastructure in the corridor between the Midland Highway/Bass Highway and the East Tamar Highway. At that time the preferred option consisted of the following three sections.

- Eastern Bypass, between Hoblers Bridge Road and Henry Street.
- Inner Ring Road, between Henry Street and Forster Street.
- New Tamar River Bridge, between Forster Street and the West Tamar Highway.

1.1.2 Current situation

[1]This feasibility study focusses on the first two sections of the 2013 proposal, i.e. the Eastern Bypass and the Inner Ring Road to comprise the “Northern Alignment” of the proposed bypass. This study has assumed the Northern Alignment will connect to the East Tamar Highway in the vicinity of the Mowbray Connector Junction. Figure 2 shows the proposed location of the Northern Alignment.

[1] A separate study is being undertaken by the Department to investigate the feasibility, constructability and preferred alignment of a new Tamar River Bridge. If this study shows a new Tamar River Bridge is feasible, it would most likely be located to the north of Forster Street.

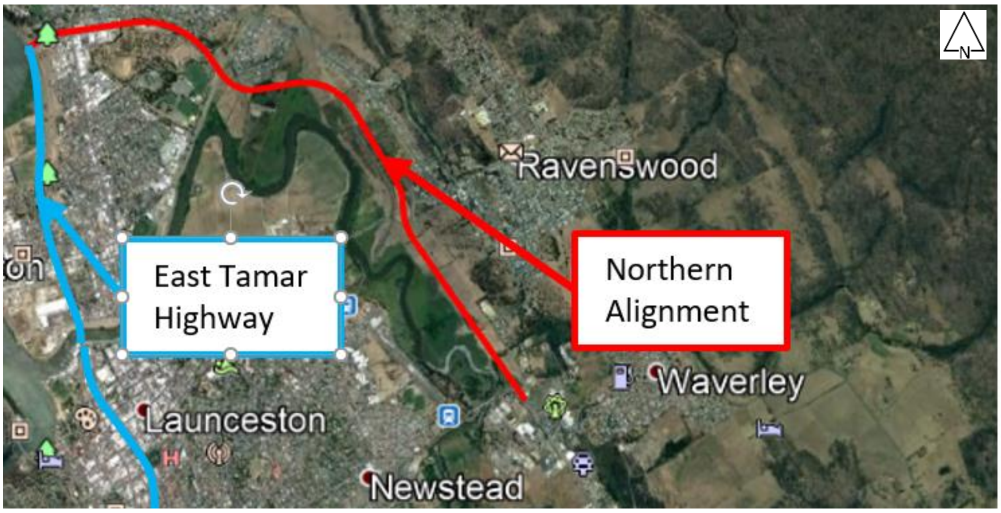

Figure 2: Proposed northern alignment

1.2 Southern alignment

Further high level planning has indicated a desire to consider a southern extension to the bypass alignment proposed in the Launceston Traffic Study 2013. It is proposed this extension would connect the bypass from St Leonards Road to the Midland Highway. The study investigated two options for connecting to the Midland Highway.

- Between the Kings Meadows Junction and Breadalbane Roundabout.
- At Breadalbane Roundabout.

Figure 3 shows the proposed location for both options of the Southern Alignment.

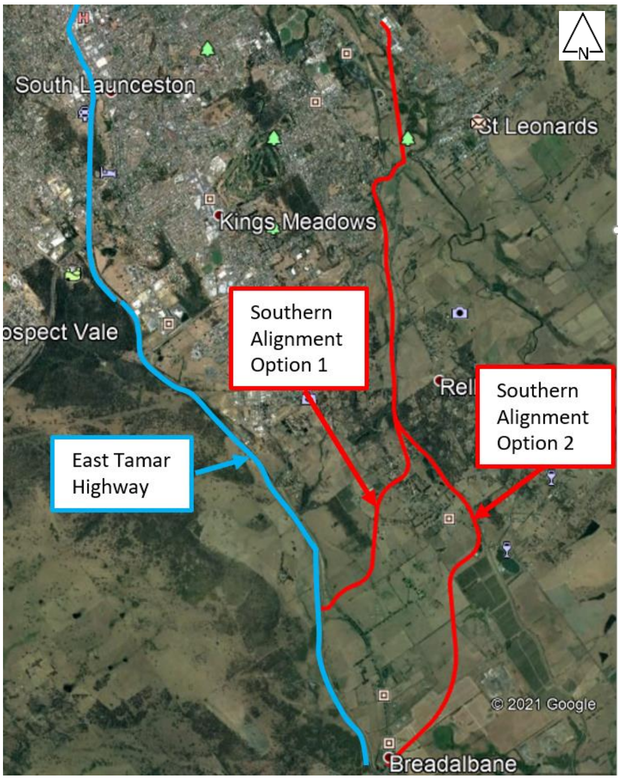

Figure 3: Proposed southern alignment options

2. Strategic context

2.1 State and regional strategy

2.1.1 Northern Tasmania Regional Land Use Strategy (2018)

The Regional Land Use Strategy (RLUS) is the statutory regional plan for Northern Tasmania. It applies to all land in the northern region of Tasmania. It sets out the strategy and policy basis to facilitate and manage change, growth, and development to 2032. Across the Northern Region the RLUS will guide land use, development and infrastructure decisions made by State and local government, and by key infrastructure providers.

The Strategy identifies the following goals.

- *Economic development* which includes an integrated and coordinated approach to government infrastructure, transport and land use planning.
- *Liveability* including identifying Urban Growth Areas to advance a sustainable urban settlement pattern.
- *Sustainability* by establishing planning policies to support sustainable development.

The strategy has developed the following policies in relation to transport planning.

Integrated Land Use and Transport Policy

- New development is to utilise existing infrastructure or be provided with timely transport infrastructure.
- Apply transit-oriented development principles and practices to the planning and development of transit nodes.
- Plan new public transport routes facilities and high-frequency services.
- Prioritise amendments to planning schemes to support new Urban Growth Areas and redevelopment sites with access to existing or planned transport infrastructure.
- Connect active transport routes to improve accessibility.
- Manage car parking provision in regional activity centres and high-capacity transport nodes to support walking, cycling and public transport accessibility.
- New development within walking distance of a transit node or regional activity centre is to maximise pedestrian amenity, connectivity and safety.

Regional Infrastructure Network Policy

- The primary form of transport access across the region is provided by the State and local road network.
- Freight transport linkages with Tasmania's northern ports are critical departure points for the State's exports.
- Facilitate and encourage active modes of transport through land use planning.
- Facilitate an efficient and convenient public transport system through land use planning.

Regional Economic Development Policy

- The region is the major destination for inter-regional freight, which is directed to key land links including Midland Highway, Bass Highway and East Tamar Highway.
- Department of State Growth aims to maximise use of major existing regional freight corridors to prevent further dispersal of the freight task across other or new road networks.

2.1.2 Northern Integrated Transport Plan (2013)

The Northern Integrated Transport Plan (NITP) provides a coordinated and strategic framework to recognise and address transport issues within the Northern Region over the next twenty years, with a focus on the highest priority strategies and actions which will benefit the region.

The Strategic Transport Network includes key regional and inter-regional links, including Midland Highway, Bass Highway and East Tamar Highway, as well as key metropolitan links and urban transport corridors, such as the Bathurst/Wellington Street Couplet, Charles Street and Goderich Street, Kings Meadows Link/Quarantine Road/Johnston Road/St Leonards Road, and Hobart Road.

The NITP identified goals across the following five strategic policy areas.

Freight

- A regional freight network which can cater for the current and future freight task including intrastate, interstate and international linkages. The network must support lowest cost, efficient and reliable supply chains.
- A safe freight transport system including road, rail, bridges, ports, airports and intermodal facilities.
- Integrated, evidence-based planning for the freight system which provides a long-term plan for the future.

People

- Improved transport safety for communities.
- Integrated, evidence-based planning for the public passenger system which provides a long-term plan for the future.
- Improved health and wellbeing, liveability and accessibility for communities.
- Improved travel time reliability on key urban transport corridors.

Land Use Planning

- Greater integration of transport with economic and land use planning for the Region at a strategic and operational level.
- Protect the strategic function of regionally significant transport infrastructure.
- Transport investment and planning decisions in the Region are informed by evidence-based strategic land use planning.

Environment

- Reduced emissions from transport.
- Reduce the impact of climate change on transport infrastructure.
- Minimise the adverse impact of transport on communities and the environment.

Tourism

- Transport infrastructure and services that contribute to a positive tourism experience.

2.2 Launceston Transport Strategy 2020-2040

The City of Launceston has recently developed the Launceston Transport Strategy 2020-2040. The City of Launceston Transport Strategy Project was launched in July 2020 to bring together all the information contained in previous studies, reports and strategies as well as the feedback received as part of Tomorrow Together.

The strategy identifies a series of actions to deliver Council's 20 year transport vision.

Our community will have access to diverse transport choices that connects them to our places. Our focus on partnerships and innovation will promote our community's wellbeing and improve Launceston's liveability.

The strategy has three key themes:

A Liveable Launceston - Increased active and public transport uptakes.

A Healthy Launceston – Reduced casualties on the road.

A Connected Launceston – 15-minute access to centres, education and health facilities.

The strategy identified 91% of Launceston's residents use a car to get to work with active transport and public transport accounting for less than 9% of journey to work trips. There is a focus to increase the percentage of active transport and public transport trips which directly supports the three themes of the strategy. The strategy identifies good planning practice should prioritise providing access to public and active transport choices, followed by private vehicles.

The strategy suggests that Launceston will need between 2,600 and 4,200 net additional dwelling stock between 2016 and 2032. It is proposed to develop two new suburban activity centres in South Prospect and St Leonards to accompany the following growth areas.

- South East Corridor including Waverley and St Leonards.
- Newnham – bounded by the East Tamar Highway to the west and north.
- South West Corridor including South Prospect.

3. Stakeholder engagement

A Stakeholder Community and Engagement Plan (SCEP) has been developed which identifies the key project stakeholders, their interest and influence on the project and proposed engagement activities.

There has been engagement with the following stakeholders at key stages during the feasibility study:

- Launceston City Council
- Tasmanian Transport Association
- Northern Midlands Council
- RACT
- Tamar Bicycle Users Group
- Launceston Chamber of Commerce
- Tasmanian Transport Council.

These stakeholders were invited to attend the following two workshops.

- Investment Logic Mapping workshop carried out at the start of the study to identify the problems the proposed bypass would solve and agree the primary benefits sought from the project.
- The multi criteria analysis workshop to evaluate the Launceston Bypass alignment options.

Additional presentations were provided to Launceston City Council councillors and the Board of the Tasmanian Transport Council. Following the presentations, the feedback from both of these groups was that there was not a compelling case for the construction of the bypass and that they did not support the project progressing to the next stage of design.

Both of the groups did identify the issue of the Toll freight handling facility being a generator of large truck movements through the centre of Launceston. Figure 4 shows the route of heavy vehicles from the East Tamar/Bass Highway link to the Toll facility. In order to access the Toll facility, trucks currently need to use Cimitiere Street, Racecourse Crescent and Dowling Street. As these roads are located within the centre of Launceston, the use by large trucks detracts from the amenity and liveability in central parts of the City.

In addition, there are issues with the current intermodal freight handling arrangements, which are located within the Toll facility, as it is located off the main line requiring shuttle arrangements to and from Western Junction. These arrangements are inefficient when compared to the current intermodal facilities at Brighton in southern Tasmania and Burnie in north-western Tasmania.

Figure 4: Heavy vehicle truck route for toll

4. Investment logic mapping

At the start of the study, an Investment Logic Mapping (ILM) process was undertaken to ensure that the context and scope of the project was understood by all stakeholders and that the problems and expected outcomes of the key stakeholders are understood by the project team. It was intended the ILM process would highlight core values, identify key performance indicators and issues for resolution, and would inform the development of solutions.

4.1 Workshop

In February 2021 an ILM workshop was undertaken with representatives from the following key stakeholders:

- RACT
- Northern Midlands Council
- City of Launceston
- Tasmanian Transport Authority
- Launceston Chamber of Commerce
- Department of State Growth.

As the ILM workshop was held at the start of the study, the objectives of the workshop were limited to:

- identifying the problem and /or opportunity the proposed bypass is required to solve
- Agreeing the primary benefits being sought from the proposed bypass.

4.2 Description of the problem

The ILM workshop distilled the problems the bypass could potentially solve to the following:

- existing arterial routes are inefficient and lack resilience, resulting in congestion and travel delays
- city roads juggle freight, passenger and active transport users, impacting on community amenity and road safety
- future transport demand growth will place pressure on existing road links, impacting future city planning and zoning.

4.3 Benefits

Following identification of the problems the workshop participants agreed the following benefits the proposed bypass would need to deliver:

- Travel time reliability improvements
- Reduced freight on city roads
- Enhanced safety for vehicles, pedestrians and cyclists
- Increased liveability and urban amenity.

Figure 5 shows the linkages between the problems and the benefits from the ILM process. It also includes possible KPI measures to assess each option against.

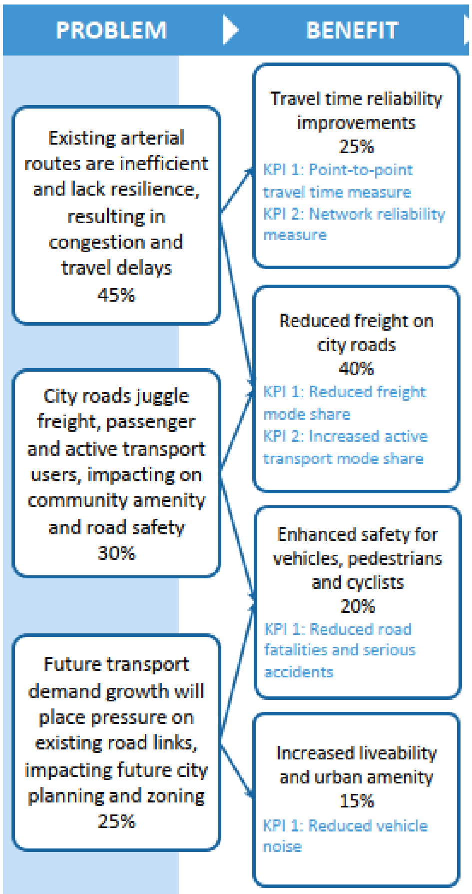

Figure 5: Investment logic map – Problem and benefits

5. Alignment options

To facilitate the assessment the following alignment designs were developed:

- Northern Alignment
- Southern Alignment:
    - Option 1 – Midland Highway
    - Option 2 – Breadalbane
- Northern Alignment - Hoblers Bridge Road to Henry Street.

5.1 Northern alignment

5.1.1 Background

The 2013 preferred alignment extended from Hoblers Bridge Road and Forster Street incorporating portions of Henry Street. At that time Forster Street was selected so that it connected to a possible bridge connecting the East and West Tamar highways at this location. The proposed 2013 alignment is shown in Figure 6.

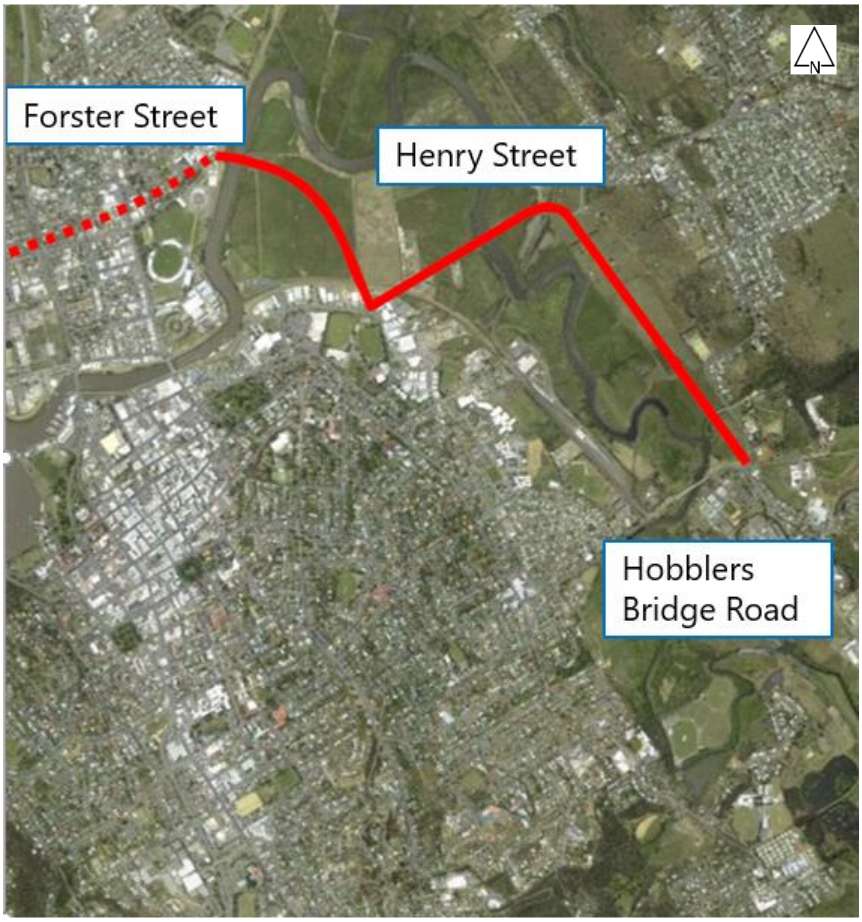

Figure 6: Proposed 2013 northern alignment

Following a review, the feasibility study team considered terminating the proposed bypass at Forster Street was no longer the preferred location for the following reasons:

- Subsequent studies have identified Forster Street is unlikely to be the preferred location for the possible bridge.
- The proposed 2013 alignment crosses the floodplain and the North Esk River which would significantly impact on the flooding issues in this area.
- It is likely the introduction of more vehicles onto Forster Street from a bypass would cause additional problems at the signalised intersections on Invermay Road and the East Tamar Highway.

An alternative alignment for the Northern Alignment was developed with the objectives of having the northern end terminating on the East Tamar Highway at the Mowbray Connector junction and minimising the impact on the flood plain and the North Esk River as shown in Figure 7 below. The overall length of this Northern Alignment option is 5.65km.

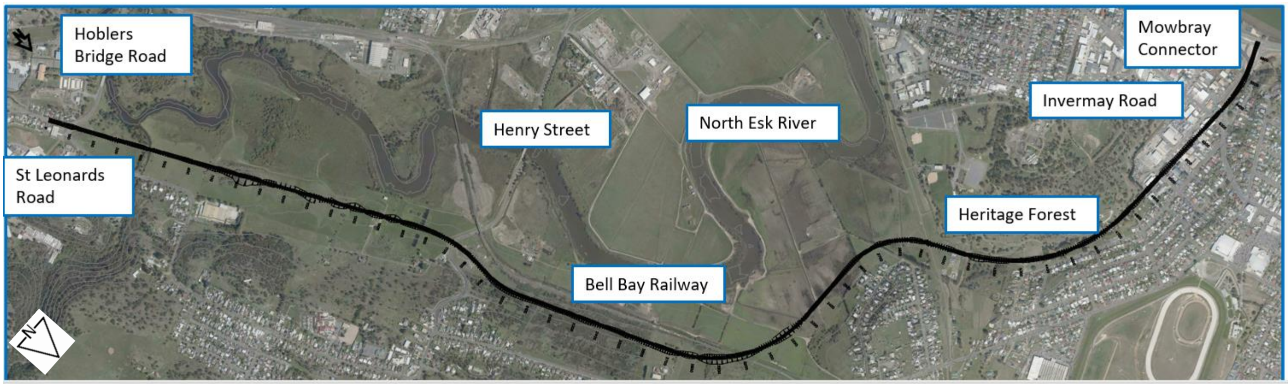

Figure 7: Northern alignment

The modelling assumed:

- 60km/hr signposted speed limit between the Mowbray Connector and Invermay Road and 80km/hr for the remainder of the northern alignment.
- At grade intersections at the Mowbray Connector, Invermay Road and Hoblers Bridge Road.
- Grade separated intersection with Henry Street.

5.2 Southern alignment

For the southern alignment a common section for both Option 1 and Option 2 was developed as shown in Figure 8.

Figure 8: Southern alignment common section

In this section it is proposed to:

- provide a link between St Leonards Road and Johnston Road across the flood plain including a crossing of the North Esk River
- utilise the current section of Johnston Road through to the Glenwood Road/Quarantine Road/Penquite Road roundabout
- construct the new road to the west of the existing rail corridor with a bridge over Opossum Road.

5.2.1 Southern alignment Option 1 – Midland Highway

For Option 1 the proposed alignment connects to the Midland Highway between Breadalbane Roundabout and the Kings Meadows junction as shown in Figure 9.

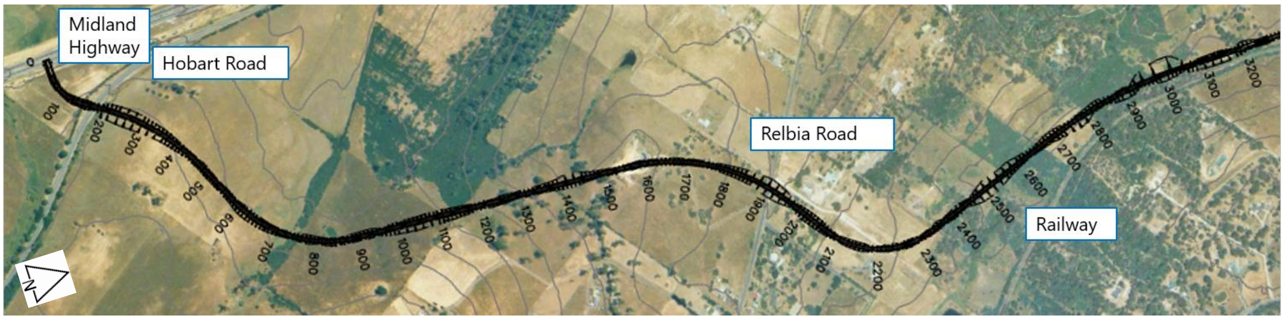

Figure 9: Southern alignment Option 1 - Midland Highway

Features of this section of the alignment include:

- a bridge over Relbia Road
- a long section of relatively steep longitudinal grades where the road climbs approximately 100m over 2.5km including 630m at a grade of 5% and 400m at a grade of 8%
- a bridge over Hobart Road
- a grade separated interchange with the Midland Highway.

5.2.2 Southern alignment Option 2 – Breadalbane

For Option 2 the proposed alignment connects to the Midland Highway at Breadalbane Roundabout as shown in Figure 10.

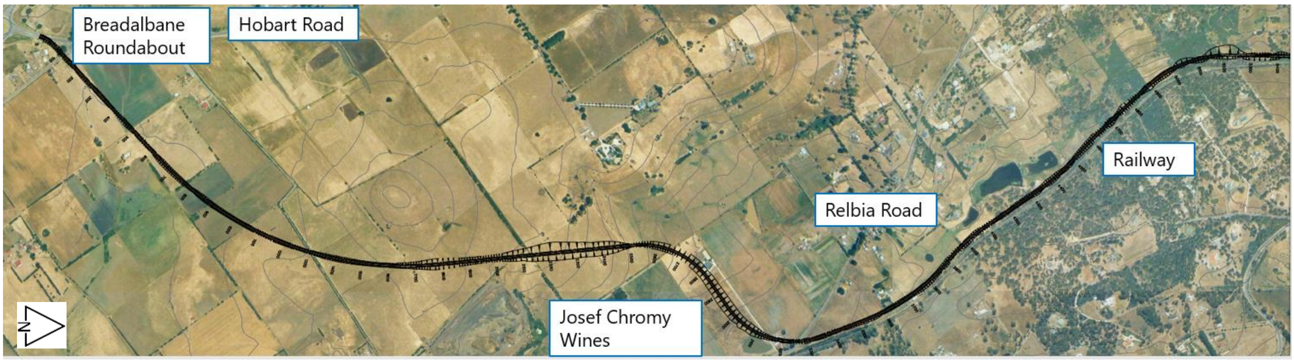

Figure 10: Southern alignment Option 2 - Breadalbane

Features of this section of the alignment include:

- a bridge over Relbia Road
- a 1.5km long length of 8% longitudinal grades where the alignment has been developed to avoid the Josef Chromy winery
- an at grade connection to Breadalbane Roundabout.

5.3 Northern alignment - Hoblers Bridge Road to Henry Street

Following receipt of the outcomes of the initial strategic modelling a further alignment option was proposed between Hoblers Bridge Road and Henry Street only as shown in Figure 11.

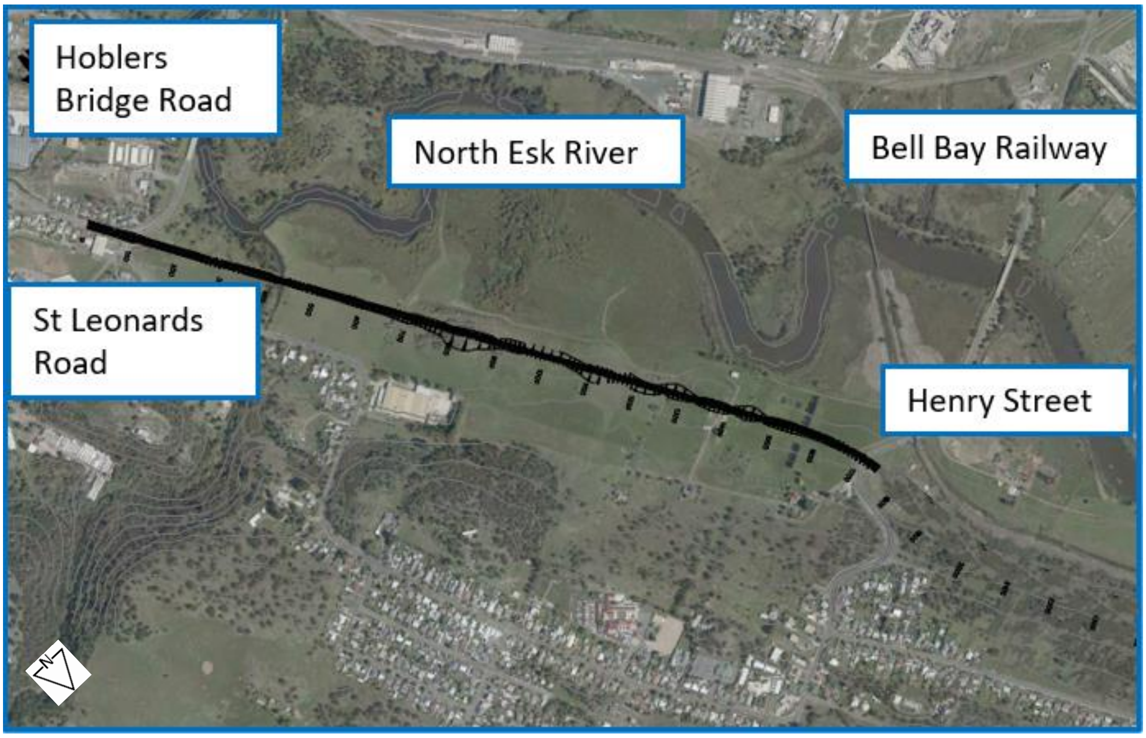

Figure 11: Northern alignment - Hoblers Bridge Road to Henry Street

The alignment of this option is the same as the full northern alignment with at grade intersections to both Hoblers Bridge Road and Henry Street.

6. Traffic modelling

pitt&sherry engaged Stantec (ex GTA consultants) to undertake strategic modelling to assess the impact on traffic for a number of potential bypass options.

6.1 Modelled scenarios

The following scenarios were modelled for the 2036 future year case.

- **BC - Base Case** including identified future projects such as the right turn bans at the Lindsay Street and East Tamar Highway intersection on approaches and at the Esplanade and East Tamar Highway on all approaches.

  The overall distance between Breadalbane Roundabout and the Mowbray Connector using the Midland and East Tamar highways is 15.7km[2].
- **PC01 - Full alignment** incorporating the proposed northern and southern alignments. Only a single northern alignment was modelled as there would be very little difference in the strategic modelling outcomes for the different connection locations to the Midland Highway.

  The overall distance between Breadalbane Roundabout and the Mowbray Connector using the proposed northern and southern alignments is approximately 18.15km.
- **PC02 - Northern Bypass** incorporating the proposed northern alignment only.

  The overall length of the northern alignment is 5.6km with a route length between Breadalbane Roundabout and the Mowbray Connector of 20.69km.
- **PC03 - Full alignment with bridge** incorporating the proposed northern and southern alignments and a bridge across the Tamar. While not part of the scope of this study, a bridge was modelled connecting the East and West Tamar Highways to allow a better understanding of the traffic impact of a proposed Launceston bypass combined with a link to the West Tamar Highway.

  The overall distance of the proposed route between the West Tamar Highway and Breadalbane roundabout with a bridge and the proposed northern and southern alignments is approximately 19.72km. This compares to the base case distance of 15.22km.
- **PC04 – Short Northern alignment** incorporating the proposed northern alignment between Hoblers Bridge and Henry Street only.

  The overall length of this section of the northern alignment is 1.7km.

6.2 Model results

6.2.1 Vehicle hours travelled

The Vehicle Hours Travelled (VHT) represents the total travel time for all trips in the model over a 24 hour period. The results[3] show a slight reduction in VHT in each of the four proposed scenarios with PC03 (Northern alignment, southern alignment, and bridge) achieving the biggest reduction (-1.2%).

6.2.2 Vehicle kilometres travelled

The Vehicle Kilometre Travelled (VKT) represents the total distance travelled over a 24 hour period. The

[2] Refer Stantec Report – Figure 4.9
[3] Refer Stantec Report – Figure 4.1

results[4] show there will be a slight increase in travel distances compared to the Base Case. PC01 shows the highest increase in VKT, followed by PC02 and PC03 with PC04 only marginally higher than the Base Case.

6.2.3 Average speed

There was a slight increase in average speed across the network during both the AM and PM peak time period[5] for each of the four modelled scenarios. PC03 has the largest increase in average speed, closely followed by PC01 then PC02 and PC04. In all of the model scenarios, the differences in speed are less than 0.6% from the Base Case.

6.2.4 Point to point travel times

The results indicate the travel time for trips between Breadalbane and the Mowbray Connector using the Launceston Eastern Bypass is 19 minutes. In comparison, the travel time for the existing route using the Midland Highway and the East Tamar Highway is 15 minutes. This outcome is to be expected as the proposed Launceston Eastern Bypass is 2.4km longer than the existing option.

6.2.5 Traffic volumes

6.2.6 Base case

The output indicates that the Midland Highway is expected to carry approximately 50,000 vehicles per day (VPD), with 5,400 (11%) being trucks. The volume within the traffic network is distributed evenly along Midland Highway and East Tamar Highway, with the busiest zone in the Wellington Street/Bathurst Street section. Additionally, the arterial roads through the urban areas of Launceston carry substantial traffic – Elphin Road 13,500 VPD, Hoblers Bridge Road 10600 VPD, Quarantine Road 7500 VPD, Vermont and Ravenswood Roads 4900 VPD.

[4] Refer Stantec Report – Figure 4.2
[5] Refer Stantec Report – Figures 4.3 and 4.4

6.2.7 PC01 - Full alignment

While the existing highway system is still expected to carry most of the north-south traffic, the new bypass is expected to attract approximately 10,000 VPD (1,000 trucks) on its busiest section, occurring between Henry Street and Hoblers Bridge Road. The southern section is expected to carry in the order of 7,000 vehicles per day (1,000 trucks). There are reasonable reductions in traffic on Elphin Road (11,400 VPD), Quarantine Road (5300 VPD), Vermont and Ravenswood Roads (2200 VPD).

Figure 12 compares the PC01 traffic volumes against the Base Case. The numbers shown in red are the traffic volumes for the new bypass for both the northern and southern alignment.

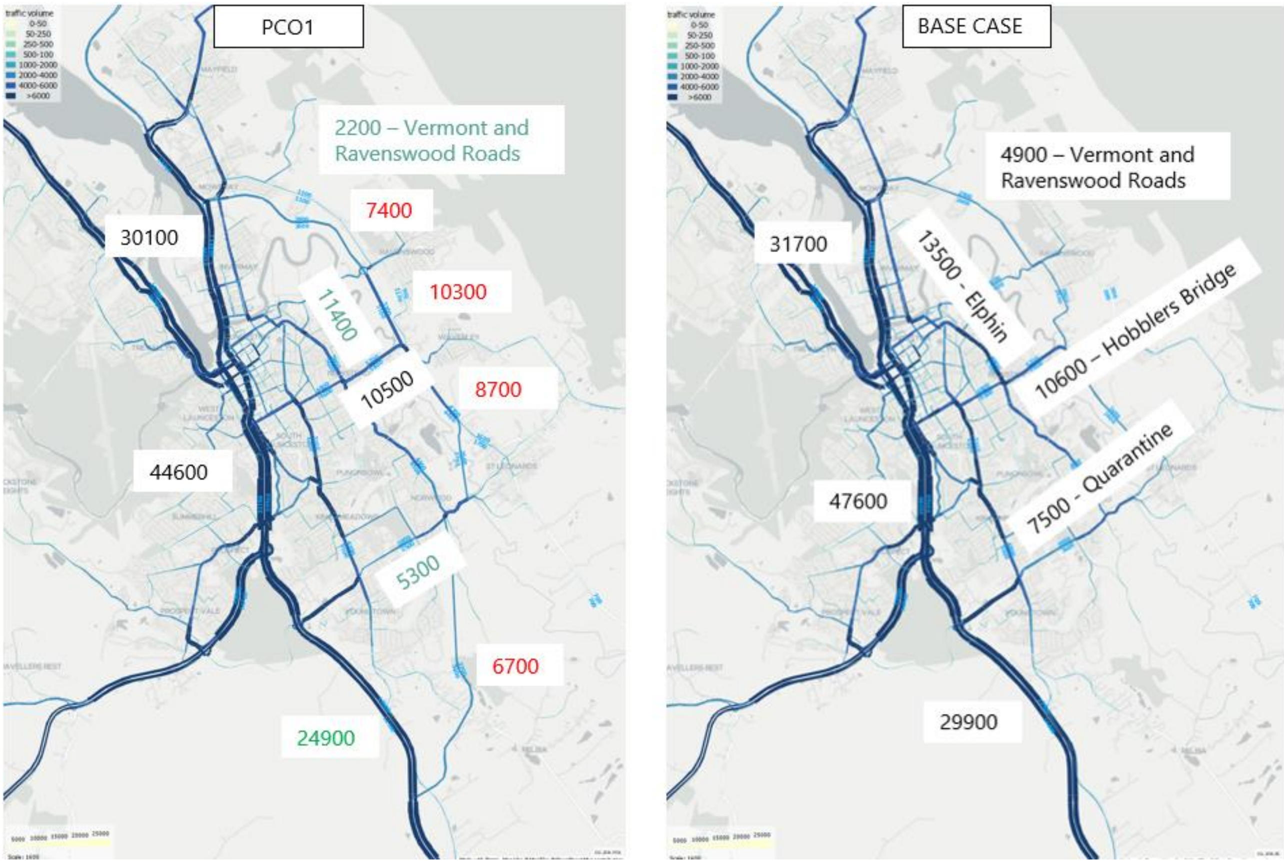

Figure 12: PC01 vs base case traffic volumes

6.2.8 PC02 - Northern bypass

Under the northern bypass only scenario, the existing highway system is still expected to carry very similar north-south traffic to the Base Case. The new bypass is seen to attract approximately 9,000 vehicles per day (800 trucks) within its busiest section which occurs between Henry Street and Hoblers Bridge Road. There are reasonable reductions in traffic on Elphin Road (10,900 VPD), and Vermont and Ravenswood Roads (1900 VPD) but there is no reduction in traffic on Quarantine Road.

Figure 13 compares the PC02 traffic volumes against the Base Case. The numbers shown in red are the traffic volumes for the new bypass for the northern alignment only.

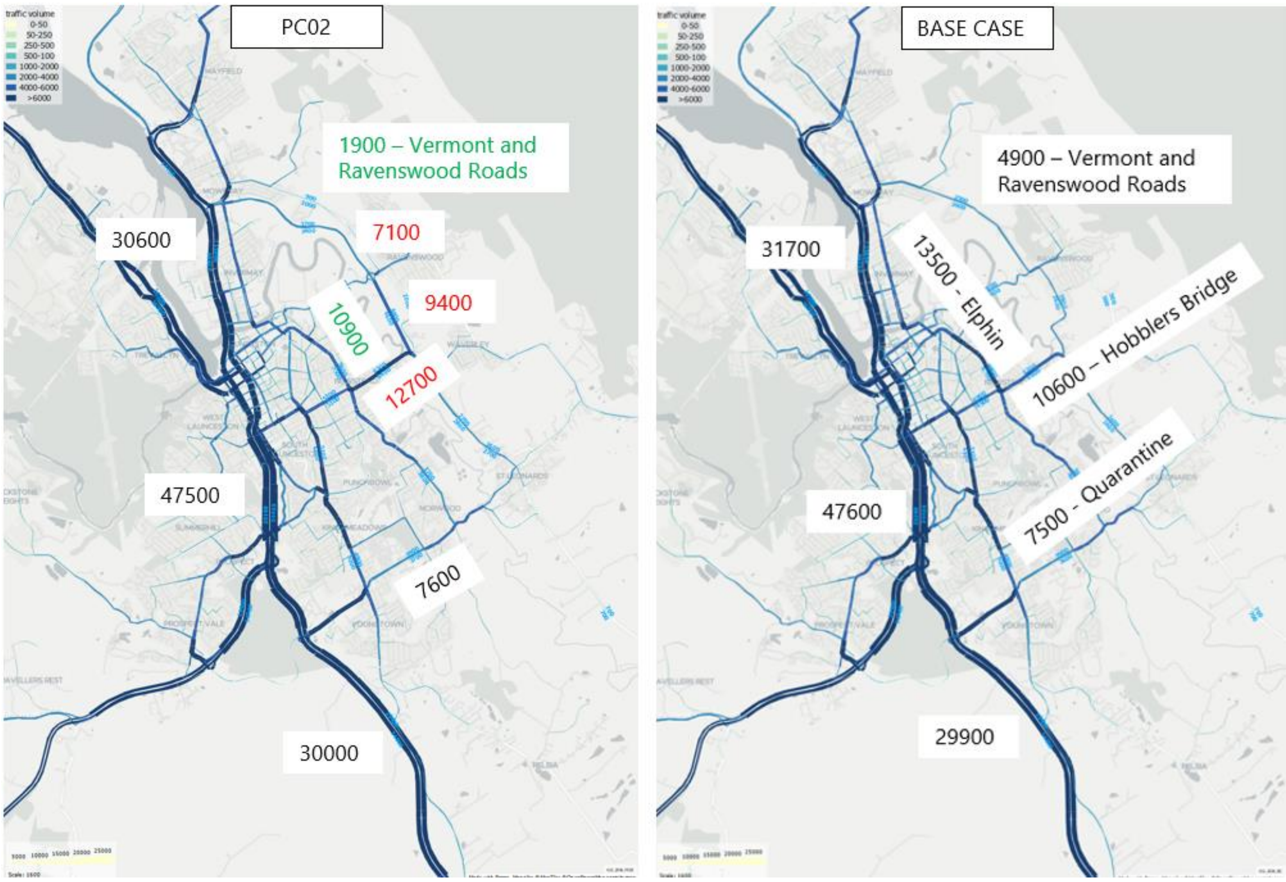

Figure 13: PC02 vs base case traffic volumes

6.2.9 PC03 - Full alignment with bridge

This scenario provides a link between the West and East Tamar Highways along with the northern and southern alignment. With the inclusion of this link, the new bypass can be seen attracting roughly 11,000 vehicles per day (1,000 trucks) within its busiest section between Henry Street and Hoblers Bridge Road. However, the existing highway system is still expected to carry most of the north-south traffic,

The model suggests the new bridge will carry about 15,000 vehicles per day (1,000 trucks). There are reasonable reductions in traffic on Elphin Road (10,600 VPD), Quarantine Road (5200 VPD), Vermont and Ravenswood Roads (2200 VPD).

Figure 14 compares the PC03 traffic volumes against the Base Case. The numbers shown in red are the traffic volumes for the new bypass for both the northern and southern alignment and the proposed bridge over the Tamar River.

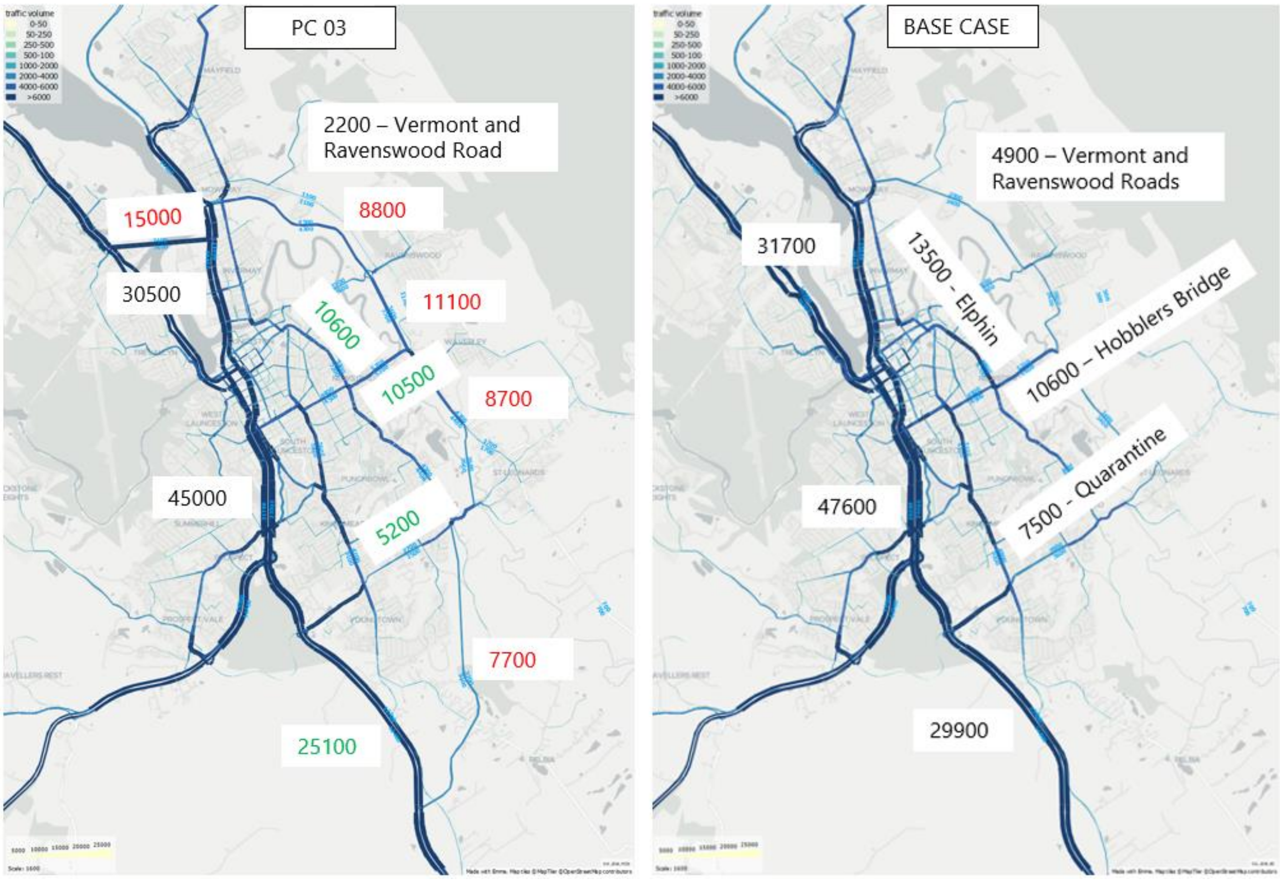

Figure 14: PC03 vs base case traffic volumes

6.2.10 PC04 – Short northern alignment

This scenario provides a short bypass between Hoblers Bridge Road and Henry Street only. The outputs from the model estimate that the new road section will attract about 4,000 vehicles daily of which about 400 are trucks.

Figure 15 compares the PC03 traffic volumes against the Base Case. The numbers shown in red are the traffic volumes for the new bypass.

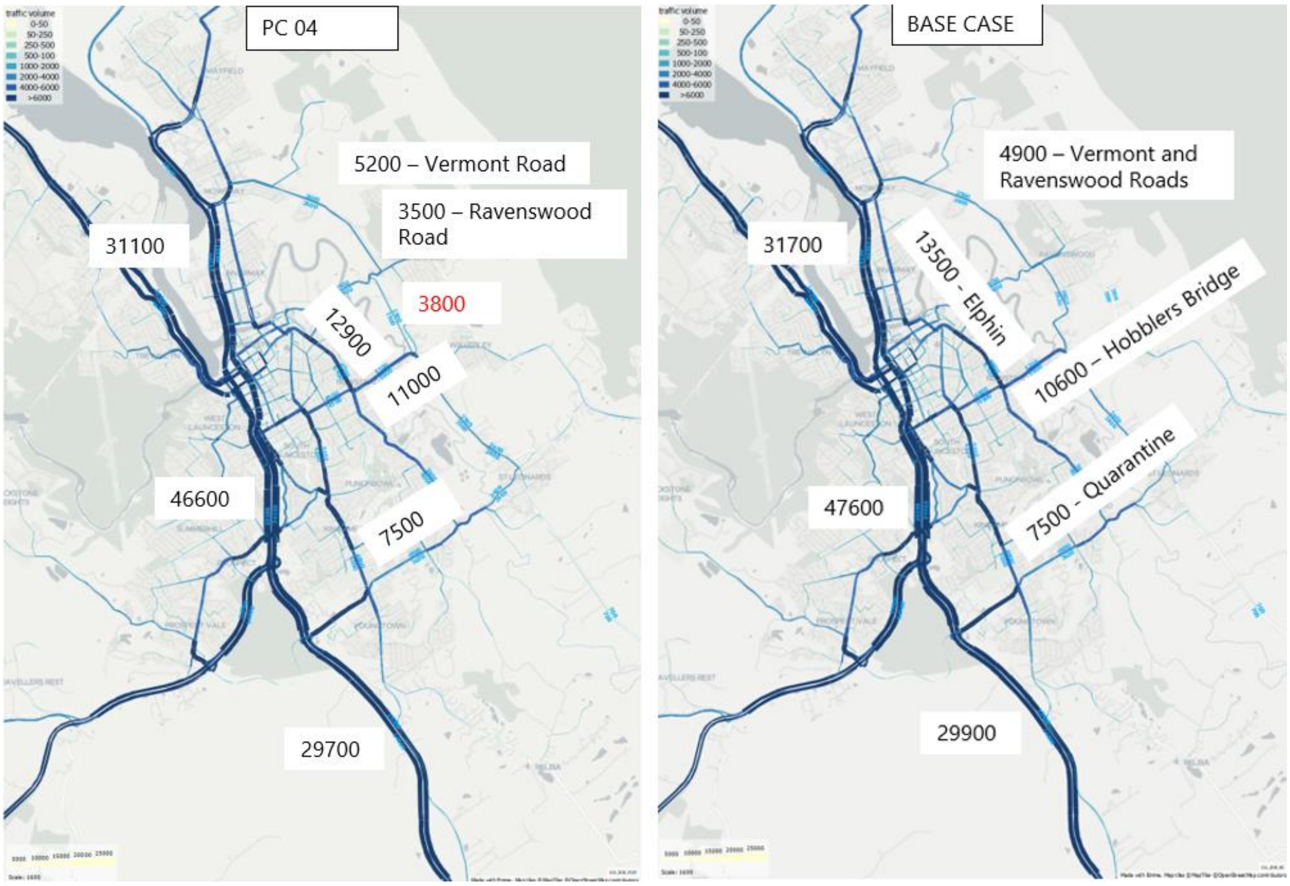

Figure 15: PC04 vs base case traffic volumes

6.2.11 Summary

Table 1 provides a summary of the daily traffic volumes from the modelling

Table 1: Daily traffic volume summary

	Base Case	PC01	PC02	PC03	PC04
Midland Highway – South of Bass Highway	29900	24900	30000	25100	29700
Wellington Street/Bathurst Street	47600	44600	47500	45000	46600
East Tamar Highway	31700	30100	30600	30500	31100
Northern Alignment Bypass North End		7400	7100	8800	
Northern Alignment Bypass South End		10300	9400	11100	3800
Southern Alignment Bypass North End		8700		8700	
Southern Alignment Bypass South End		6700		7700	
Elphin Road	13500	11400	10900	10600	12900
Hoblers Bridge Road	10600	10500	12700	10500	11000
Quarantine Road	7500	5300	7600	5200	7500
Vermont and Ravenswood Roads	4900	2200	1900	2200	3500[6]

6.2.12 Volume to capacity ratios

The traffic model extracted the level of demand for each respective link in the AM, PM or daily period in terms of the Volume to Capacity Ratios.

The volume to capacity (or degree of saturation) outputs for the network are a measure of the congestion on a particular link and is the ratio of demand divided by the modelled link capacity. A higher ratio means a higher level of congestion which influence the travel times and how traffic is assigned through the model. When the ratio exceeds 1.0 the road is operating above capacity and traffic is be slowed down – these sections are shown in red in the following figures. When the ratio has a relatively high value, such as 0.8, but below 1.0, the road will have an acceptable level of service – these sections are shown in orange in the following figures.

[6] Value for Vermont Road.

6.2.13 Base case

For the Base Case the model[7] identified the PM peak will experience heaviest congestion (V/C ratio above 1) at locations on the southbound carriageway to the Southern Outlet on the Midland Highway and at isolated sections of the East Tamar Highway. During the AM peak the level of congestion is generally 0.8.

Figure 16 shows the Volume to Capacity ratios for the Base Case where the sections in red are locations where the V/C ratio exceeds 1 and the orange areas are locations where the V/C ratio is between 0.8 and 1.

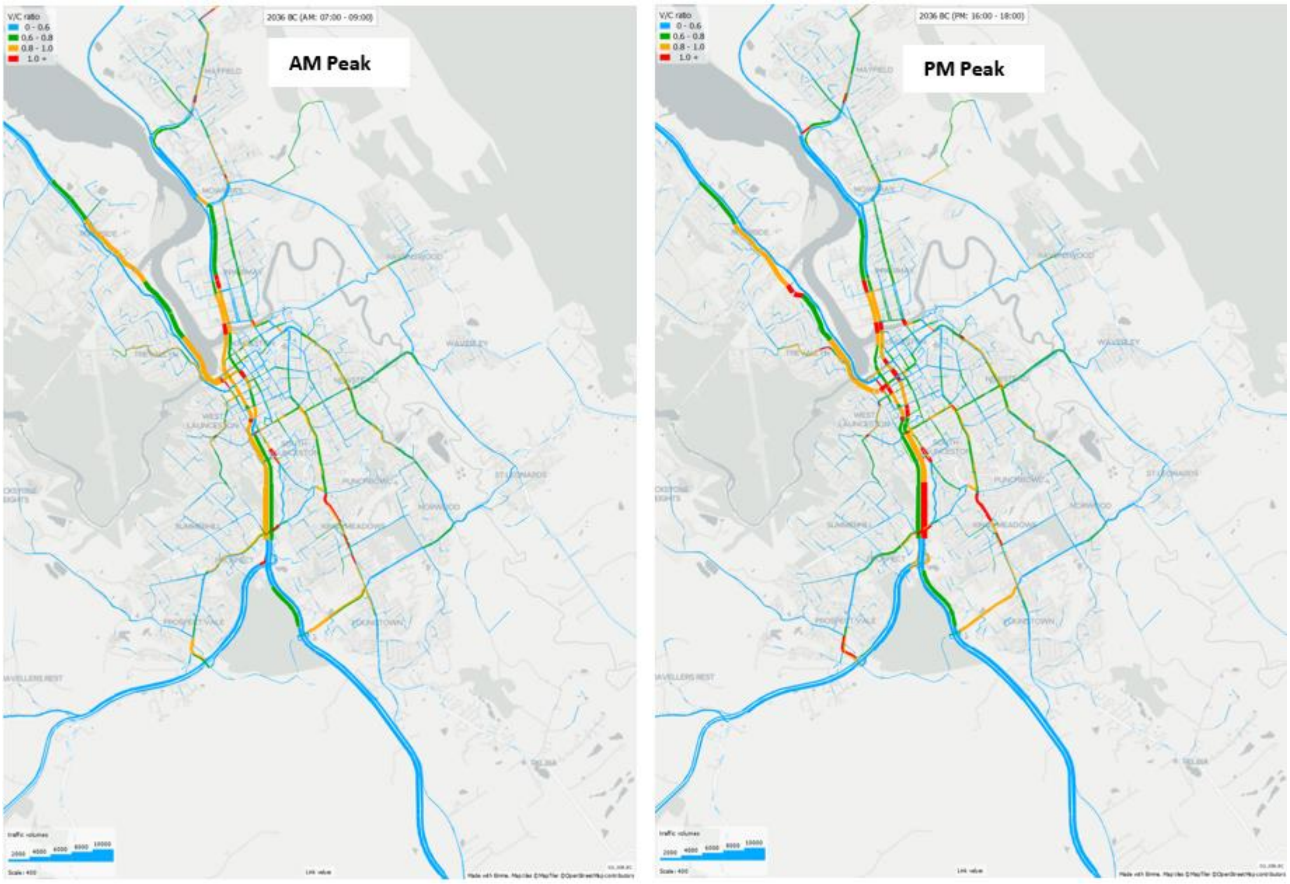

Figure 16: Volume capacity ratio – Base case

[7] Refer Stantec Report – Figures 4.12 and 4.13.

6.2.14 PC01 - Full alignment

For the full bypass alignment the Launceston Bypass will experience V/C ratios of below 0.8 along its length and busiest section. When comparing the results with the Base Case the bypass improves the level of congestion by attracting traffic away from the Midland Highway.

Figure 17 compares the PM Peak V/C ratios for the PC01 and the Base Case.

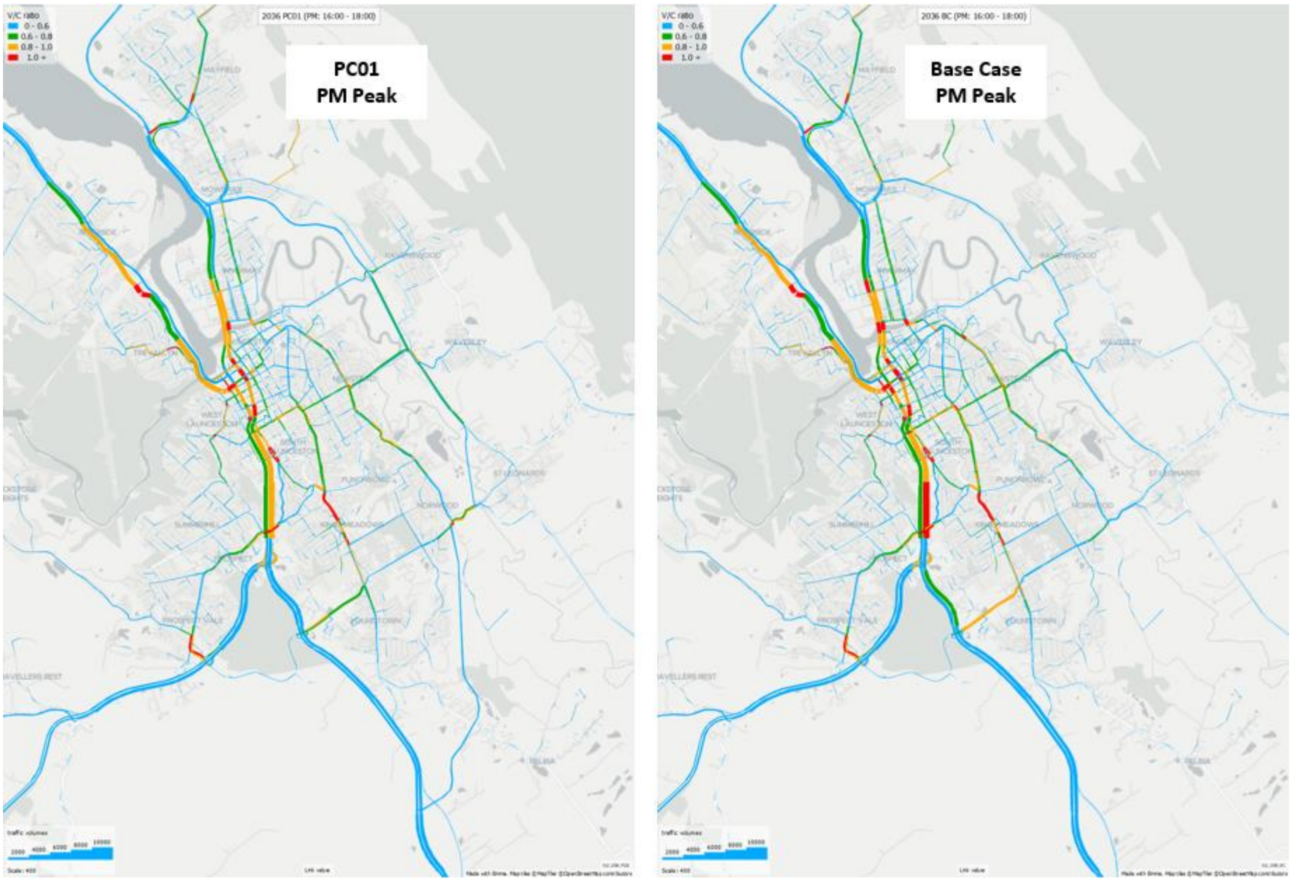

Figure 17: Volume capacity ratio – PC01 and base case

6.2.15 PC02 - Northern bypass

For PC02 with the Northern Bypass only, the Northern Alignment is expected to experience V/C ratios less than 0.6 and has a limited effect on the critical sections of the Midland Highway when compared to the Base Case.

Figure 18 compares the PM Peak V/C ratios for the PC02 and the Base Case.

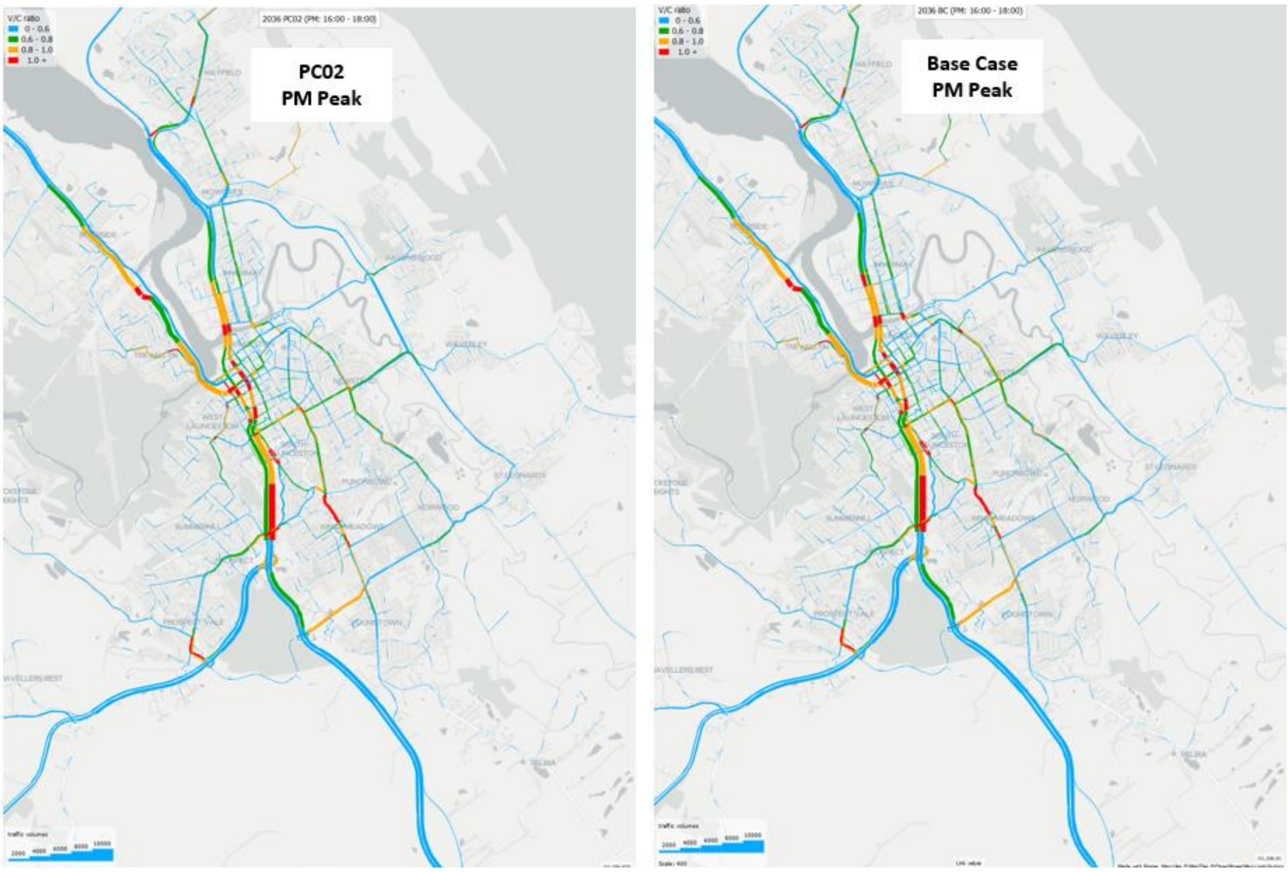

Figure 18: Volume capacity ratio – PC01 and base case

6.2.16 PC03 - Full alignment with bridge

For PC03, which has the full alignment with bridge across the Tamar River, the Launceston Bypass improves congestion by attracting traffic away from the Midland Highway. Additionally, the model suggests that the bridge between the East and West Tamar Highway would be well utilized, presenting a V/C ratio in excess of 0.8. It is also noted congestion is reduced on the West Tamar Highway.

Figure 19 compares the PM Peak V/C ratios for the PC03 and the Base Case

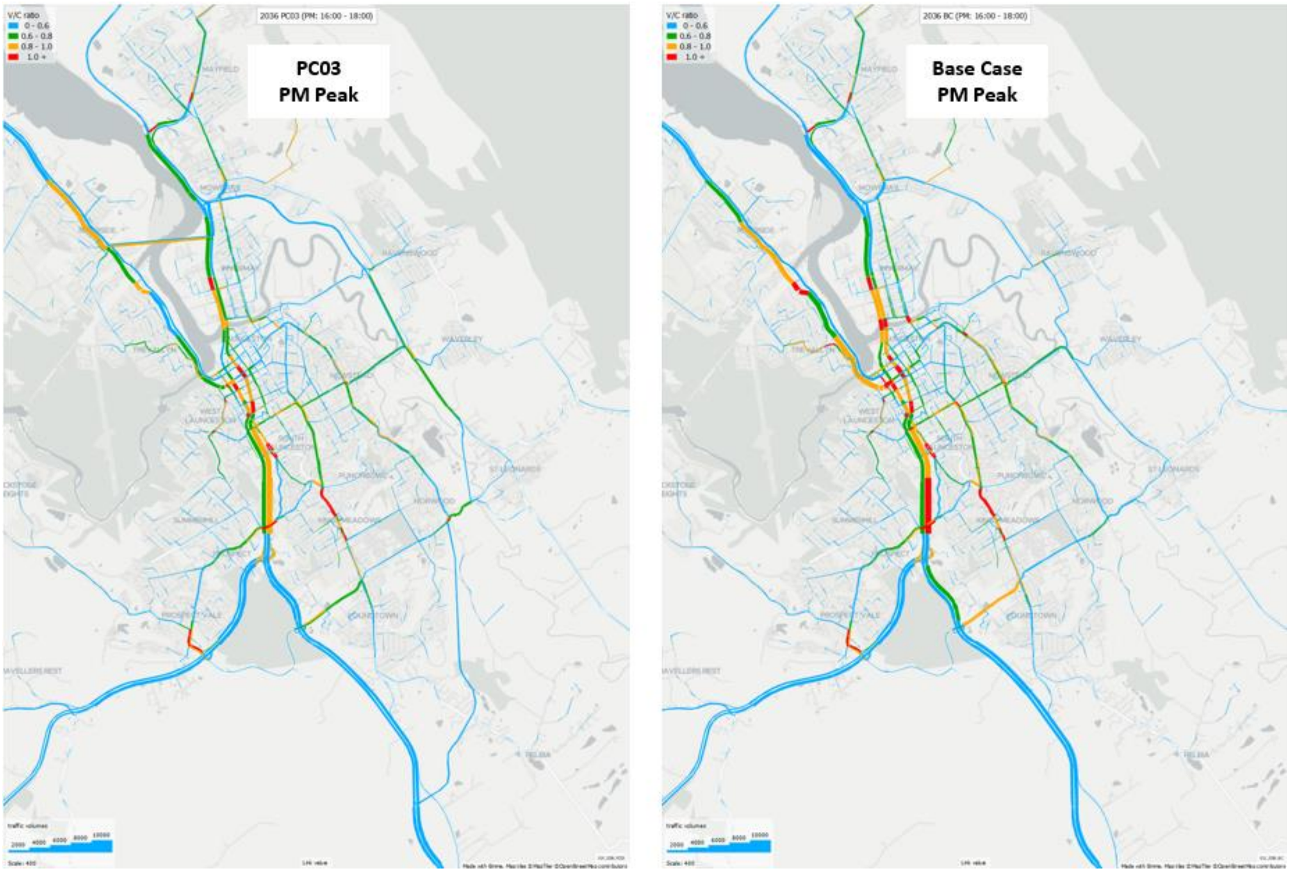

Figure 19: Volume capacity ratio – PC01 and base case

6.2.17 PC04 – Short northern alignment

For PC04 with the short Northern alignment between Hoblers Bridge Road and Henry Street the new road does not provide significant relief to the existing network.

Figure 20 compares the PM Peak V/C ratios for the PC04 and the Base Case

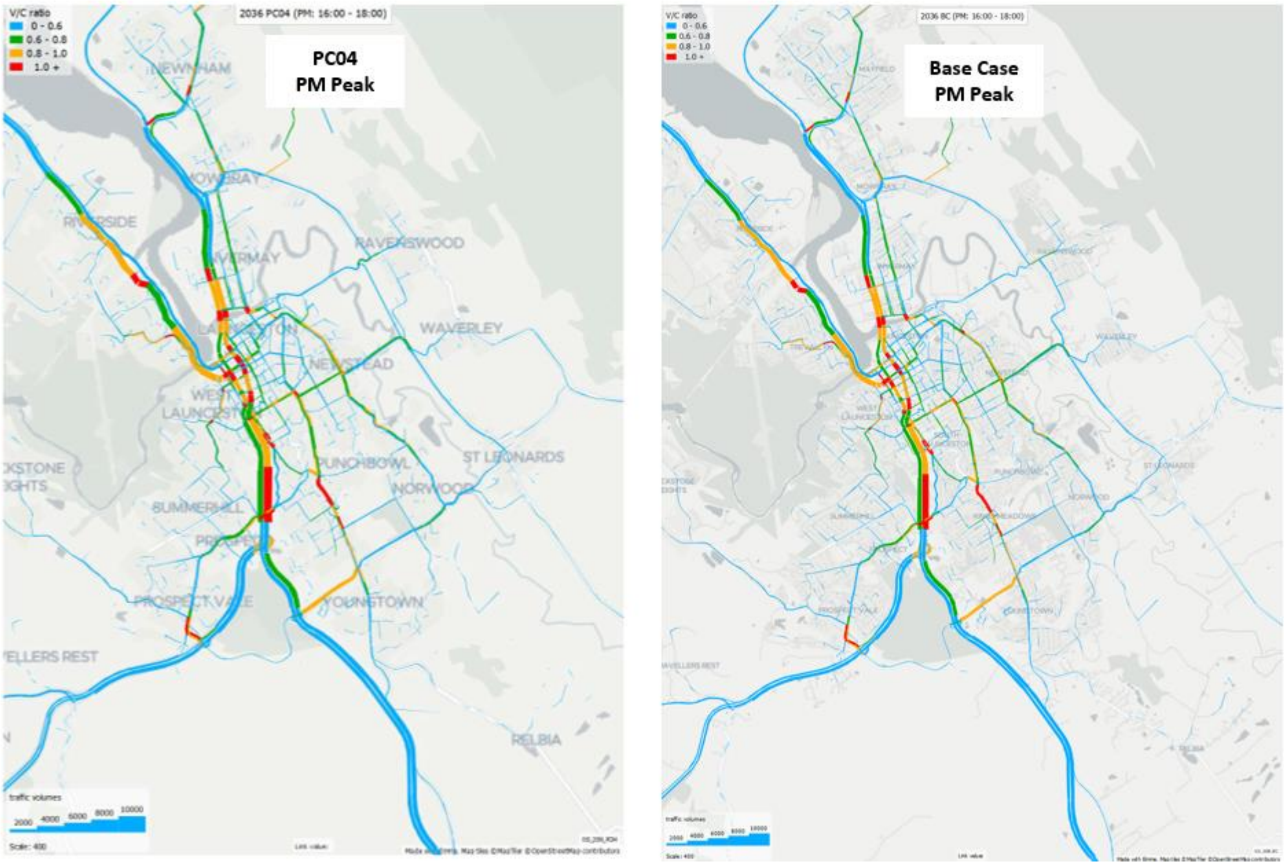

Figure 20: Volume capacity ratio – PC01 and base case

6.2.18 Level of Service

The Volume Capacity Ratios can be correlated to a Level of Service which relates to the traffic service quality to a given flow rate of traffic. The level of service divides the quality of traffic into six levels ranging from Level A (V/C < 0.35) to level F (V/C >1.0). Level A represents the best quality of traffic where there is typically less than 10 second delays at signalised intersections and the driver has freedom to drive with free flow speed. Level F, where delays are likely to exceed 80 seconds at signalised intersections, represents the worst quality of traffic.

Table 2 summarises the Level of Service during the PM peak. The table shows there are poorer levels of service in the Wellington Street/Bathurst Street and East Tamar Highways sections of the existing route. The modelling shows there would be improved levels of service in these sections of the existing route if both the northern and southern alignments were constructed. However, there is little improvement in the level of service if the northern alignment only was constructed.

Table 2: Level of Service in PM peak

	Base Case	PC01	PC02	PC03	PC04
Midland Highway – South of Bass Highway	B	B	B	B	B
Wellington Street/Bathurst Street	D - E	C	D - E	C	D - E
East Tamar Highway	D - E	C	D	C	D - E
Northern Alignment Bypass North End		A	A	A	
Northern Alignment Bypass South End		B - C	A	B - C	A
Southern Alignment Bypass North End		B - C		B - C	
Southern Alignment Bypass South End		A		A	
Elphin Road	C	B	C	B	C
Hoblers Bridge Road	C	C	C	C	C
Quarantine Road	C	A	C	A	C
Vermont and Ravenswood Roads	A	A	A	A	A

6.2.19 Select Link Analysis

A Select Link Analysis (SLA) was conducted to determine the usage of trips on the bypass from their origin to their destination which can assist in understanding the types of users for the new Launceston Bypass. A SLA is able to determine the usage of trips on the bypass from their origin to their destination which can assist in understanding the types of users for the new link.

The distribution of origins and destinations suggests that the Launceston bypass is not an attractive option for longer distance trips. For these trips the modelling shows the existing route along the East Tamar Highway and Midland Highway will still be preferentially used. Intuitively the modelling seems correct because the existing route is shorter than the bypass option.

6.2.20 Northern alignment

Figure 21 shows the location and distribution of the origins (shown in blue) and the location and distribution of the destinations (shown in brown) for vehicles that travel southbound on the Launceston Bypass between Henry Street and Hoblers Bridge Road.

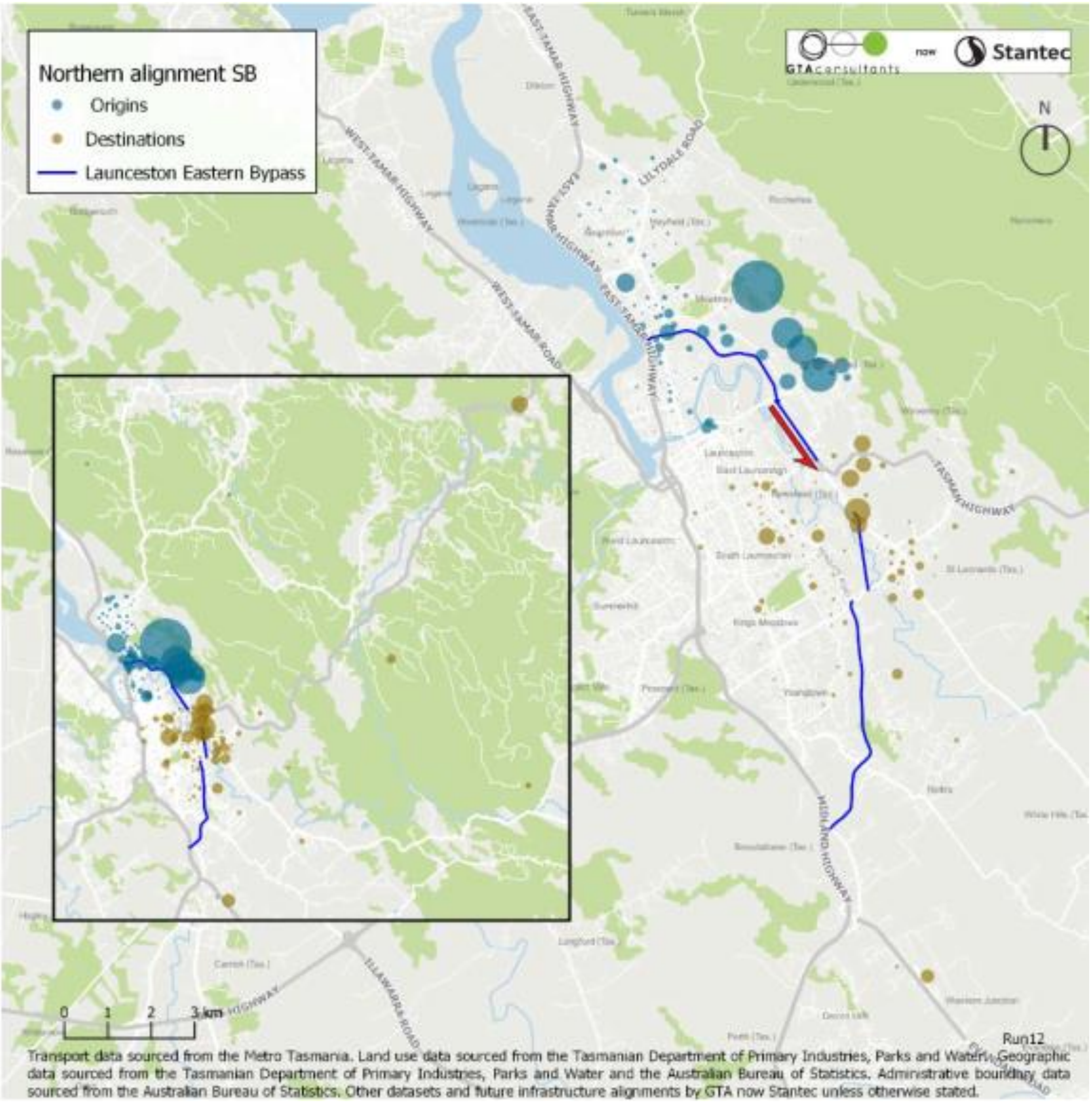

Figure 21: Northern alignment southbound - Origin and destination

The model suggests that the Launceston bypass serves a localised catchment with most of the origins in Ravenswood and Mowbray, along Vermont Road, and some from Newnham and Mayfield. Destinations are clustered along St Leonards Road and Penquite Road.

6.2.21 Southern alignment

Figure 22 shows the location and distribution of the origins (shown in blue) and the location and distribution of the destinations (shown in brown) for vehicles that travel southbound on the Launceston bypass between Johnston Road and Midland Highway.

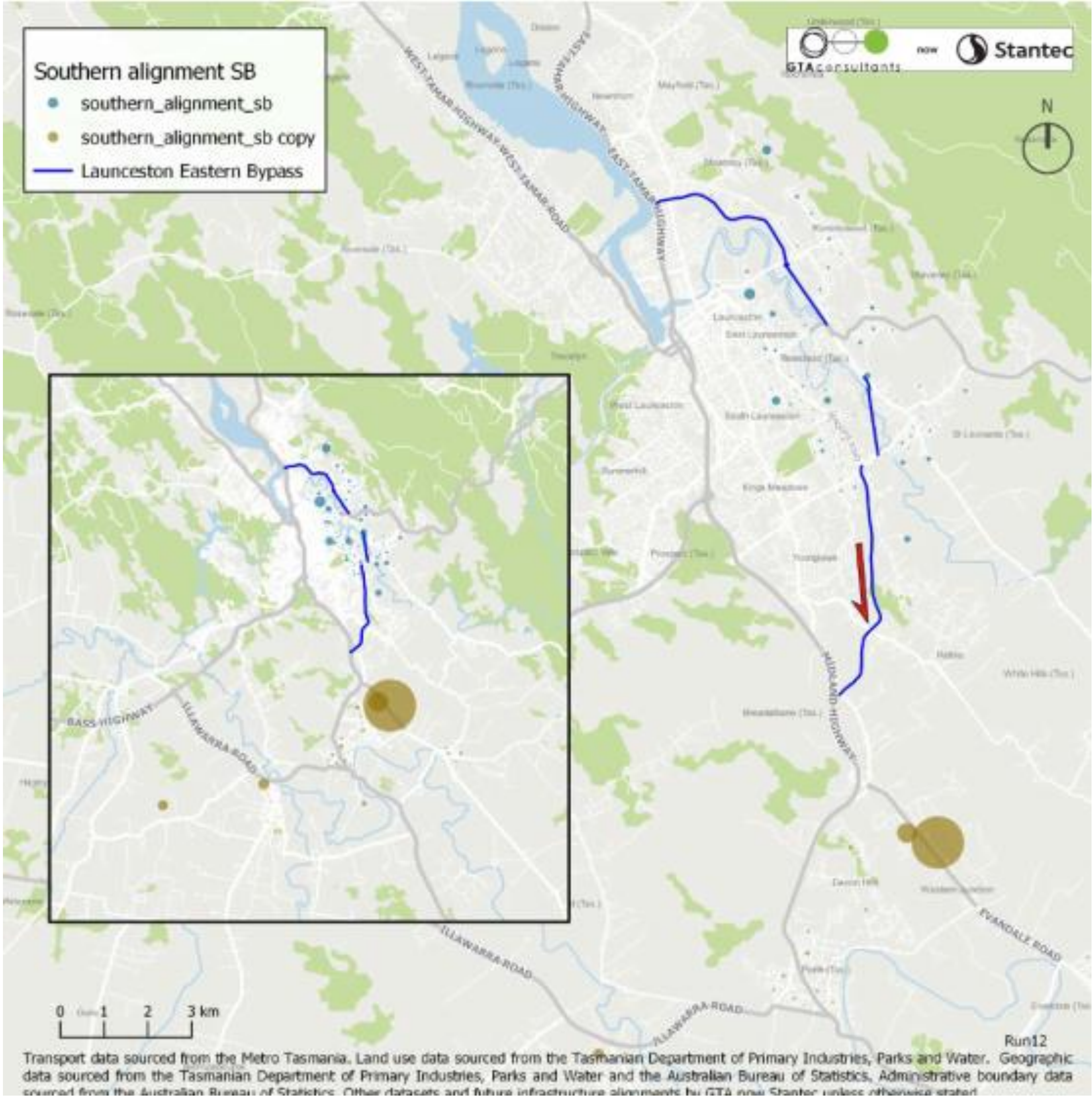

Figure 22: Southern alignment - Origin and destination

The Launceston bypass southern section also shows a localised catchment with very few trips travelling along the full length of the bypass, even though the distances of these trips are longer. Origins are scattered along the bypass north of Johnston Road while destinations are mostly clustered around Western Junction, Perth, and Longford.

7. Engineering, environmental, and economic assessment

In order to determine the issues and constraints associated with the proposed alignment of the southern section, pitt&sherry arranged for the following desktop assessments to be undertaken:

- flood modelling
- geotechnical assessment
- statutory planning
- heritage investigations
- ecological investigations
- project costs
- Cost Benefit Assessment.

7.1 Flood modelling

For both options the proposed southern alignment passes through the North Esk River floodplain between Johnston Road and St Leonards Road, directly downstream of the Johnston Road Bridge. The flood impact assessment identified several risks and issues associated with placing a road embankment within the flood plain.

- The construction of a new road within the flood affected area does have the potential to change flood behaviour. The proposed bypass would separate part of the flood plain from the main channel, essentially removing flood storage and flood conveyance. This results in a major increase in flood level on the river side of the bypass which would reduce the level of service of Johnston Road and raise the flood level on some properties adjacent to the North Esk River.
- For the scenario assessed a water level increase in excess of 500mm is likely for the 1% AEP event for areas upstream of the proposed bypass.
- There are three road bridges that cross the North Esk River at Launceston. These are:
    - Henry Street Bridge
    - Hoblers Road Bridge
    - Johnston Road Bridge.
- Both the Henry Street Bridge and the Hoblers Street bridge are frequently overtopped during flood events. Of the three bridges, Johnston Road has the greatest level of service. If the level of service of the Johnston Road bridge is reduced, east /west access in Launceston will be impacted in a major flood event.
- Several bridge or culvert openings would be required in the bypass to ensure there is not unacceptable flood impact on Johnston Road and the floodplain. For the assessment undertaken for this feasibility study, a nominal single 80m bridge opening has been modelled (approximately matching the opening of Johnson Road Bridge). Figure 23 shows there would be a substantial increase in the flood level at Johnson Road under this scenario.
- If the project proceeds to the next stage of design, the impact of flooding will need to be investigated in more detail. It is possible an alternative road alignment with additional openings may be required to ensure the impacts of the bypass satisfy the Launceston Flood Authority.

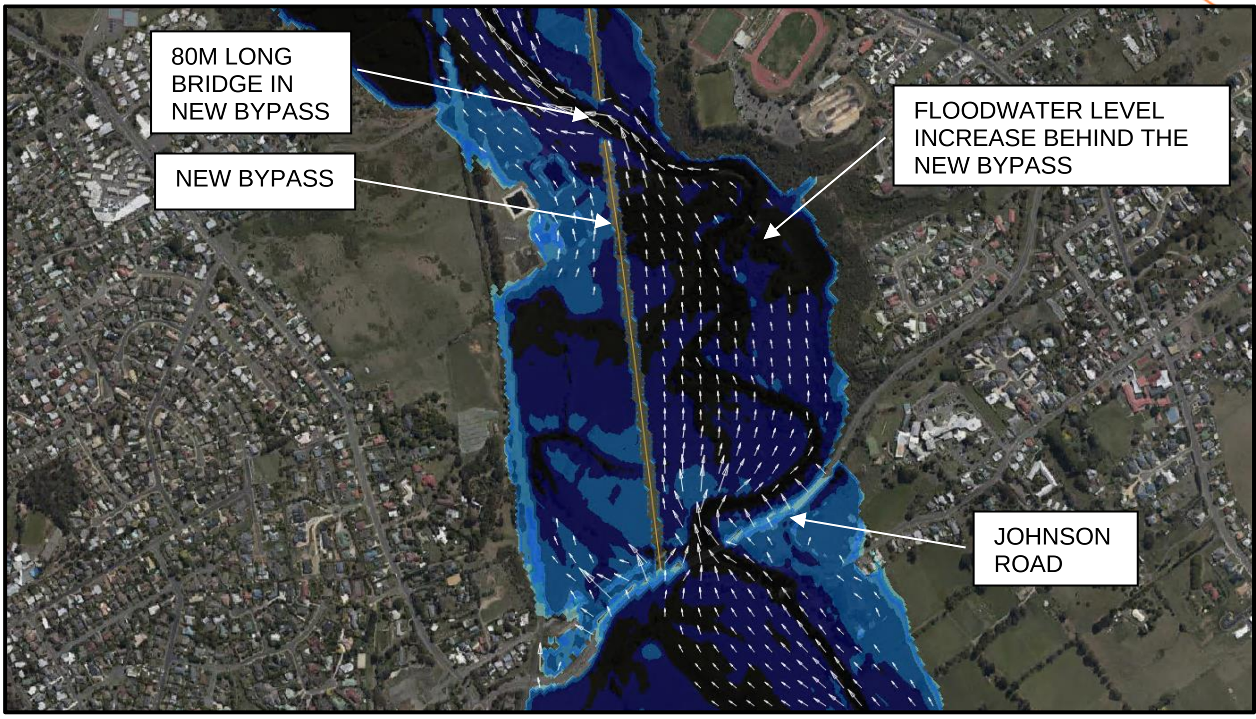

Figure 23: Effect of southern alignment on flood levels at Johnson Road

The assessment suggests that it may not be economical to construct the bypass without any water level increase upstream. Options such as optimisation of the proposed alignment to ensure the maximum amount of flood conveyance area and flood storage is retained could assist with the feasibility of the alignment.

A further review of the alignment and its effect on flooding at Johnson Road will need to be assessed in more detail if the project progresses to the next stage of design as any impact on Launceston's current 1 in 200 year flood level or area would likely result in the Launceston Flood Authority not agreeing to the proposed development.

7.2 Geotechnical assessment

The dominating geology along the route of the proposed bypass are potentially unstable colluvial (slope wash) soils and compressible alluvial soils in the flood plain of North Esk River.

The terrain is generally undulating with open slopes in the southern section and flat areas in the flood plain in the northern section. Each alignment will require hillside cuts, fill embankments, bridge flyovers as well as embankments in flood plain areas.

There are several geotechnical risks which need to be managed through the project life cycle. The key geotechnical risks are as follows.

- Construction of fill embankments over poor ground leading to excessive settlement, property damage and/or embankment failure particularly in the floodplain around the North Esk River between Johnston Road and the industrial area west of St Leonards Road where alluvial depths may exceed 20m. Any embankments required as part of the road construction will cause consolidation of these soils over a protracted period. With such soil conditions special construction techniques are often required, such as preloading of the ground or use of light weight fill.
- High groundwater levels in colluvial soils and in cuts in rock.
- Earthworks in medium to high landslip hazard areas reactivating landslips.

- Requirement for blasting in very high to extremely high strength rock leading to property damage.
- Potential Acid Sulphate soils exposure resulting in negative environmental impact and increased construction costs.

A geotechnical risk management plan was developed with suggested mitigation strategies to manage risk during the project lifecycle.

It is expected that the majority of the risks can be managed to an acceptable level during the design phases with no unreasonable risks being transferred to construction phase.

7.3 Statutory planning

The planning advice identified the proposed alignment for the Launceston Eastern Bypass is located on land which is currently subject to the provisions of the:

- Launceston Interim Planning Scheme 2015
- Northern Midlands Interim Planning Scheme 2013.

It is noted the City of Launceston Council and Northern Midlands Council are currently transitioning to the Tasmanian Planning Scheme (TPS). Under the current schemes the proposed alignment would be located in a wide range of planning zones in which the proposed bypass would be considered to be a discretionary use.

The planning advice identified there would be a number of significant planning issues that would need to be considered if the project progresses to the next stage of design. The following investigations would need to be undertaken.

- A desktop assessment of potentially contaminated land to determine if a Land Contamination Report is required to address the Potentially Contaminated Land Code.
- A Landslip Risk Assessment to address the Landslide Code.
- A Traffic Impact Assessment to address the Road and Railway Assets Code.
- A Hydrology Design report to address the:
    - Flood Prone Areas Code
    - Water Quality Code
    - Clause E16.7.2 of the Invermay/Inveresk Flood Inundation Area Code (if Council consider the road a structure).
- A Scenic Values Impact Assessment to address the Scenic Management Code.
- A Flora and Fauna Assessment to address the Biodiversity Code and Water Quality Code.
- An Aboriginal Heritage Impact Assessment to inform design and determine if a permit is required under the Aboriginal Heritage Act 1975.
- A review of the future Tasmanian Planning Scheme.
- A Stakeholder Engagement Strategy to ensure the various landowners can receive appropriate levels of engagement in a timely manner. It is likely many stakeholders will be concerned with the bypass intersecting their properties and impacting on prime agricultural land.

7.4 Heritage investigations

pitt&sherry engaged Cultural Heritage Management Australia (CHMA) to prepare a desktop Aboriginal and Historic Heritage Report for the proposed Launceston Eastern Bypass. The outcomes of their report is summarised in the following section.

7.4.1 Aboriginal heritage

The Aboriginal Heritage Register shows there are a total of 25 registered Aboriginal sites located within an approximate 5km radius of the study area. None of these sites are situated within the study area corridor. The closest registered Aboriginal heritage sites are located around 200m to the west of the preferred bypass corridor. A more detailed Aboriginal study would need to be undertaken if the project progresses to the next stage of design.

7.4.2 Historic heritage

A search of the various historic heritage registers shows there are eight heritage places listed on the Tasmanian Heritage Register (THR) situated within a 200m radius of the preferred Launceston Eastern Bypass corridor. Two of these heritage listed places appear to be directly intersected by the proposed corridor. They are the Evandale to Launceston Water Scheme and Strathroy Bridge, Kerry Lodge Probation Station, Convict Quarries and Road. The potential impact of these heritage listed places would need to be further assessed if the project progresses to the next stage of design

7.5 Ecological investigations

pitt&sherry engaged North Barker to undertake a desktop and limited field-based investigations into the natural values which are likely to be present within the study area and includes their report details the likely assessment and approval pathways which may result from impacts to significant flora or fauna values. The outcomes of he North Barker report is summarised in the following section.

7.5.1 Vegetation

Vegetation within the study area is likely to comprise a mixture of native and modified vegetation types which includes native forests, moist non-forest environments, dry non-forest sites and modified lands. Of these broad classifications the following State-listed threatened vegetation types are likely to be present within study area:

- Eucalyptus amygdalina inland forest and woodland on Cainozic deposits
- Eucalyptus ovata forest and woodland
- Riparian Scrub
- Wetlands.

Further Federal-listed ecological communities also have potential to be present within the study area as follows:

- Lowland Native Grasslands of Tasmania
- Tasmanian forests and woodlands dominated by Eucalyptus ovata (black gum) or E. brookeriana (Brookers gum).

There is a moderate to high likelihood of State-listed threatened vegetation being present within the study area. If such communities are present and cannot be avoided through the design process, the impacts and mitigation requirements will need to be addressed through development application permits under the relevant local planning schemes.

It has also been determined there is a low likelihood of Federal-listed vegetation within the study area, however if such vegetation is present within the study area and cannot be avoided, then an assessment of impacts and a referral under the EPBCA may be required.

Further ground-based assessments are required to definitively establish the presence or absence of threatened vegetation within the study area.

7.5.2 Threatened flora

Many threatened flora (including State & Federal-listed species) have been recorded within 5 km of the study area. Within the study area itself there is likely to be potential habitat for eight species which have a high likelihood of being present along with a further 34 species which have a moderate potential of occurrence. All the 42 species with moderate to high potential of occurrence are recognised as threatened under the Tasmanian Threatened Species Protection Act 1995 whilst two (*Epacris exserta* and *Dianella amoena)* are recognised under the Federal Environment Protection and Biodiversity Conservation Act 1999.

Further ground-based assessments are required to definitively establish the presence or absence of threatened flora within the study area. Future surveys will need to factor in the optimal survey times for different threatened flora species which may include periods of Spring, Summer & Autumn.

7.5.3 Threatened fauna

There is a moderate to high potential of elements of foraging, nesting or denning habitat being present within the study area for a total of 12 threatened fauna species. This includes four birds, four mammals, two reptiles, one amphibian and one fish species. Most of these species are listed under the TSPA and eight are also listed under the EPBCA including the following key species with the potential to have important habitat within the study area:

- Wedge-tailed Eagle
- Australasian Bittern
- Green and Gold Frog; and
- Australian Grayling.

Further ground-based assessments of habitat presence and condition for these species is warranted. Where a significant impact to habitats and populations of these species cannot be avoided through design, then an assessment of impacts and a referral under the EPBCA may be required. Application of the Department of State Growth's Green & Gold Frog Management Guideline may also be required.

7.5.4 Weeds

Numerous declared weeds and weeds of national significance are likely to be present within the study area with 43 weed species recorded on the NVA within 5 km. Further ground-based assessments are required to establish the presence and distribution of weed species. Weed within the study are unlikely to influence design considerations for a potential bypass but will require weed management planning and mitigation during construction.

7.6 Project costs

The following table summarises the cost estimates, which include a 30% contingency. The base year of the estimate is 2021 with an allowance for 3 years of cost escalation at 3% per annum.

Table 3: Cost estimates

	Total Cost Estimate
Southern Alignment from Hobart Road (Option 1)	$97,400,000
Southern Alignment from Breadalbane (Option 2)	$98,300,000
Northern Alignment	$59,400,000
Hoblers Bridge Road to Henry Street only	$10,000,000[8]

Table 4 lists the cost estimate for the modelled options. Note PC03 is not listed as the construction of the bridge is not in the scope of this study.

Table 4: Cost estimated for modelled options

	Total Cost Estimate
PC 01 – Northern and Southern Alignment	$156,800,000
PC 02 – Northern Alignment only	$ 59,400,000
PC 04 - Hoblers Bridge Road to Henry Street only	$ 10,000,000

7.7 Cost benefit assessment

pitt&sherry engaged Mark Johnson of 2XF Advice to undertake a rapid cost-benefit analysis of the four options. A copy of the 2XF report is summarised in the following section.

Cost-Benefit Analysis (CBA) has been used to compare the benefits and costs of each option (project cases) against a base case of continuing to rely on current infrastructure. The economic assessment recommended:

- the three major bypass options are rated as weak in the economic element of the bypass feasibility study
- the Hoblers Bridge-Henry St link be considered an economically borderline project.

7.7.1 Cost benefit analysis – Summary results

In Table 5 the Net Present Values were calculated using the project costs nominated in Table 1 for standard impacts such as vehicle operating cost savings, time savings, safety impacts and environmental

[8] Note that the short Northern Alignment - Hoblers Bridge Road to Henry Street option was identified late in the project as a potential low-cost alternative, and the cost estimate has been assumed to be of the order of $10,000,000 based on comparison with the Northern Alignment estimated cost. Should this option be identified for further development, it would be important to confirm this cost estimate.

impacts in the form of carbon emissions.

Table 5: Summary results – Net present values, standard benefits only

Option	NPV $ at 4% Discount Rate	NPV $ at 2% Discount Rate
Full Bypass from Breadalbane	-151.9 million	-150.1 million
Full Bypass from Hobart Rd	-150.6 million	-148.7 million
Northern Only bypass	-52.2 million	-49.9 million
Hoblers Bridge Henry St link only	-2.2 million	0.2 million

The NPV values determined in Table 4 were used to determine the Benefit Cost Ratios (BCR) in Table 6. A project should typically achieve a BCR close to, or over, 1 (or a positive NPV) based on standard benefits to warrant further consideration.

Table 6: Summary result – Benefit cost ratios, standard benefits only

Option	BCR at 4% Discount Rate	BCR at 2% Discount Rate
Full Bypass from Breadalbane	0.04	0.05
Full Bypass from Hobart Rd	0.04	0.05
Northern Only bypass	0.1	0.2
Hoblers Bridge Henry St link only	0.8	1.0

A further assessment was carried out considering wider benefits, such as output change in markets and increased tax revenue and other benefits such as transport infrastructure resilience. The resulting BCRs from this assessment is provide in Table 7.

Table 7: Benefit cost ratios, all benefits

Option	BCR at 4% Discount Rate	BCR at 2% Discount Rate
Full Bypass from Breadalbane	0.4	0.5
Full Bypass from Hobart Rd	0.4	0.6
Northern Only bypass	0.7	0.9
Hoblers Bridge Henry St link only	1.9	2.5

The standard impacts included in the summary results in Table 5 and Table 6 are vehicle operating cost savings, time savings, safety impacts and environmental impacts in the form of carbon emissions.

Additional benefits included in the results shown in Table 7 are:

- wider Economic Benefits – output change in markets and increased tax revenue
- other benefits – transport infrastructure resilience.

These are the categories of benefit used in the Australian Transport Assessment Planning Guidelines.

Comment on summary results

The three major bypass options are weak projects when assessed on economic grounds.

For example, using a very low 2% discount rate, the Benefit Cost Ratio (BCR) for the full bypass options only return around 5 cents in direct benefits for every dollar spent on new infrastructure. The Net Present Values (NPV) shows, using another indicator, that costs greatly outweigh benefits.

For the Hoblers Bridge-Henry Street link the BCR is 0.8 at 4% discount rate and 1.0 at 2% discount rate for the standard benefit assessment, which are are not particularly strong results. However, when all benefits are included, the BCR is positive, ie the project may return total benefits greater than the amount spent to construct it. Sometimes such borderline projects might be warranted if there will be clear benefits to road users and the surrounding community. However, because the BCR is reliant on the wider benefits it may be difficult to argue these benefits are sufficiently strong. As noted above, the assumed cost estimate for this option would require further refinement if any further development of the option is to be considered.

The failure of the large-scale bypass options to achieve a net economic benefit is due to the following.

- The combination of the relatively high capital cost of the infrastructure and the achievement of only low (or negative) benefits.
- Traffic modelling indicated that the time savings and vehicle operating benefits are positive but very minor. This translates to very minor economic gain.
- The safety impact of all 4 options is negative because the project cases divert traffic onto slightly longer and higher speed routes. The net effect indicated by the traffic modelling is a very minor increase in crash rates. Therefore safety is not a benefit of the proposed projects.
- There is also a minor increase in carbon emissions under all options. This is again due to the increase in distance travelled which is not offset by any significant reduction in idling time.

8. Multi criteria assessment

8.1 Workshop

Following the completion of the engineering, environmental and economic assessments a multi criteria assessment workshop was held to evaluate the Launceston Bypass alignment options. The attendees at the workshop included representatives from:

- Northern Midlands Council
- City of Launceston
- Tasmanian Transport Authority
- Tasmanian Transport Council
- Department of State Growth.
- 2XF
- pitt&sherry

RACT, Tamar Bicycle Users Group and the Launceston Chamber of Commerce were invited but did not attend the workshop.

8.2 Evaluation methodology and criteria

A multi criteria assessment process using a pair-wise assessment of evaluation criteria was undertaken. The results of the evaluation, including a discussion on the results of sensitivity tests for the evaluation, are presented below.

8.2.1 Evaluation criteria

Evaluation criteria were formulated based on the criteria developed in the ILM workshop and further refined by the study team. The chosen evaluation criteria were:

- travel time reliability
- community acceptance
- enhanced safety for vehicles, pedestrians and cyclists
- increased liveability and urban amenity
- Environmental and Aboriginal and Historic Heritage
- constructability.

For each evaluation criteria a range of sub criteria items were developed as shown in Table 8.

Table 8: MCA evaluation criteria and sub criteria

Criteria	Sub-criteria
Travel time reliability	Point-to-point travel time Network reliability Connectivity to other freight routes Ability to accommodate future development
Community acceptance	Directly affected landowners (acquisition) Noise impacts Local Businesses Other stakeholders
Enhanced safety for vehicles, pedestrians and cyclists	Reduced road fatalities and serious accidents Increased vehicle safety Safety for cyclists Increased active transport mode share Connectivity for cyclists and pedestrians
Increased liveability and urban amenity	Reduced freight mode share on existing roads Heavy Vehicle usability Improves first and last mile issues Facilitates growth corridors
Environmental and Aboriginal and Historic Heritage	Prevention of impacts on Aboriginal & European Heritage sites Prevention of adverse environmental impacts Approval complexity
Constructability	Cost including allowances for: • Extent of public utility relocations; and • Traffic management requirements.

8.2.2 Pair-wise criteria weighting

The first stage of a Multi-criteria Assessment (MCA) is a pair-wise comparison of criteria to generate weighted criteria.

The pair-wise comparison technique compares each of the criteria against each other sequentially in pairs and the most important was agreed by consensus by the workshop attendees. For example, criterion A is compared against criterion B in terms of which criterion is "preferred" over the other one and the preferred criterion is nominated in the table, which in this case was Criteria B. A value of "X" is used if the two are considered to be of equal value.

The pair-wise matrix information is then summed to determine the total number of occurrences of "A" through to "F". For cases where the value of each criteria comparison results in an equal comparison, for example, A=B, then in this case each criterion will receive ½ point. The resultant criterion weightings are presented in Table 9.

Table 9: MCA evaluation criteria and weighting

Criteria	Weighting
Travel time reliability	14%
Community acceptance	19%
Enhanced safety for vehicles, pedestrians and cyclists	8%
Increased liveability and urban amenity	25%
Environmental and Aboriginal and Historic Heritage	31%
Constructability	3%

8.3 Option assessment

The final step in the evaluation process is the scoring of each criterion in terms of a rating for each option. The options assessed at the MCA workshop were:

1. Base Case
2. Option 1 – Northern Alignment only
3. Option 2 – Northern and Southern Alignment together
4. Option 3 - Hoblers Bridge to Henry Street only.

The scores used in the evaluation were based on the following:

- 10 = Exceeds project objectives
- 7 = Meets project objectives
- 5 = Partially satisfies project objectives
- 3 = Fails to meet project objectives
- 0 = Works against project objectives.

The resultant scores are provided in Table 10.

Table 10: MCA evaluation scores

Option Number	Description	Score
0	Base Case	63.9
1	Northern Alignment only	52.2
2	Northern and Southern Alignment together	46.1
3	Hoblers Bridge to Henry Street only	56.4

This MCA scoring shows that the preferred option is the current Base Case followed by Hoblers Bridge to Henry Street only option. The combined Northern and Southern Alignment option was the least preferred by a significant margin.

9. Conclusions

This study identified the following.

- The proposal for a new bypass is not aligned with the relevant state and regional strategies and those of the City of Launceston of sustainable economic development, improved liveability with greater integration of transport with economic and land use planning.
- The traffic modelling shows a bypass is not an attractive option for longer distance trips which maintain the same travel path as the existing route along the East Tamar and Midland Highways. The southern and northern bypasses would serve quite distinct and separate catchments to each other and mostly benefit a localised network.
- The study has not demonstrated any significant improvements to active transport or reduction of traffic accidents.
- The proposed bypass would separate part of the North Esk flood plain from the main channel with the potential to increase the flood levels on the river side of the bypass. The bypass would require several bridge or culvert openings to ensure much of the floodplain is useable.
- The construction of fill embankments over poor ground in the floodplain is likely lead to ongoing consolidation of the alluvial soils over a protracted period.
- The cost benefit analysis rated the major bypass options as having weak economic feasibility.
- The MCA scoring identified the preferred option is the current Base Case followed by Hoblers Bridge to Henry Street only option.

Based on feedback from stakeholders, it is apparent that the current freight handling facility located close to the centre of Launceston conflicts with the long term transport strategies of the State Government and the City of Launceston as:

- there are inefficiencies in the road based regional freight task with the requirement for heavy trucks to use local roads to access the existing freight handling facility
- there are inefficiencies with the intermodal freight task located in central Launceston when compared with other similar facilities in southern and north-western Tasmania
- the relatively high use of large freight vehicles in central Launceston negatively affects the liveability and amenity of the city.

Based on the findings above, it is recommended:

- none of the bypass options warrant progression to Stage 2 of the feasibility assessment.
- a further study is warranted to investigate options of locating the primary freight handling facility to outside of central Launceston.

Launceston Eastern Bypass Feasibility Study

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