



An Australian Government Initiative



Regional
Development
Australia

TROPICAL NORTH

Tablelands Access Options

Technical Analysis

Cairns – Kuranda Corridor

May 2026



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Website: <https://www.rdatropicalnorth.org.au/our-projects/> (Access to the Atherton Tablelands)

Version 9 – May 2026

Glossary & Acronyms

Abbreviation	Description
AADT	Average Annual Daily Traffic. Used generally for rural roads. Urban capacity is usually conducted at 15 minute intervals due to wide variation in congestion volumes. KKR is a commuting route and determination of capacity is better determined through parametric traffic modelling which simulates the time sensitive vehicle movements.
CV	Commercial Vehicle
AECOM	AECOM is a multinational engineering and technical professional services firm
ARRB	Australian Road Research Board
CBRC	Queensland Cabinet and Budget Review Committee
Cummings	Cummings Economics (Reports and route modifications by Mr Bill Cummings and Mr Andrew Cummings)
EPBC	Environment Protection and Biodiversity Conservation Act. A Commonwealth Act.
FEV	Freight Efficient Vehicle. This includes any vehicle larger than a semi-trailer and includes vehicles configured to reduce or spread wheel loads over a larger pavement area resulting in less wear and tear. B-double and B-triple vehicles comply.
FNQ	Far North Queensland
GHD	GHD is an employee-owned multi-national technical professional services firm
KKR	Kuranda Range Road (Local name for the section between Smithfield and Kuranda. Part of the Kennedy Highway between Cairns and Mareeba State Roads No. 32A)
RDATN	Regional Development Australia Tropical North
TMR	Queensland Department of Transport and Main Roads
TRARR	“Traffic on Rural Roads”. A traffic model development by the Australian Road Research Board (ARRB).
WTMA	Wet Tropics Management Authority
WTWHA	Wet Tropics World Heritage Area

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1. PURPOSE

This publication is intended to provide Regional Development Australia Tropical North Inc (RDATN) with a factual appraisal of proposed alternative access to the Atherton Tablelands from Cairns including:

1. Previous studies
2. Current alternate solutions
3. Government position, where public

The route options included in this publication are:

Existing Routes; (Figure 1)

- Mossman - Mt Molloy Road (Rex Range)
- Quaid Road (Not currently used or designated a public road)
- Kuranda Range Road (KKR) (subject to a proposed realignment and widening to four (4) lanes in 2004)
- Gillies Range Road
- Palmerston Highway

Alternate Routes proposed by various Proponents; (Figure 2)

- Saddle Route (Brett Duck proposal)
- May's tunnel and Smith's Surface Route (Cummings refinement of alignment)
- Redcliffe Route
- Katter's Bridle Tunnel and Surface Route

While all of the above routes are assessed, the focus of this publication is on the technical viability of the Proposed Alternate Routes in comparison with the Kuranda Range 2004 proposal. This publication does not canvass any other possible routes. The publication includes an explanation of the technical rules governing the design of roads and tunnels in Queensland and any impact on costing.

The public conversation to date has been lacking any rigorous attention to design standards or cost implications.

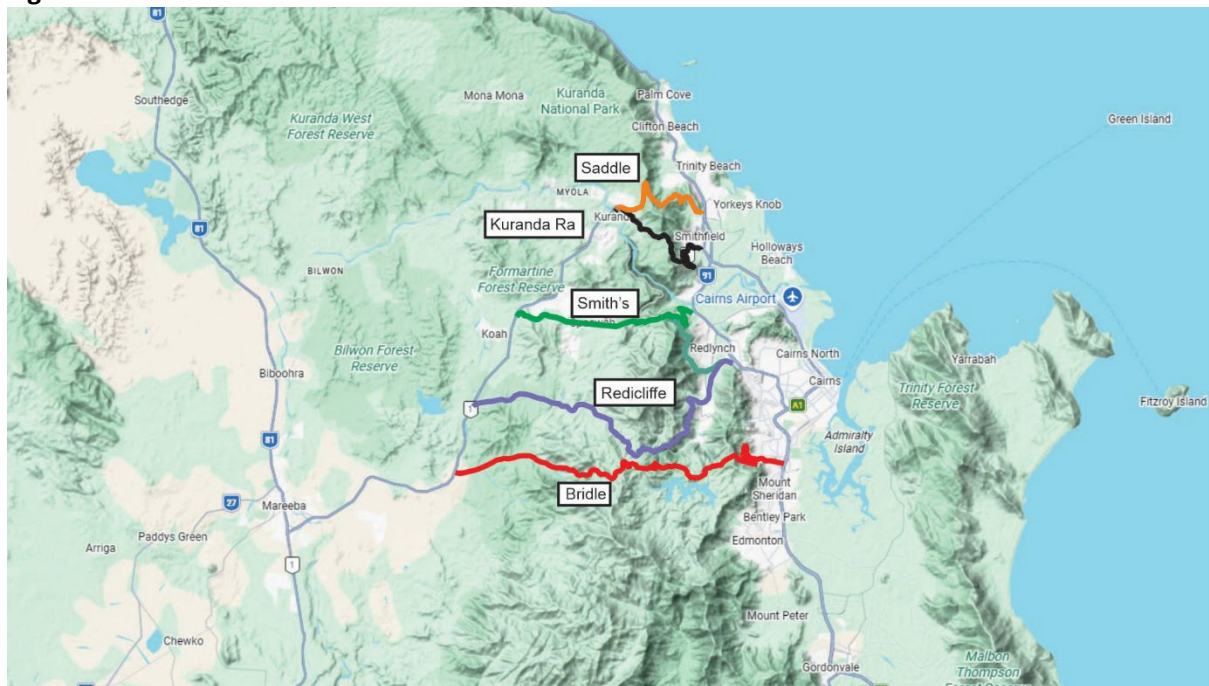


Figure 1 - Transport Networks



Source: Cairns to Northern Tablelands Access Strategy July 2022 Queensland Department of Transport and Main Roads (modified to include Quaid Rd in the north and comments on range section in the south west Tablelands)

Figure 2 - Alternate Routes to the current Kuranda corridor



IMPORTANT NOTICE / LIMITATIONS

This publication is not intended to provide a recommendation for action by RDATN. This publication, while available to the public via the RDATN website is not a policy document.

This publication has been prepared for RDATN. The publication is intended to be a high level technical analysis of issues surrounding road access options for an alternate route to the current Kuranda Range between Cairns and the Atherton Tablelands. Data included in this publication should not be relied upon for technical decisions or conclusions without independent verification. The publication is not subject to assurance or other standards and, consequently no opinions or conclusions intended to convey assurance have been expressed. RDATN does not make any representation or warranty as to the accuracy, completeness, reasonableness, or reliability of the information included (whether directly or by reference) in the publication, and/or the achievement or reasonableness of any plans, projections, forecasts, (whether express or implied) in the publication. The information provided in this publication is derived from generally publicly available information. We have not sought to independently verify those sources. Use of this publication does not constitute a valid reference for research or other reasons unless expressly permitted by RDATN. The routes shown are not intended to represent final alignments and may differ from what some proponents consider appropriate and are shown for comparison only.

The title of this publication refers to the Atherton Tableland which includes all of the Tablelands Regional Council and those areas of Mareeaba Shire west to Dimbulah.

Specifically, this publication does not address:

1. The broader aspects of servicing areas outside of the Tableland region such as the Etheridge area, the Gulf or Cape York Peninsula, though any alternate route will impact access to these areas.
2. Future economic or population growth. This will be an outcome from the new FNQ Regional plan, though it is likely to be disputed by some as not being sufficiently optimistic. This publication has canvassed whether there is evidence of economic decline on the Tablelands due to restraints resulting from limited accessibility of the Kuranda Range. The evidence for this

is not obvious from the historical data and would need to be assessed through a rigorous economic analysis beyond the scope of this report.

3. The need for upgrading of the Kuranda Range other than for transport efficiency. The issues of liveability, health and education may be resolved through individual resident's preferences and are unlikely to be the sole reasons for an alternate route. Again, these issues will be considered by government in assessing the economic and social benefits of any alternate route.
4. The cost of alternate access. The cost of road building has escalated over the last few years, some of which is due to legislative changes to safe work practices, increased environmental compliance, some due to resource shortages including labour, as well as competition for major projects in other areas. Costs in the Cairns area for simple four-laning on level ground has cost around \$17 million per km. The Toowoomba Range bypass was \$39 million per km, completed in 2019. It is too difficult to assess the likely cost for an alternate route without significant design.

BACKGROUND

The wider Cairns Region comprises five (5) Local Government areas with contiguous population centres.

Coastal (East of Wet Tropics):

- Cairns Regional Council
- Cassowary Coast Regional Council
- Douglas Shire

Tablelands (West of Wet Tropics):

- Mareeba Shire
- Tablelands Regional Council

The coastal and tablelands areas with concentrated population total about 11,000sqkm. (Excludes the sparser dry country to the west in the Tablelands and Mareeba Local Government areas). This compares with the area of Greater Brisbane of 10,432sqkm (Brisbane, Gold Coast, Ipswich, Logan, Moreton Bay, Noosa, Redlands, Sunshine Coast).

These areas are currently connected by four (4) range road transport routes (from north to south):

1. Mossman-Mt Molloy Road (Rex Range)
2. Kennedy Highway (Kuranda Range)
3. Gillies Range Road
4. Palmerston Highway

In addition, internal range roads connect the Millaa Millaa area to Ravenshoe (East Evelyn Road) and Atherton to Ravenshoe (Crater section of the Kennedy Highway). The section of road between Malanda and Millaa Millaa is also severely restricted by hilly geography (slowing traffic), currently narrow, and with few overtaking opportunities. (See **Figure 1**)

Alternative routes to the Tablelands have been proposed by various proponents over a number of years and their background (routes from North to South) is described below. These and the existing routes are compared and summarised in **Table 6**.

Existing Routes

Of the existing routes, only the Quaid Road has been suggested as an option for an alternate route, with the current road Kuranda Range Road to be retained.

Quaid Road (Figure 1)

This road was proposed and constructed in 1989 by developer George Quaid with government approval. The 32km Quaid Road (or Southedge-Wangetti Road) is a private, two lane bitumen road connecting Wangetti on the coast (Captain Cook Highway) to a proposed rural subdivision north of Mareeba and adjacent to Lake Mitchell (also constructed by George Quaid). The road includes some uphill overtaking sections on steep sections.

Despite initial approvals, its construction became controversial due to the subsequent declaration of the area as a Wet Tropics World Heritage Area.

Its suitability as a permanent alternative for public access is affected by some steep grades and limited structural stability with steep batters. In addition, it adds significant distance to the route from Cairns to Mareeba. The proposed subdivision near Mareeba has not proceeded.

Alternate Routes

In early 2025 Bill Cummings and his son Andrew (Cummings Economics, referred to below as 'Cummings') prepared a series of amendments and some new deviations and these alignments are generally represented in this report though may deviate or differ from the original proposals.

The Saddle Route (Figure 2)

This route was proposed by Mr Brett Duck in 2021. The route is a two-lane downhill road with two flat or low gradient tunnels. This route requires the existing Kuranda Range to remain as an uphill two-lane route.

Investigations show that one of the tunnels may approach 13% gradient and would be too steep for cars let alone trucks. Further investigation would be required to validate Mr Duck's proposal.

Notwithstanding, the existing Kuranda Range, while safer as an uphill route only, would still require substantial works to remove the threat of environmental closures from landslips of vegetation blockage. Proposed as an uphill route only, this road may be less subject to crashes due to a lower speed.

In 2025, Cummings proposed a surface route to avoid tunnels and major bridging.

Smith's Route (Figure 2)

This route was originally proposed by Mr Lawrence May in 2020. The proposal was to construct a road from Speewah (west of Kuranda) to Kamerunga near the Barron River Bridge on the Cairns Western Arterial Road incorporating a six kilometre long tunnel (6.82% gradient).

In 2025, Cummings proposed a variety of surface options naming them as the Smith's Route options. Some of these originated near Speewah, an alternative deviation saw the western end begin near Davies Creek Bridge closer to Mareeba, while one deviated at the Cairns end to terminate at Brinsmead.

There was no indication by either May or Cummings that a four-lane road was proposed.

Redcliffe Route (Figure 2)

This route was proposed as a surface route by Ron Redcliffe and Duncan McInnes in early 2021 and supported by the Kuranda Range Bypass Committee. It commenced just north of Davies Creek Bridge on the Cairns to Mareeba road (Kennedy Hwy) headed due east then negotiated the coastal range following natural contours, exiting over Redlynch Valley and joining the Cairns Western Arterial Road near Tunnel Hill in Brinsmead.

It included overpasses of the Redlynch Valley Road and Freshwater Creek.

Bridle Track (Figure 2)

Federal Member for Kennedy Hon. Mr Bob Katter in a letter to various northern Councils in July 2025 advised that "For decades, since the days of former Minister Martin Tenni, this alternate connection has been proposed as the "Bridle Track extension."

This proposal surfaced from Mr Katter in early 2022. Originally reported as 16km of surface construction of the 'Bridle Track' and a 1 to 2km of tunnel, it was obvious that this was not long enough to reach the Bruce Highway south of Woree. Modifications were made over time to the alignment such that by mid-2024 it comprised a 20.4km route from Tichum Creek to the Bruce Highway near Woree including an approximately 1km tunnel on the eastern end. No design has been complete. It is assumed that a four-lane route is proposed.

In 2025, Cummings proposed a surface route to avoid tunnels and major bridging.

3. NEED

The perceived need for improved connectivity between the Coast and the Tablelands has always been to provide more efficient transport for the potential expansion in either the productive agricultural areas or an improved economic environment in the Cairns region and beyond, including addressing population forecasts and accessibility for the Far North Queensland region.

In the early days, and in the absence of good road access, the Kuranda Railway network provided this outlet and connected to the Port of Cairns when alternative road connections to either Townsville or further south did not exist.

The Palmerston Highway is the only current route designed and approved for Freight Efficient Vehicles (FEV) up to B-double class (25m long), though 23m B-doubles are permitted on the Rex Range for the sugar industry alone. The Palmerston Highway is therefore the preferred and only continuous FEV route to Cooktown and Cape York Peninsula particularly from areas immediately to the south of Cairns. It also offers an FEV route from Cairns to the Gulf, though roadtrains must 'break down' at Mt Garnet when coming from the southern inland to traverse the Tableland or proceed to Cooktown.

A more westerly route is available from Charters Towers or Hughenden to Mareeba via an inland route through Almaden. Some of this route is still unsealed. This route still requires road trains to 'break down' from Type 2 (3 trailers) to Type 1 (2 trailers) prior to Mareeba.

Transport from origins in the coastal south going to the Gulf of Carpentaria would travel more directly via Charters Towers through Julia Creek rather than the Palmerston Highway and the Gulf Developmental Road.

4. OBJECTIVES

The objectives for improvements to the Kuranda Range Road has always been:

- 1) to service the Tableland industries and allow faster and more efficient travel to Cairns itself as both a seaport/airport hub or as a service centre, and
- 2) to provide for more effective utilisation of transport through use of larger vehicles, to at least B-Double and provide greater economic benefits, and
- 3) to alleviate the traffic delays which occur through either:
 - environmental incidents such as tree fall or landslips
 - crashes due to
 - slippery road conditions,

- driver error in negotiating tight curves with steep superelevation,
- Instability of freight vehicles due to steep superelevation combined with steep grades.

Construction of an alternate route would need to satisfy these requirements while some would also reduce the travel distance between Cairns and Mareeba.

5. CONSTRAINTS

Constraints to transport improvements include:

- 1) Environment - "Wet Tropics", Environment Protection and Biodiversity Conservation Act (EPBC) and offsets. These all have financial impacts on any route selection and affect all of the current or proposed routes from the coast to the Tablelands. These issues require preservation of significant animal travel paths, vegetation connectivity, and indicates the preference for extensive use of bridging or tunnels.
- 2) Safety "Range road, steep winding" – all current routes suffer from excessive winding alignments, though the Palmerston Highway to a lesser extent. This reduces travel speeds for all users but especially for heavy transports. With steep roads, narrow pavement, no shoulders, no stopping places for breakdowns, it is difficult for emergency vehicles to access and turn around, while delaying traffic for extended periods.
- 3) Freight Efficiency – Narrow winding roads not allowing safety or adequate width to accommodate freight vehicles larger than a semi-trailer, noting that the Gillies Range Road, while allowing semi-trailers, is generally not wide enough to ensure vehicles stay in the designated lane on curves and significant encroachment over the opposing lane is recorded.

HISTORY

- 1) 1993 – Road Corridors Through The Wet Tropics – capacity estimated due to mountainous terrain and tight curves at 10,000 to 12,000 vehicles per day (vpd).
- 2) 1995 – Kuranda Range Links Study, GHD. First assessment of alternate transport corridors.
- 3) 1998 – Commencement of Integrated Transport Study (ITS) to support the Far North Queensland 2010 Regional Plan (2009 to 2031)
- 4) May 1999 – ITS Evaluation of Route Options - - investigated 14 surface and tunnel roads, and four (4) rail tunnel routes. This includes the Lake Morris/Davies Creek Route. (APPENDIX A)
- 5) Feb 2000 – Release of FNQ 2010 Regional Plan
- 6) Aug 2000 – ITS Impact Assessment Study released
- 7) Sept 2001 – Reporting to Cabinet with recommendation for more work to be done
- 8) 2004/5 – Formal notification under the Wet Tropics Management Plan and EPBC
- 9) 2004 – Digital documentation prepared to support public consultation around the Impact Assessment Study (APPENDIX E) reported likely construction costs for a surface solution at around \$300million and a tunnel at around \$500million. Capacity was still at about 10,000 vehicles per day.
- 10) 2007 – Approval permits (with conditions) from Wet Tropics Management Authority (WTMA) and EPBC until 31 December 2030.
- 11) 2008 – Further report to Cabinet
- 12) 2012 – Kuranda Range Upgrading Strategy (AECOM)
- 13) May 2014 – Presentation to Wet Tropics Management Authority (WTMA) advising outturn costs to be \$3.04Billion
- 14) Jan 2016 – Road Safety Performance Review – Kuranda Range Road
- 15) Feb 2016 – Improving Kuranda Range Road Traffic Incident Management Operations – Independent Review
- 16) 2017 – Business Case Report CN-6142 High Risk Roads Safety Improvements Gillies Range Road
- 17) 2017 – Business Case Report CN-6132 High Risk Roads Safety Improvements Kennedy Highway (Cairns – Mareeba)

- 18) 2017 – Kuranda Range Road Link Study Report
- 19) 2018 – Kennedy Highway TRARR Analysis
- 20) Feb 2022 – Cairns to Northern Tablelands Access Strategy (The Strategy) released – concluded that capacity levels to warrant an upgrade will not be reached until 2051.

7. COSTS

The direct cost to build an modified Kuranda Range Road as estimated in 2001 was \$300Million (**Ref.7**) for a surface route. This had risen to \$700Million by 2006 (**Ref. 11**). The factors resulting in the \$3.04Billion (outturn) reported in Reference **13** include the time to construct, whether one off over 10 years, or staged over 20 years (i.e. cost escalation), and the debt servicing costs.

The inflation adjusted cost of \$3.04Billion would require a budget provision of at least \$300Million per km in 2014. Current provision in 2026 would need to be around \$420Million per km.

8. TRAFFIC

Traffic Growth

Data for traffic volumes is obtained regularly from three (3) sites (distances from Captain Cook Hwy roundabout):

1. Smithfield – 1.4km. Provides a breakdown to vehicle classification.
2. Cairns side of Davies Creek – 29.64km. This is a “Weigh In Motion” site (WIM) and traffic is detected from stress sensors under the road pavement and converted to traffic volumes and vehicle classification.
3. Near Mareeba – 45.96km. Located on the Cairns side of the Tinaroo Creek Road intersection.

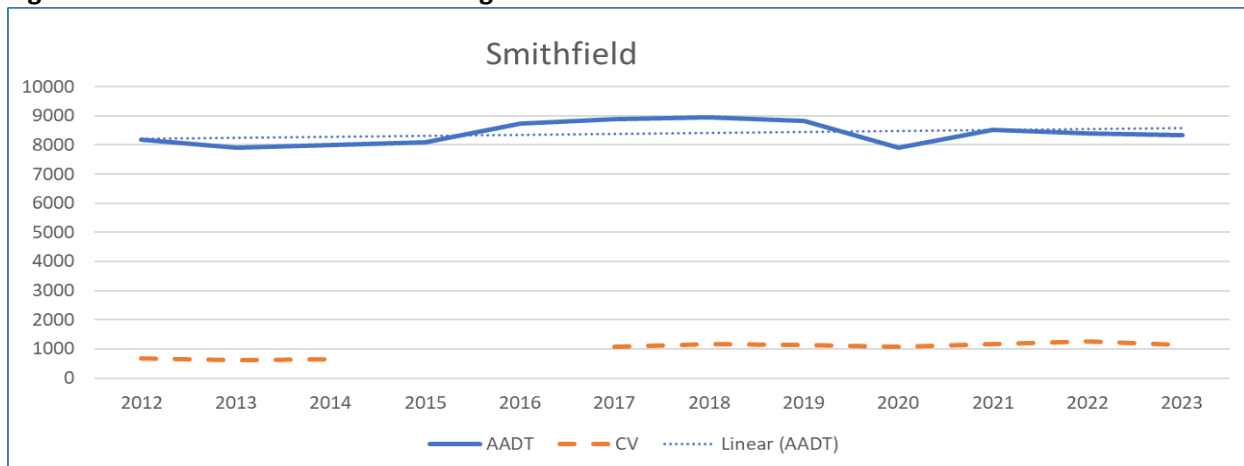
TMR has been conducting number plate recognition on the Kuranda Range for some time and information is available on request. The specific reason for this is for traffic management and speed control when environmental or crash instances occur.

Traffic volumes and commercial vehicle percentages are summarised in **Table 1**. Data is not available for every year. **Figure 2** shows traffic history for the Smithfield site, and therefore for the Kuranda Range. These exhibits include data beyond 2018 which was the latest data used for the Department of Transport and Main Roads (TMR) “Cairns to Northern Tablelands Access Strategy, July 2021” (The “Strategy” hereafter). **APPENDIX B** shows the available historic traffic data.

Table 1 - Traffic Volumes Kennedy Hwy (Cairns to Mareeba)

Year	Smithfield		Davies Creek		Mareeba	
	2012	2023	2013	2018	2013	2021
Annual Average Daily Traffic (AADT)	8171	8347	5392	6120	6827	7794
AADT Cars	7493	7211	4868	5720	6054	6983
Commercial Vehicles (CV) No's	678	1136	524	400	773	811
(CV) %	8.30%	13.61%	9.72%	6.54%	11.32%	10.41%
AADT Annual Compound Growth Rate		0.20%		2.60%		1.67%
CV Annual Compound Growth Rate		4.80%		5%		0.60%

Figure 3 - Traffic Volumes Kuranda Range



The graph (Figure 3) demonstrates that traffic volumes have not substantially increased for Kuranda Range over 11 years, with only a minor growth rate. The volumes for Davies Creek and Mareeba generally show an increase (Table 1). There appears to be an increase in traffic for all sites between 2016 and 2018 with no indication why this occurred nor why the volumes subsequently decreased. However, 2020/2021 coincides with Covid-19 and probably reflects restrictions on domestic travel movements.

Of note however is the growth in commercial vehicles (CV's) on the Kuranda Range both in total numbers and as a percentage of total traffic.

The traffic volumes at Davies Creek and Mareeba, tend to show an increase in local traffic movement within the Kuranda to Mareeba corridor, probably because of local growth. Specific breakdown of traffic transiting the Kuranda Range through to Mareeba would only be possible with additional traffic census data from Origin-Destination surveys. e.g. automated number plate recognition. In 2000, TMR (Ref12) estimated the through traffic to Mareeba to be 45%. This would require additional number plate recognition west of Kuranda in addition to the current site on the Range section, probably closer to Davies Creek to reflect some of the more southern alternate routes.

Traffic Capacity

In considering traffic capacity, steep winding roads prevent high capacity (e.g. up to 20,000 vehicles per day on straight level ground for two (2) lanes). Not only is traffic slower, but heavy vehicles are even slower and longer than passenger vehicles. It is estimated that a semitrailer is equivalent to between 3 and 6 cars. Table 2 shows the impact of allowing for only the equivalent of three (3) cars for each CV, resulting in a better reflection of traffic volumes, to determine capacity, on the Kuranda Range. Capacity calculations are always expressed as equivalent cars, so earlier estimates of 10,000 vpd allow for this, as reflected in Ref 1

The Strategy concluded that upgrading of the route was not required until 2051 based on the projected traffic volumes and the road capacity. However, the associated working papers do not conclude this as the 2051 date is simply a cutoff for assessment. However, the assessment is probably consistent with historic growth rates but does not consider the impact of road closures due to environmental factors or road crashes affecting traffic flow (see Appendix F of the TMR Cairns to Tablelands Access Strategy (Planning Technical Working Paper 2)).

Table 2- Equivalent Traffic Volumes for CV's

Smithfield					
Year	2006	2012	2017	2018	2023
Annual Average Daily Traffic (AADT)	7229	8171	8871	8940	8347
AADT Cars		7493	7786	7796	7211
Annual Compound Growth Rate		2.06%	1.66%	0.78%	-0.57%
Commercial Vehicles (CV) No's		678	1085	1162	1136
(CV) %		8.30%	12.23%	13%	13.61%
CV Equiv cars (1CV = 3 cars)		2035	3255	3487	3408
Equiv AADT		9527	11041	11283	10619

This conclusion resulted in a program of works for electronic traffic management to alleviate those delays attributable to crashes through speeds higher than the prevailing conditions support. This would result in real time control to lower speed limits when road surface conditions for wet weather, slick from oil or fuel spillage or the presence of incidents warranted a lower speed.

Level of Service (LoS)

Level of Service (LoS) refers to the road user experience with “LoS A” being ‘good’ and “LoS E” being ‘on the verge of traffic stopping’. Generally, it relates to the tendency of drivers to modify their speed according to perceived road conditions including the behaviour of other drivers. “LoS E” is often found on high-speed freeways where dense traffic travelling at 100kph can suddenly come to a halt because of drivers slowing due to reduced gap clearance to the vehicles in front.

For the Kuranda Range, the working papers for the Strategy assessed the current LoS as “C” and would not worsen to “D” by 2050. This means that, based on the modelled scenarios, an upgrade is not required within the strategy timeframe.

This is not necessarily the experience of regular and commuting drivers on the Kuranda Range Road. The Strategy highlighted the issues raised by the community about the “unreliability of travelling on existing roads especially during major weather events and in the event of incidents”.

This highlights that unrestrained traffic flow is not the issue. The issue relates to the design and location of this road in a mountainous wet tropic environment, when a substantial proportion of the regional population rely on this link, including for commuting to work.

The Strategy included a summary of road closure incidents. These included environmental (landslips, trees falling), crashes, as well as stationary vehicles. Unfortunately, the reporting included “disobey road rules” as part of the environmental incidents but did not elaborate. The incidents of stationary vehicles are also not explained and accounted for 17% of all closures and was significantly higher than for the other range roads. In addition, the environmental incidents (53%) were reported as resulting in the road being closed for 3% of the time, however given that most of these would have occurred in the wet season, this percentage is likely to be substantially higher between December and March. It is not clear if this is total or partial closure of the road, but partial closure, with traffic control, will impact travel times.

The Strategy did not calculate the average travel time for road users by including the ‘total delays including closures’ (see Appendix F of the TMR Cairns to Tablelands Access Strategy (Planning Technical Working Paper 2). To improve reliability, significant work is required to eliminate the twin hazards of landslips and trees falling, as well as the frequency of crashes due to either road conditions or driver behaviour.

Landslip incidents are typically addressed following an incident (usually wet weather) and mostly occurs on the downhill side of the road where that lane is on constructed fill. These incidents invariably result in loss of part of the road, and require extensive, complex and time-consuming remediation. Land slips are less frequent on the uphill side of the road, and usually only require removal of the debris to allow full opening of the road, unless there is likelihood of further slippage and danger to traffic.

Tree falls are a common incident during the wet season, and vegetation management involving removal is significantly impacted by the presence of the World Heritage Wet Tropics. Tree falls obviously occur on the uphill side of the road and result in shorter closures than land slips, though the five longest closures were related to partial blockage from vegetation. Treefalls often result from penetration of roots into the top of the cut face, resulting in expansion and ingress of water to weaken the cut slope. Typical remediation (without external environmental constraints) would include clearing trees a minimum distance from the top of the cut slope and may include installation of concrete catch drains to collect and divert water from the cut slope.

9. REGIONAL IMPACTS

It has been suggested that the decision not to upgrade the Kuranda Range has impeded population growth and land development, and hence traffic growth, through implementation of the 2010 Regional Plan. This in turn would impede economic growth.

It is also suggested that implementing an alternate shorter route between Cairns and Mareeba would result in significant economic benefits to the region.

Traffic Growth

The traffic growth shown in Table 1 would suggest the total AADT has not increased since 2010, around the time the deferral of upgrade occurred. However, the freight component through commercial vehicles has increased, and both AADT and CV% has increased at Davies Creek and Mareeba sites.

The Kuranda record (**Figure 10, Appendix B**) shows a distinct reduction in growth from 2009 onwards, reducing from 5.2%pa to 0.2%pa, though freight vehicles have continued to increase at 6.3%pa. A comparison with the Palmerston Highway as the only long-term freight route for B-double vehicles, shows a consistent AADT growth rate of 1.23% p.a. between 2006 and 2023, though a similar drop in traffic can be seen from 2009 and with the same variability between 2009 and 2023.

The Gillies Range Road also shows slight variability between 2009 and 2023 (**Figure 11, Appendix B**), but no decrease in the annual growth rate.

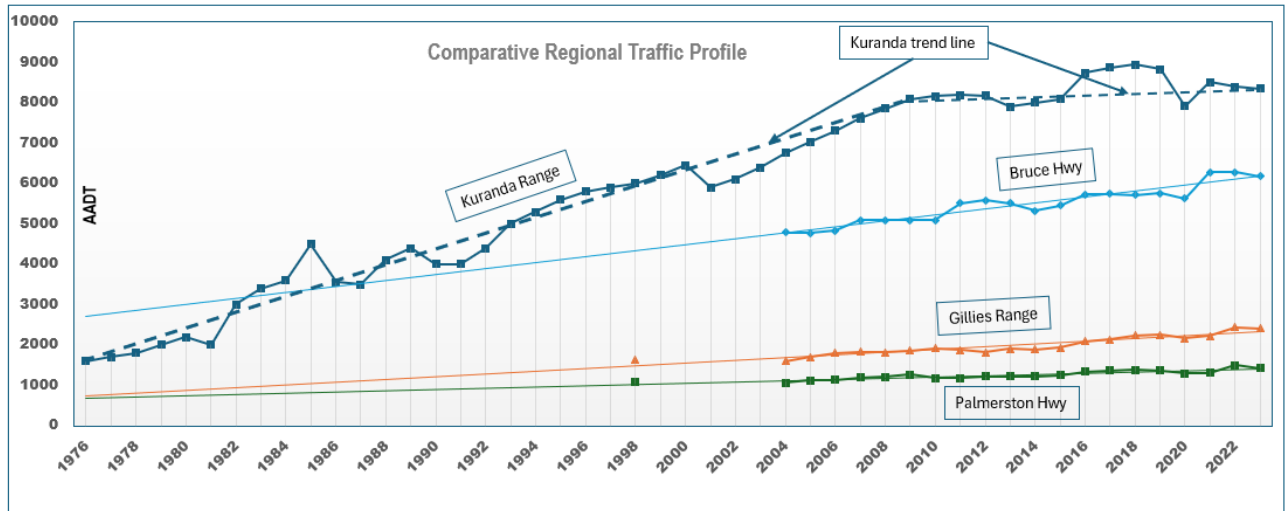
Traffic volumes prior to 2004 were not available for comparison but could also show the same reduction from 2009 for both Palmerston and Gillies routes. (**Figure 12, Appendix B**) for the Palmerston details.)

The Bruce Highway at Silkwood (**Figure 13, Appendix B**) just south of Innisfail shows a steady increase in both AADT and CV's.

All routes show a steady increase in both the number of CVs as well as the percentage of CVs in the traffic stream.

Figure 4 shows a comparison between all local roads for AADT. The Bruce highway site is south of Innisfail and would not be affected by any reduction in the Kuranda Range traffic, leading as it does to both the Palmerston freight route and the more northerly Tableland access routes.

Figure 4 - Regional Comparative Traffic Volumes



Source: Transport and Main Roads Traffic Census

Population Growth

Population growth would be expected to reflect a hindrance in economic activity if there were constraints on growth. **Table 3** compares various Local Government Areas' (LGA) population growth with both Queensland and other coastal centres which would not be affected by the upgrade of the Kuranda Range e.g. Hinchinbrook, Cassowary Coast. Both Tableland LGAs have increased population while some of the coastal LGAs have experienced significant decline.

Table 3 - Population Growth

Region	2001	2011	2021
Queensland	3,571,469	4,476,778	5,217,653
2001 to 2011		25.35%	
2011 to 2021			16.55%
2001 to 2021			46.09%
Tablelands	21,894	24,372	26,488
2001 to 2011		11.32%	
2011 to 2021			8.68%
2001 to 2021			20.98%
Mareeba	18,125	20,745	23,174
2001 to 2011		14.46%	
2011 to 2021			11.71%
2001 to 2021			27.86%
Townsville	142,012	180,114	195,515
2001 to 2011		26.83%	
2011 to 2021			8.55%
2001 to 2021			37.67%
Hinchinbrook	12,172	11,817	10,992
2001 to 2011		-2.92%	
2011 to 2021			-6.98%
2001 to 2021			-9.69%



Region	2001	2011	2021
Cassowary Coast	29,536	28,636	29,525
	2001 to 2011	-3.05%	
	2011 to 2021		3.10%
	2001 to 2021		-0.04%
Cairns	115,373	150,992	169,312
	2001 to 2011	30.87%	
	2011 to 2021		12.13%
	2001 to 2021		46.75%

Source: <https://www.abs.gov.au/statistics/people/population/regional-population/2021#data-downloads>

The Draft 2025 FNQ Regional Plan states that growth rate for FNQ has been slowing over the last 15 years (down from 1.8 per cent in 2009 to one per cent in 2023). The 2010 FNQ Regional Plan projected a population of 277,621 by 2021 and 311,411 by 2031. The population of FNQ is now forecast to grow from 264,550 in 2021 to a range of between 341,360 and 378,340 people in 2046. This translates to an average annual growth rate of one per cent, a growth rate that has held steady for the past 10-15 years.

Table 4 - Population Forecasts

The population forecasts from the Draft 2025 FNQ Regional Plan are:

LG	2021	2046		Compound Growth Rate 2021 to 2046	
		Medium	High		
Cairns	169,310	231,165	259,745	1.25%	1.73%
Cassowary	29,525	31,600	33,155	0.27%	0.46%
Douglas	12,445	15,290	16,695	0.83%	1.18%
Etheridge	725	630	375	-0.56%	-2.60%
Mareeba	23,175	28,685	31,505	0.86%	1.24%
Tablelands	26,490	31,335	32,530	0.67%	0.82%
Yarrabah	2,600	2,700	3,698 *	0.15%	1.42%
Wujal Wujal	285	310	335	0.34%	0.65%
Total	264,555	341,715	378,038	1.03%	1.44%
2025 Plan	264,550	341,360	378,340	1.02%	1.44%

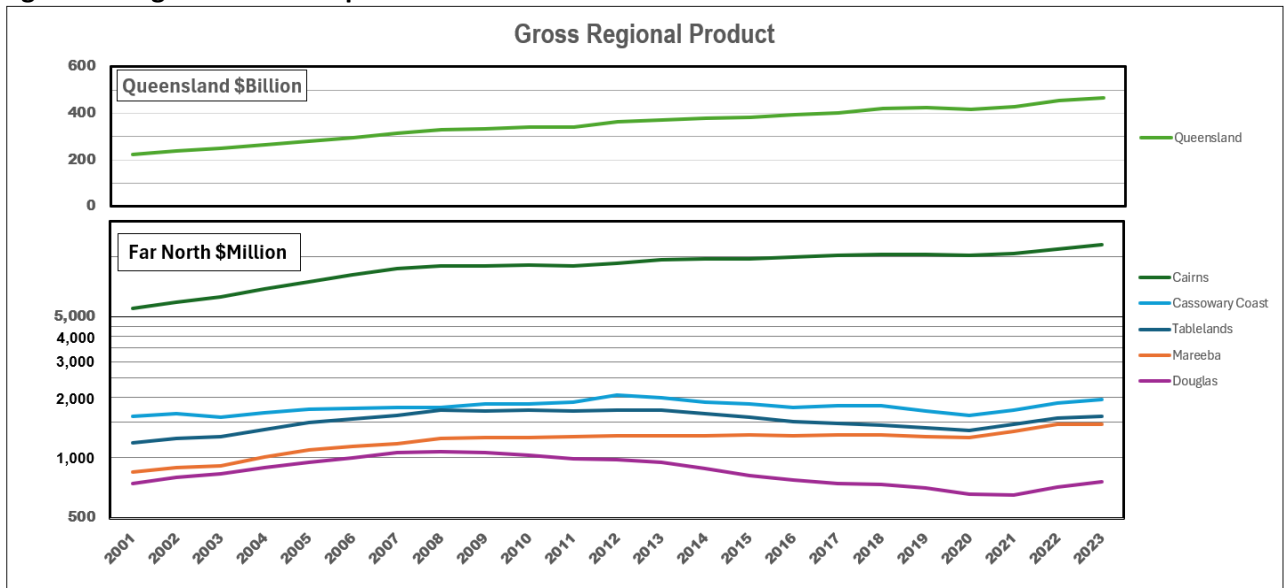
Source: From 2025 FNQ Draft Regional Plan Page16

* values inserted by author to balance the Regional Plan forecasts. There seems to be an error in original table in Reg Plan where the 2046 values for Yarrabah were 760 to 900. Medium value still seems low at 0.15%.

Economy

Figure 5 shows the historic Gross Regional Product (GRP) for LGAs compared to Queensland. Except for Cairns and Mareeba, all LGAs show overall decline since 2006. Since Cassowary Coast and Douglas are not affected by access to the Tablelands region, there would seem to be little obvious correlation with the fate of the Kuranda Range history, while Mareeba has shown a steady increase.

Figure 5 - Regional GRP Comparison



Source: <https://economy.id.com.au/fngroc/gross-product?>

Conclusion

Analysis of traffic, population and economic history does not support a conclusion that deferral of the Kuranda Range upgrade since 2004 has had a detrimental effect on economic growth on the Tableland. If this was the case, then a more rigorous analysis would be needed to establish this and demonstrate any impediment to economic growth. The Draft FNQ Regional Plan still shows low population growth for all Local Governments.

The current volumes of traffic and freight on the Kuranda Range are not significant compared with other major arterial roads across the State and are unlikely to generate a significant increase in economic output above current growth rates from major investment in an alternate access route.

Based on the conclusion from the Draft 2025 FNQ Regional Plan above for projected population growth, there appears to be little scope for significant economic growth which would lift traffic volumes to the growth rate experienced on the Kuranda Range prior to 2009.

10. DESIGN STANDARDS

Alternatives to the current Kuranda Range include both surface and tunnel solutions, sometimes within the same proposal. There are several minimum standards which apply to each solution for a suitable 'highway' standard carrying freight vehicles.

Surface Routes

Issues for the long term design of road routes of four (4) lanes to cater for heavy and longer vehicles include:

- 1) Where the road has a winding and steep alignment and there is no option for a centre median strip (>9metres), the road will require a solid median barrier to avoid head-on collisions. This will also require provision for removal of barriers for emergency vehicle access or diversion of traffic during any full lane closures. Solid barriers (which are preferred as they are a safer obstacle for motor bikes in event of a collision) restrict visibility should there be an object on the road adjacent to the barrier. This results in a wide inner shoulder next to the barrier.
- 2) An outer shoulder width sufficient for vehicle breakdown as well as cyclist provision is required.

- 3) Current slow speed designs result in a high 'camber' up to 10% which is dangerous for top heavy large vehicles contributing to rollover. Reducing camber to a more acceptable 3% to 6% means the curvature must be larger, usually resulting in higher fills and cuts and increasing costs. Slower speeds also result in rear wheel tracking over a larger area of pavement and increases in road width.

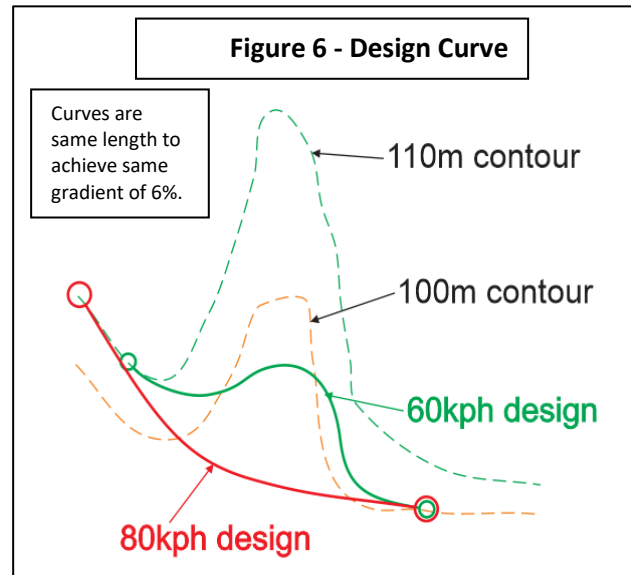
All these issues work against less expensive roads even when proactive safety management is in place.

Design standards are a combination of gradient and curvature parameters together with resulting road widths. The most common standards relevant to this situation are:

- Gradient
 - Not greater than 6% or 1 in 16 for freight vehicles. Where there are frequent heavy vehicle movements, the length of the slope should be limited to avoid unacceptable speed reduction and holding up trailing traffic. Where this cannot be achieved, an additional lane is required to allow smaller vehicles to overtake. The 2004 preferred route provided for up to 7% grade. It is noted that the Toowoomba Bypass has an average of 3% grade over 14km with very deep cuts.
- Curvature
 - Curvature is related to design speed. This is determined by the road classification taking account of the total, and peak volumes, the number and type of heavy vehicles and the constraints placed on the alignment by the terrain. Where traffic volumes are high and the road is of high strategic importance, the design speed is usually designed for an upper bound, e.g. 100kph, in which case the terrain is of less consequence and the cost proportionally higher.
 - A straight road is normally constructed with a crossfall from the centreline to the shoulder edge of 3% to accommodate dispersal of surface water. A consequence of curvature is the need to modify this crossfall to accommodate the sideways force on a vehicle and assist the tyre friction to maintain surface grip. Where the design speed is 100kph or above, a crossfall of 3% is maintained but uniform in one direction around the curve across both directions.
 - Where a tighter curve is required, either for a 100kph design speed or lower, the crossfall is increased to accommodate this. In the case of the Kuranda Range where the design speed is 60kph or lower, the crossfall has been increased to a minimum of 6% and occasionally to 10%. This causes a significant sideways slope with the concurrent gradient of 6% resulting in a more difficult driving experience with potential for crashes.
 - Adoption of a steep crossfall is based on vehicles maintaining close to the design speed. Where a vehicle with a high centre of gravity cannot maintain speed up the steep gradient, or the vehicle stops, the vehicle would be susceptible to rollover. A double deck cattle truck would not be appropriate in those circumstances.
 - To avoid this situation, either the road needs to be reconstructed to a higher design standard with larger radius curves and less crossfall, or the traffic speed needs to be reduced further with a more aggressive reduction in crossfall.
 - The 2004 surface proposal mandated a design speed of 80kph.
- Road Width
 - Road width is determined by the traffic volume and operational speed. For a highway, the usual width will be 3.5m lanes in each direction with up to 2m shoulders on each side depending on traffic volume.
 - Operational speed is influenced by the traffic volume and clearance to oncoming vehicles. Higher volumes generally mean wider shoulders and or wide centrelines to mitigate the potential for head-on crashes.
 - The vertical road alignment is determined by sight distance, usually to an obstacle (100m) in the road with the ability for a vehicle to stop or manoeuvre around it.

- Where the road alignment is curved there is also an influence on visibility depending on the sight distance around a left-hand curve adjacent to a cut slope, or adjacent to a dividing barrier where an obstacle can be obscured. In either case additional road widening may be required.

The alternate surface route alignments presented in this publication assume the gradient for each route follows the existing contours. This means that all indentations or gullies in the topography are followed and the required gradient, e.g. 6% is achieved by increasing elevation by 10 metres for every 167m in length. However, with a desirable design speed of 80kph, while the ratio of height to length is the same, the higher design speed warrants larger horizontal curves which requires higher fills or bridging over the gullies. The result is that the point at which the next 10metre contour is reached is at a point further (in plan) than if the gully contours are followed. The effect on any route is to stretch the plan of the route to achieve the required design speed and gradient and alter the point at which the total height of the escarpment is reached.



Tunnel Routes

Tunnels present different challenges. It is assumed that a future tunnel would comprise two independent tunnels for up and down movements and construction would be by tunnel boring methods. These would be separated by a third access/emergency tunnel with fireproof doors to allow emergency rescue and exit operations. For tunnels with a low volume of traffic the exit may be into the adjacent traffic tunnel only, if the probability of a simultaneous incident in the adjacent tunnel was unlikely.

Summary of Standards from QTMR Ch23 (Road Planning and Design Manual)

- Traffic lanes 3.5 m wide (plus any required curve widening)
- Shoulders 2.5 m wide to act as a breakdown lane.
- Alignment for highway tunnels should be straight, where possible. Horizontal curves based on sight distance should be of desirable radii, rather than minimum standards to alleviate the feeling of discomfort experienced by some drivers in tunnels.
- Grades in road tunnels should be limited to 3.5% in general. For long two-lane tunnels with two-way traffic, a maximum grade of 3% is desirable to maintain reasonable truck speed. (To help drain water, it may be desirable to place the floor at a small longitudinal grade not less than 0.5%). A free draining tunnel will deliver economies in drainage costs. (The Gotthard Road Tunnel in Switzerland has an uphill grade of 1.1% over 8km and a down grade of 0.7% over 9km with a maximum depth below ground of 1,640 metres).
- Vehicle exhaust emissions contain toxic (notably carbon monoxide (CO)), and noxious gases, smoke, and particulates. In short tunnels, they may be removed by longitudinal ventilation. For tunnels longer than 200 metres, longitudinal bi-directional smoke ventilation systems and control panels should be provided. The structures required to accommodate the extraction and control equipment, particularly at the portals can be significant in size and could be buildings up to five (5) stories high. Very long tunnels may also require vent chimneys along the length, potentially inserting structures in the rainforest above.

Challenges for Tunnels

- Unlikely to allow:
 - toxic and flammable products, meaning a suitable alternate route is required;
 - bicycles.
- Difficult and expensive to provide in long tunnels:
 - ventilation, which requires full time pumped airflow. Pollution discharge needs to be assured for safety,
 - Fire detection and prevention and control (high water volumes and pressure required). Avoidance of high air flow updraft from bottom to top in case of fire and smoke,
 - Structural stability of walls and other components under high temperatures from fires,
 - Lighting levels and attenuation at portals to avoid blinding or eyesight adaptation,
 - Communication systems for regular and emergency use.
- High operational costs from much of the above as well as the need for long lasting pavements to minimise traffic disruption during scheduled maintenance operations.

11. ALTERNATE ROUTES

Previous studies in 1995 and 2001 all considered up to 17 different routes including some train routes and road or rail tunnels. The 2001 study led to a more detailed evaluation of both surface (approx. C1 **BLUE**) and tunnel (**RED**) road routes generally along the current road route). (**Figure 6**). The length of the tunnel would not comply with the minimum grade of 3% to 3.5% and is not likely to comply with the current guidelines. The 2004 digital documentation presentation (Ref. 9, page 7) provided for public consultation includes a video representation of the likely surface route which included 40% of the road area on bridges or viaducts to satisfy predominantly environmental objectives but also to lessen some earthworks costs due to high cuts and fills.

Various alternate routes have been proposed since 2021, initially the Redcliffe Route, followed by the Katter_Bridle Track. Since then, several other routes have been proposed and more recently reviewed by Cummings Economics to further refine the route locations. These routes are shown in **Figure 7**.

Except for the Palmerston Highway, all other current and proposed routes between the coast and the Tablelands will have similar impacts to an upgrade of the Kuranda Range alignment.

Table 5 shows the comparative distances along routes connecting Cairns and Mareeba. While **Table 6** provides some commentary on each route. It is noted that the location of the surface routes for the Katter_Bridle and Redcliffe alignments come within 800 metres of each other and connection to the coastal highways, could be used. Details of all routes are contained in **APPENDIX C**.

Figure 7 – 2001 Study on current Kuranda corridor

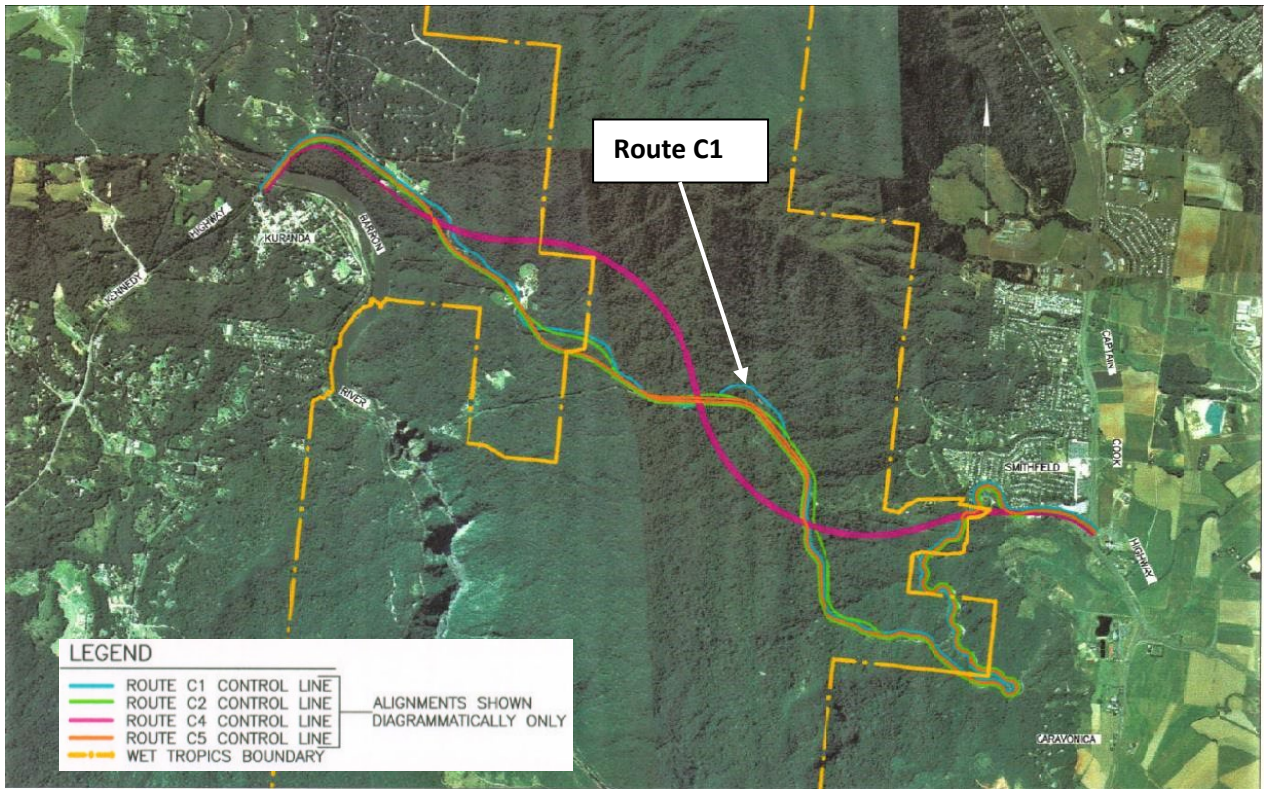


Figure 8 - Alternate Routes to the current Kuranda corridor

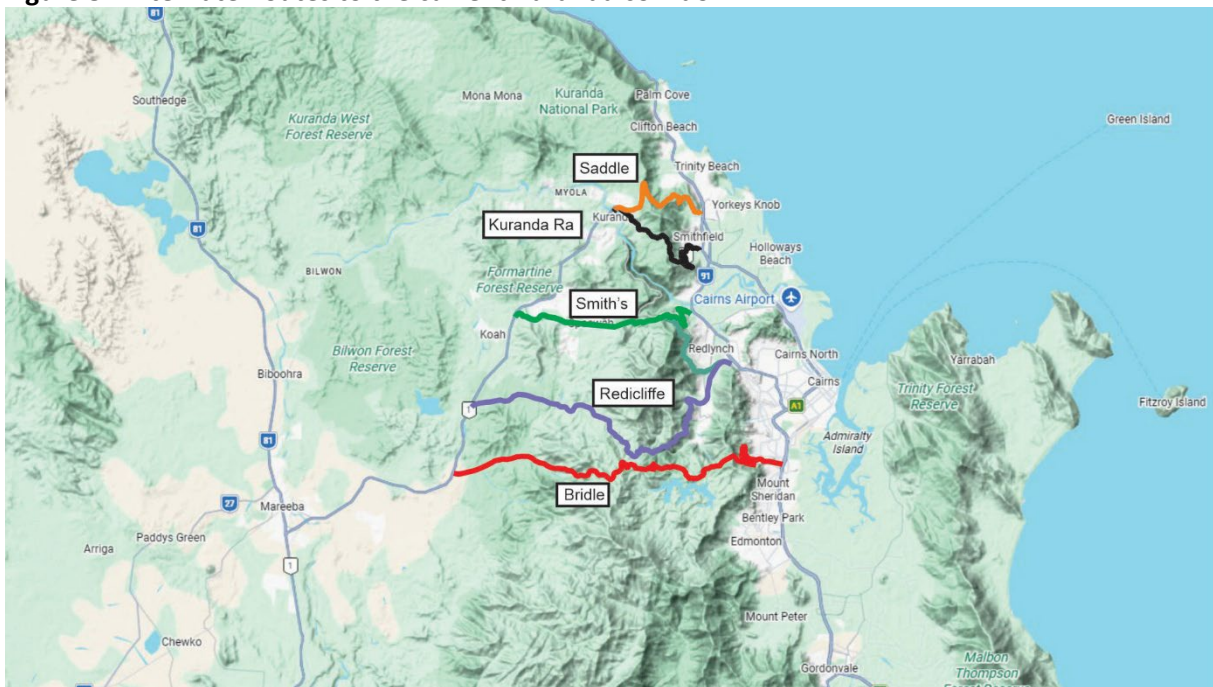




Table 5- Route Distances (Cairns to Mareeba)

Route Name	Distance Cairns to Mareeba km	
	Tunnel/Surface	Surface
Katter_Bridle	45.96	54.23
Rediccliffe	54.79	54.79
Smith's	52.15	49.73 to 53.23
Kuranda Range	61.91	61.91
Saddle (downhill only)	59.47	63.09
Quaid Road	99.83	99.83
Gillies	109.14	109.14
Rex Range	142.57	142.57
Palmerston Hwy	216.47	216.47

Table 6 - Summary and Comparison of Routes

Route Name Nth to Sth	Distance Cairns to Mareeba km	New Construction km	NOTE: (All grades are averages over the distance measured)
Rex Range	142.57	NIL	
Not suitable due to distance. Shortest section of range but not convenient location for access to Mareeba or the Tablelands.			
Quaid Road	99.83	31.8 (Quaid Rd section only Page 34)	
Needs to include upgrade of the Captain Cook Hwy to Wangetti. Is a significant detour from access to Mareeba, with traffic diverted 25.7km north on the coastal section of the Captain Cook Hwy, then travelling a further 28.8km south to Mareeba. Current design and construction is substandard. Has grades to 10%, tight curves, fill batter slopes nearing 1:1, and drainage is likely to be inadequate as there have already been failures and slips.			
Kuranda Range	61.91	12.0	(Page 34)
New alignment approved by Wet Tropics but design could be refined. Original approval had additional requirements incl 150Ha environmental offset.			
Brett Duck Saddle Route			(Page 35)
Tunnel Route	59.47	7.16	
Surface Route	63.09	10.78	(Cummings)
Originally proposed by Brett Duck, this route proposes an uphill route (existing Kuranda Range) and a downhill route to the north. This would create a two lane, one-way route, in each direction. The downhill route would join the Captain Cook Highway around Reed Rd area. The original proposal would have two short tunnels, one could be about 2% grade, but the second may be up to 13%. The tunnel would need to be connected by bridging over 1km in length. For this option to be feasible, significant additional length would need to be added to enable a tunnel slope less than 3% and minor bridging. Cummings Economics has investigated a surface route without tunnels at 5.3% (Page 35) . This increases the length by 4km, but could then be constructed to four lanes, 2 up and 2 down.			
Route Name Nth to Sth	Distance Cairns to Mareeba km	New Construction km	NOTE: (All grades are averages over the distance measured)



Route Name Nth to Sth	Distance Cairns to Mareeba km	New Construction km	NOTE: (All grades are averages over the distance measured)
Smith's Track			
<i>May Tunnel Route p36</i>	52.15	10.9	Page 36
<i>Surface Route (All p38)</i>			
<i>Stoney Ck p36</i>	54.24	16.2	
<i>Redlynch p37</i>	52.72	19.7	
<i>Davies Ck Connection</i>	2.2km shorter	5.0km additional construction	Page 37
<p>Commencing at Speewah as a partial tunnel (7km May Tunnel) route and exiting near Stoney Creek Road with 6% grades but only as a car route, presumably two (2) lanes. Cummings Economics has proposed a totally surface route, with an exit near Stoney Creek Road (5.4%) (Page 36) or further south in Redlynch Valley (4%) (Page 37) to avoid issues with crossing the Kuranda rail line. Significant issues arise from the very steep slopes (to 80%) adjacent to Stoney Creek. For stable slopes, vertical reinforced walls will likely be needed.</p> <p>Cummings has identified an alternate connection closer to Mareeba near Davies Creek which reduces the distance to Mareeba by 2.22km but adds 5km extra construction.</p>			
Redcliffe Hwy	54.79	28.47	Page 39
Surface Route which exits through the Redlynch Valley with potentially significant urban impacts. Grades to 7%.			
Bridle			
<i>Tunnel Route</i>	45.96	23.84	Katter Page 40
<i>Surface Route</i>	54.23	32.10	Cummings Page 40
<p>This distance differs from Mr Katter's assertion of 16km straight and 1 to 2 km tunnel. Difficult to avoid Copperlode Dam. Tunnel is likely to be 13.5 km long to achieve maximum of 3% grade followed by on ground section for about 9.5km. Cummings Economics has investigated a surface route at 6% grade. (Page Error! Bookmark not defined.) (Note proximity to Redcliffe route at mid-point prior to descent to the coast.)</p>			
Gillies	109.14	19km	
Min of 19km of range road to be duplicated. Does not target Mareeba, so not suitable for a route to Mareeba and the main regional traffic volumes.			
Palmerston Hwy	216.47	NIL	
Not suitable to Mareeba due to distance other than for heavy freight. Range section is 29km long, would need four (4) lanes in the long term if no alternate route is found.			

Tunnels

Adoption of a tunnel solution compliant with the TMR design code would require a maximum of 3% gradient. The length of a tunnel would be dependent on the elevation required. A coastal entry point is likely to be around an elevation of between 0 to 50metres and the exit elevation based on the adjacent tableland topography would be between 400 and 450 metres. The minimum length would be between 13 and 14kilometres. This would result in a tunnel, without intermediate access points, longer than any existing or proposed tunnels in Australia and certainly the steepest over this distance. The tunnel would also rank as unique in the world for a tunnel of this length and continuous gradient. (See **APPENDIX F** for examples).

12. UPGRADE EXISTING ROUTE

After the route selection study of 2000 and its consideration up to 2008, a report was prepared by AECOM in 2012 (Ref. **12**), page 7) to investigate a possible short to medium term, lower cost upgrading strategy for the Kuranda Range. Its objectives included:

- Possible relaxation of the design standards adopted in the development of the ultimate four (4) lane alignment.
- Hybrid solutions retaining the existing road where possible with new sections on the ultimate alignment.
- Identification of new sections to provide early environmental benefits.
- Identification of new overtaking lanes for shorter term capacity improvements.

The strategy considered two (2) scenarios and traffic models:

1. Incremental Upgrade – Incremental provision of new opportunities at regular spacings along the link including extension of existing facilities without consideration of geometric or constructability issues.
2. Feasibility Upgrade – Provision of new opportunities and extension to existing facilities at locations which could feasibly be constructed, based on a concept level review of geometric and constructability issues.

The report identified a range of opportunities including; safety, capacity, environmental and geotechnical improvements under the two (2) scenarios.

The possible Incremental Improvements are shown in **Figure 8** and include over 4km of new overtaking lanes and 1.5km of extension to existing overtaking lanes.

Figure 9 shows the Feasibility Upgrades opportunities including four (4) lane overtaking opportunities.

Both options were high cost due to terrain and the need to construct under traffic. Neither option provided significantly better travel times, and improvements did not include future wet weather or crash incidents.

Only the “Feasibility” option (**Figure 9**) considered both the uphill (tree fall) and downhill (landslip) slope stability and this option was considerably more expensive than the Incremental Improvements.

Neither option would address the tight curvature at the ‘bottom’ lookout, nor the access requirement for emergency vehicles.



Figure 9 - Incremental Improvements on existing alignment

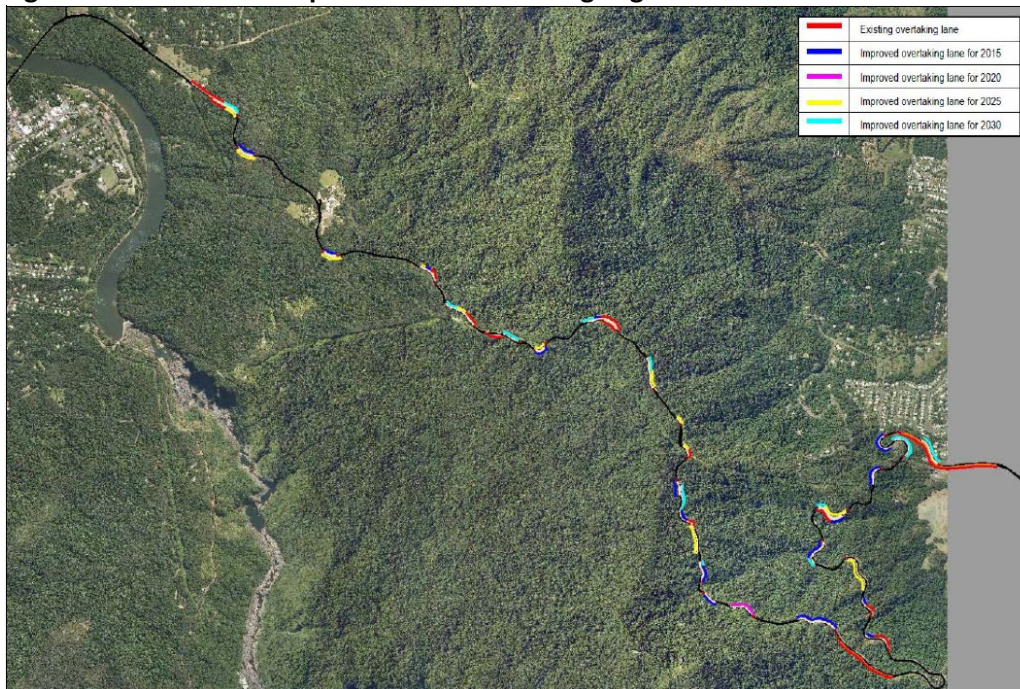


Figure 10 - Feasibility Improvements included 4 laning



13. CONCLUSIONS

General

- 1) All routes traverse the Wet Tropics World Heritage Area.
- 2) The traffic modelling undertaken during 2021 revealed that barring 'incidents' the current road can sustain a further number of years of operation without causing significant reduction in travel time. The current impediments to travel time are due to wet weather events such as treefalls, landslips and vehicle crashes due to wet pavements and loss of friction. Dry weather events include crashes due to excessive speed for the alignment as well as vehicle breakdown restricting traffic in a narrow roadway.
- 3) Minimisation of these 'incidents' would significantly improve driver satisfaction and road reliability.
- 4) Curve alignment works would be required to allow the larger freight vehicles such as B-doubles on the Range.

Surface Routes

- 5) All surface routes will impact environmental values, and the cost of mitigation measures is unlikely to be significantly different between options.
- 6) Incremental widening of the Kuranda Range may have more significant environmental impacts (no bridges or short tunnels) than a newer route without significant slope stability works (e.g. rock anchors and near vertical retaining walls to maintain steep batters and the cost may be similar without providing better safety e.g. wider separation between opposing streams, still tight curves with steep camber.
- 7) Due to the nature of the formal road investigation, design, approval and implementation process, it is unlikely that any final alternate alignment will bear close resemblance to those presented in this publication.
- 8) The only solution with some prospect of minimising environmental impacts is by tunnelling.

Tunnel Routes

- 9) Tunnelling still has impacts if the termination points are within or adjacent to the Wet Tropics areas. These include: ventilation towers (significant height and footprint, visual amenity); the extent of entry civil works at tunnel portals; connection to adjacent and appropriate networks.
- 10) Tunnelling has significant on-going operational costs including ventilation, lighting, hazard reduction.
- 11) Tunnels require extensive safety measures including a small exit tunnel, usually located between the two traffic tunnels with means to firelock the exits.
- 12) It is unusual to allow transport of flammable goods in tunnels due to the significant risks e.g. Channel Tunnel, Swiss Tunnels (Mont Blanc 1999, Gotthard 2001), thus requiring continued use of a surface route.
- 13) Effective tunnels worldwide need to have very low gradients. High gradients lead to; wind tunnel effects which are problematic for fires and effective ventilation; and of course, safety in the event of runaway vehicles.

Alternate Routes

None of the alternate routes will satisfy the needs, objectives or strategic priorities for either the region or the transport network without some tradeoffs:

- 14) None of the alternate routes, other than the Saddle Route, addresses the continued access to Kuranda, the impact on the Rainforestation and SkyRail Cableway access, or the on-going

maintenance of the existing range road. Routes which do not service Kuranda still require retention of this route with significant questions of on-going ownership, operating costs, need for future upgrades.

- 15) All routes have significant environmental impacts.
- 16) Some routes will have additional impacts on current urban areas due to the corridor or termination points e.g. Redcliffe through Redlynch Valley and exit near Brinsmead, Katter_Bridle exiting near Mount Sheridan.
- 17) Routes with tunnels usually underestimate the construction and operational costs.
- 18) Appropriate routes need to be as direct as possible, so some routes are not effective for access between the Tablelands and Cairns e.g. Palmerston, Gillies, Quaid Rd, and Rex Range.
- 19) The existing parallel surface route explored in the 2004 study has environmental approval, subject to conditions, until 2030. It is likely that, with clear government intent, this could be extended with consideration of more recent environmental standards. Any move away from this corridor will result in the whole exercise restarting and no certainty of affordable environmental protections.

Challenges

- 20) The likelihood that WTMA would countenance an additional route, particularly a surface route, through the Wet Tropics. If considered there would likely be significant tradeoffs and further design impositions which may jeopardise both the cost of a new route and the potential economic benefits.
- 21) If WTMA approval was achieved, the timeframe is likely to be at least ten years or longer, given the original approval for the current route took seven years and was in an already disturbed corridor.
- 22) No detailed survey, or geotechnical information is currently available, and this is likely to consume a few years and itself, be subject to access conditions. Ground truthing will be required as well as geotech drilling and access routes. Detailed design will be complicated and consume its own timeframe.
- 23) Construction on an alternate route, depending on the solution chosen will vary from a minimum of 10 years.
- 24) Adopting an alternate route will not delay the need to replace the current Kuranda Bridge as this will need to continue to service heavy freight vehicles for at least 20 years (from initial government decision to completion of construction of a new route).
- 25) Significant actual and social disruption to parts of Cairns to accommodate a new connection point for a new route to existing road networks with potential for overpasses. This will include significant resumption of land and properties and appropriate compensation. These costs were not included in the 2001 Kuranda Range Road proposal (Ref. 7, page 7) as the land was majority Crown owned.

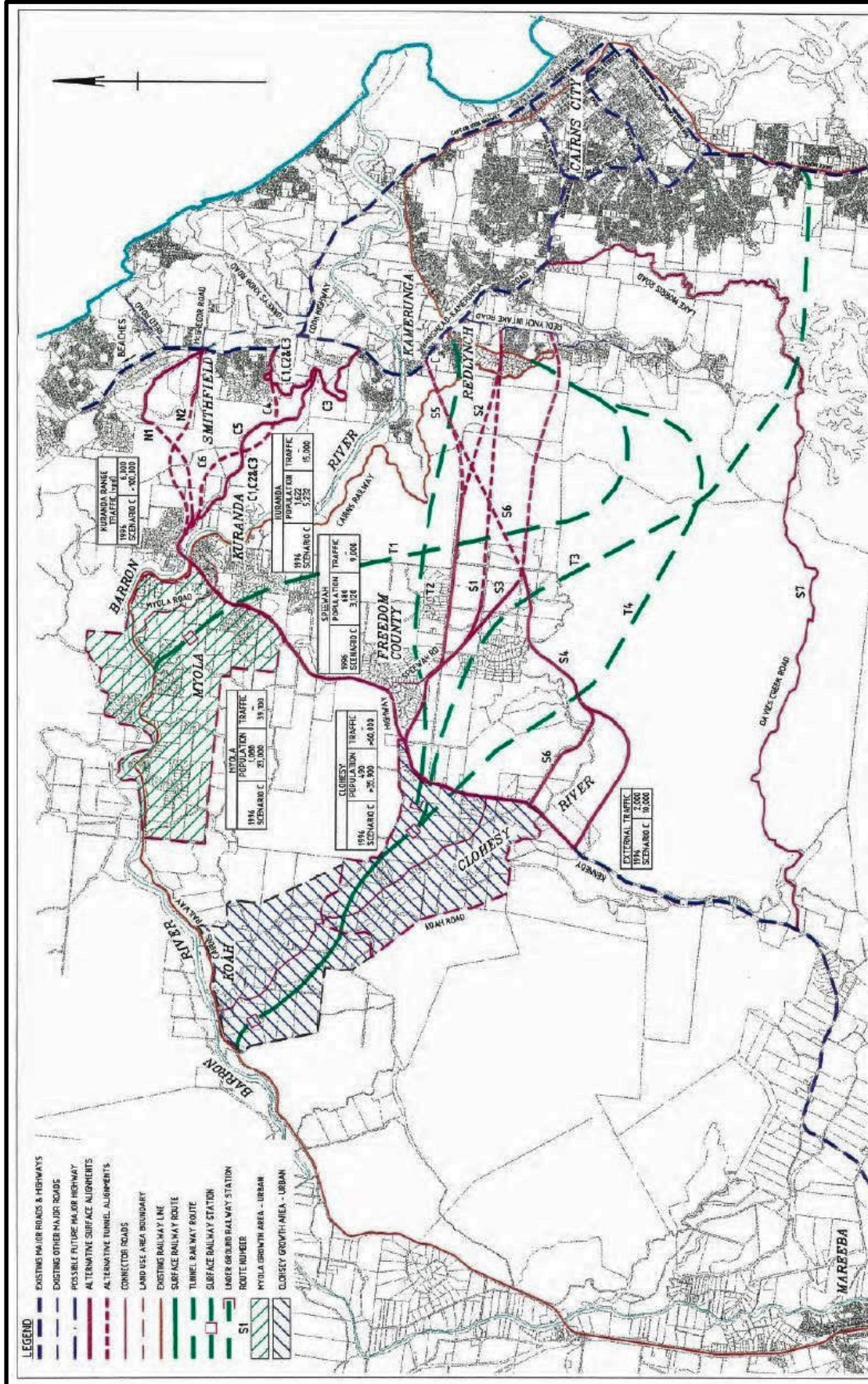
Options

- 26) While upgrading of the existing road has its own challenges, it is likely that to continue to address the current deficiencies and recognising the unlikely option of a new corridor even on the existing alignment, continual improvements to the current road will continue. As a minimum these are likely to be:
 - Intelligent real-time traffic management. This will impose variable speed limiting during adverse weather conditions or for crash incidents.
 - Continued stabilisation of fill slopes either as programmed works or in response to disaster events.

- 27) In addition, over the long term, accommodation with WTMA would be needed to provide for:
- Clearing of vegetation from slopes with strategic buffers to stabilise cut slopes and install drainage structures to divert water from slopes.
 - Widening of constrained road widths, to provide for B-double freight vehicles and provide some additional overtaking opportunities. To achieve this with limited encroachment on the Wet Tropics footprint, several constraints may be applied. Widening of cut batters could incorporate vertical retaining walls pinned for stability to the cut batter to achieve a wider base without increasing the overall width of batter.
 - During widening, which would increase curve radii, a reduction in the extreme crossfall could be considered to alleviate the problem of vehicle instability.
- 28) The study conducted by AECOM in 2012 identified possible improvements to the existing alignment. These included:
- hybrid solutions to retain the existing road together with sections on the new alignment
 - improvements to curve geometry
 - construction of new overtaking sections
 - incorporation of new environmental provisions to improve environmental benefits



APPENDIX A – Previous Routes Investigated



APPENDIX B – Traffic Data (Source: Transport and Main Roads Traffic Census)

Figure 11 - Long term Traffic Growth on Kuranda Range

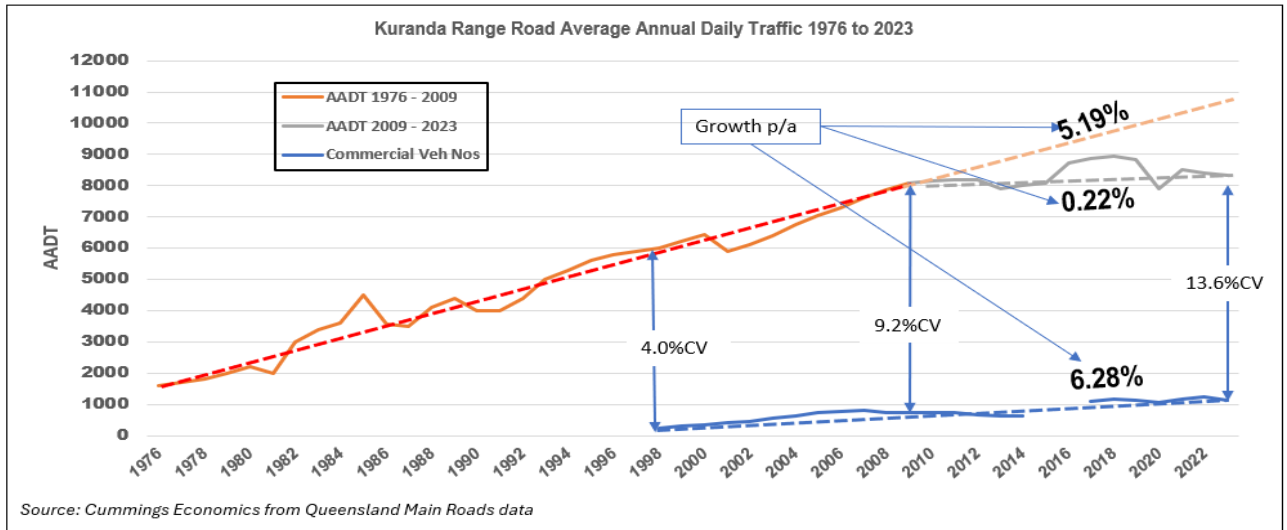


Figure 12 - Long Term Traffic Growth on Gillies Range Road (Boar Pocket Road)

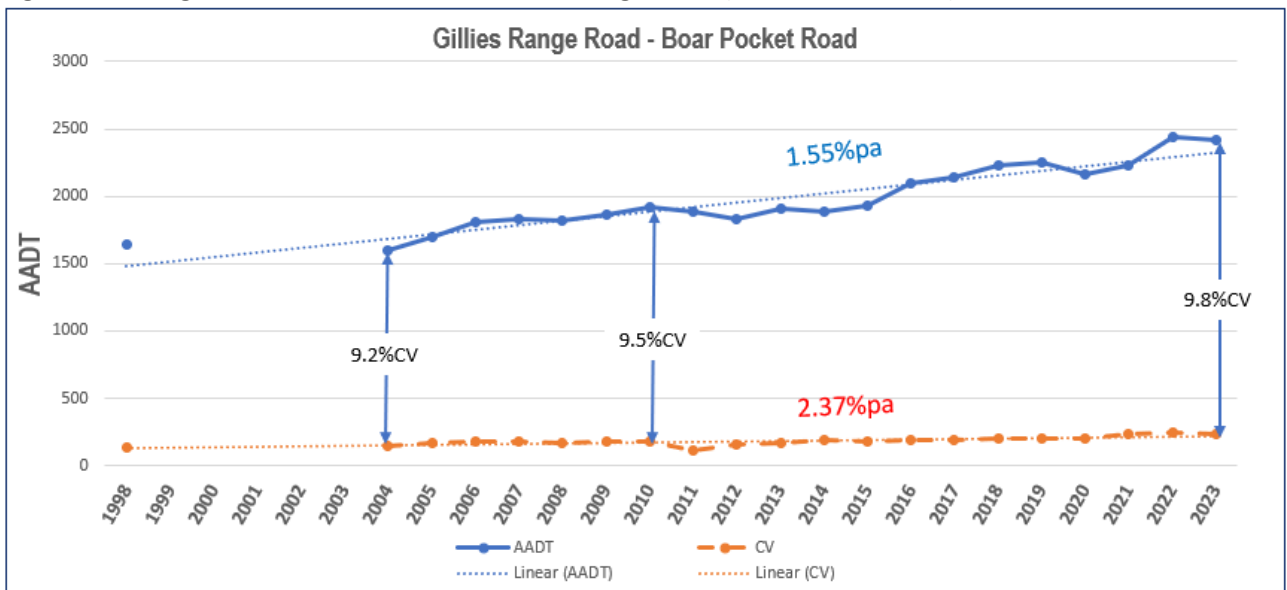


Figure 13 - Long Term Traffic Growth Palmerston Hwy

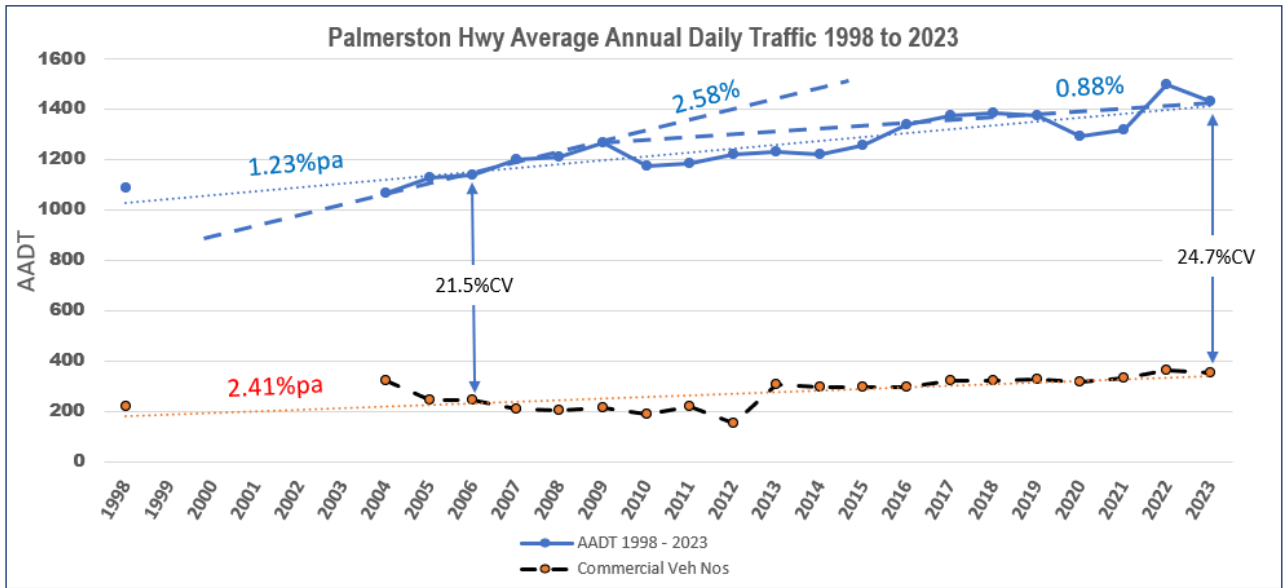
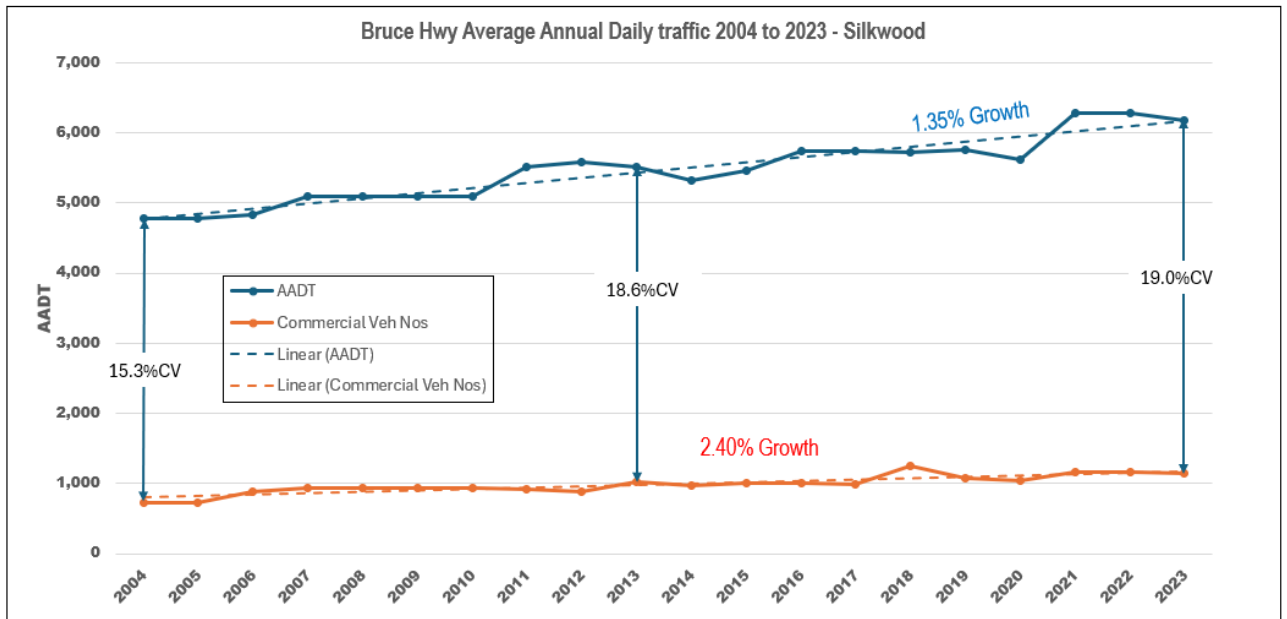


Figure 14 - Long Term Traffic Growth Bruce Hwy at Silkwood



**APPENDIX C – Economic Data****GRP \$Millions**

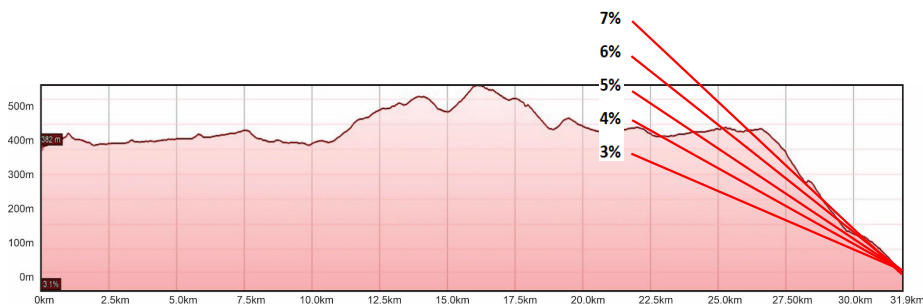
Year (ending June 30)	Tablelands	Mareeba	Cairns	Cassowary Coast	Douglas	Queensland
2001	1,187	846	5,539	1,598	742	225,044
2002	1,238	888	5,927	1,656	794	239,119
2003	1,267	912	6,296	1,585	833	249,858
2004	1,381	1,003	6,920	1,675	891	266,176
2005	1,491	1,089	7,480	1,745	943	280,251
2006	1,561	1,137	8,066	1,761	1,000	294,355
2007	1,623	1,174	8,716	1,766	1,060	313,876
2008	1,716	1,239	8,993	1,782	1,067	328,642
2009	1,707	1,255	8,982	1,847	1,054	333,062
2010	1,720	1,255	9,028	1,853	1,024	339,945
2011	1,710	1,265	8,999	1,893	985	342,746
2012	1,729	1,282	9,270	2,051	979	362,448
2013	1,720	1,285	9,604	1,983	947	372,564
2014	1,650	1,280	9,744	1,893	885	379,759
2015	1,586	1,299	9,731	1,847	812	383,068
2016	1,507	1,288	9,887	1,782	774	392,496
2017	1,473	1,295	10,090	1,814	744	403,417
2018	1,453	1,298	10,236	1,811	736	419,525
2019	1,402	1,265	10,223	1,698	706	423,647
2020	1,367	1,261	10,097	1,620	657	418,697
2021	1,464	1,354	10,353	1,723	650	430,195
2022	1,567	1,460	10,916	1,868	715	454,024
2023	1,595	1,467	11,464	1,950	758	464,910



APPENDIX D – Alternate Routes

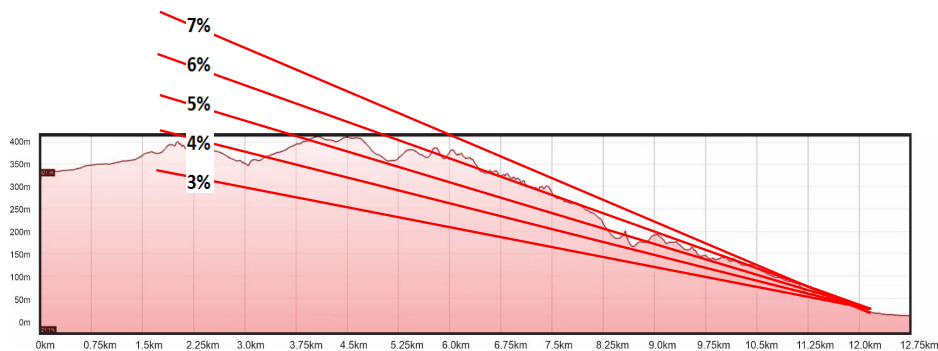
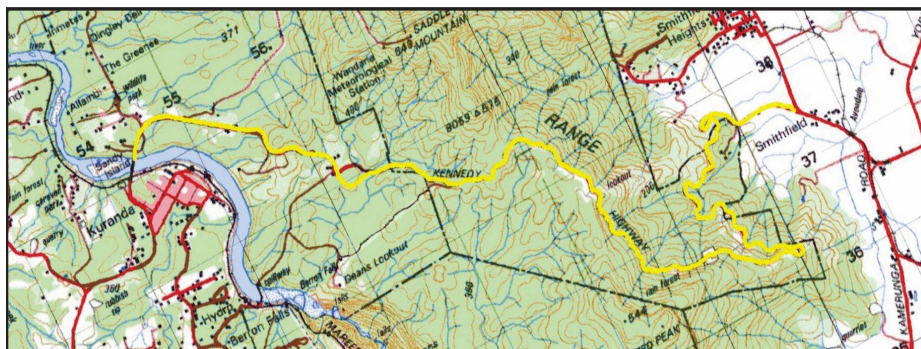
Quaid Road

Rd No	To	From	Chg	Chg	KM	Cum
20A	Cairns	Smithfield	0.000	13.069	13.069	13.069
20A	Smithfield	Quaid Rd	13.069	40.209	27.140	40.209
	Quaid Rd	Quaid Rd	0.000	31.800	31.800	72.009
34A	Quaid Rd	Dimbulah I/S	24.419	0.000	24.419	96.428
664	Dimbulah I/S	Mareeba	3.400	0.000	3.400	99.828
TOTAL					99.828	



Kuranda Range

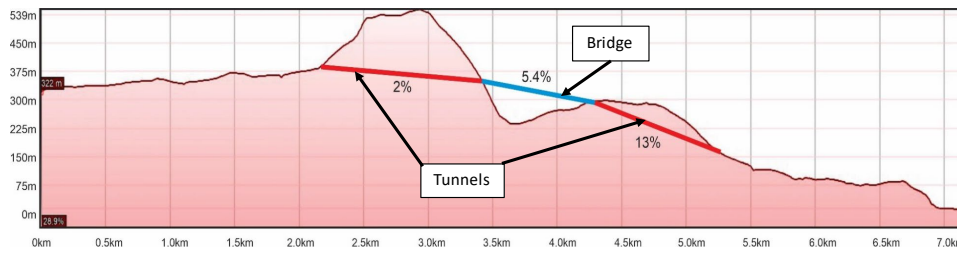
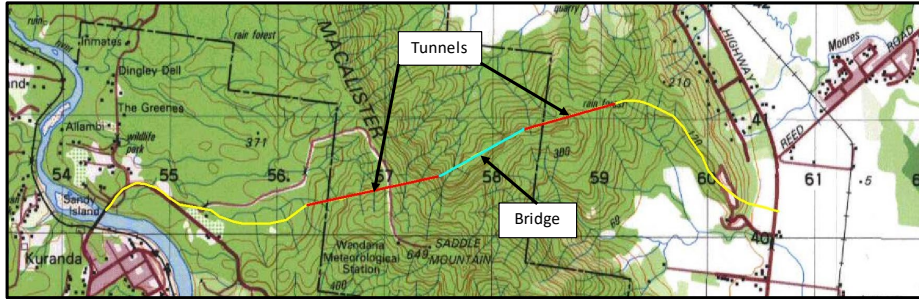
Rd No	To	From	Chg	Chg	KM	Cum
20A	Cairns	Smithfield	0.000	13.069	13.069	13.069
32A	Smithfield	Barron R Bridge	0.000	12.535	12.535	25.604
32A	Barron R Bridge	Speewah	12.535	20.105	7.570	33.174
32A	Speewah	Davies Ck Bridge	20.105	31.118	11.013	44.187
32A	Davies Ck Bridge	Mareeba	31.118	48.844	17.726	61.913
TOTAL					61.913	





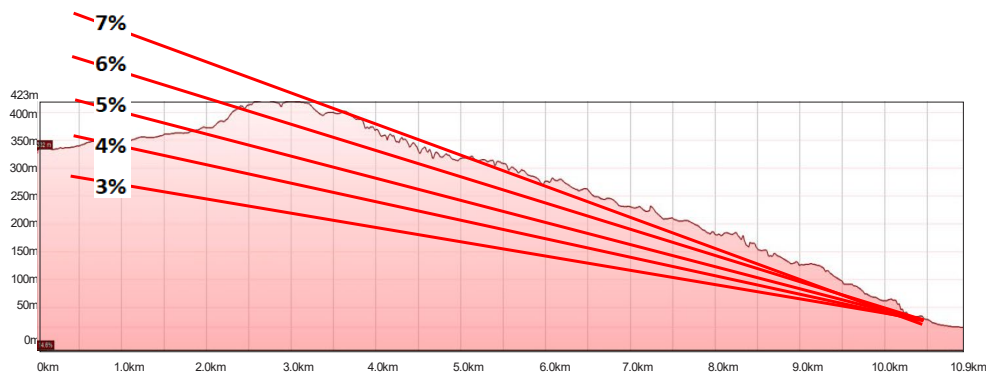
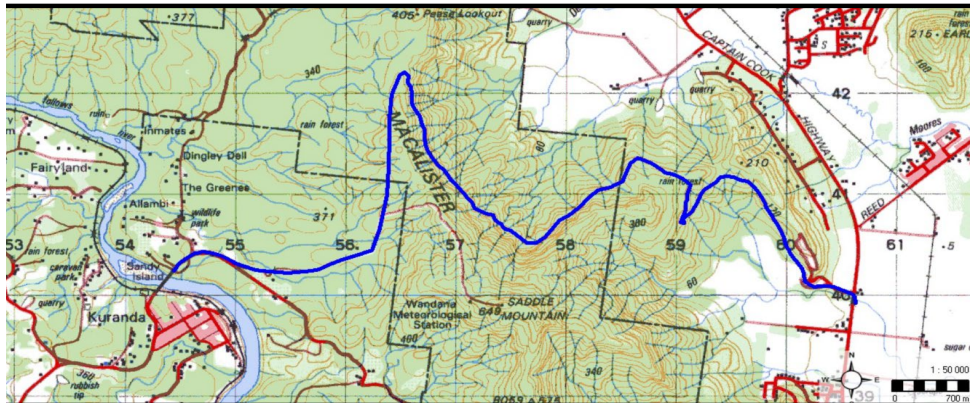
Brett Duck Tunnel Route

Rd No	To	From	Chg	Chg	KM	Cum
20A	Cairns	Smithfield	0.000	13.069	13.069	13.069
20A	Smithfield	Start Alignment	13.069	16.000	2.931	16.000
	Start Alignment	Barron River Bridge	16.000	23.160	7.160	23.160
32A	Barron River Bridge	Mareeba	23.160	59.469	36.309	59.469
			TOTAL	59.469		



Saddle Surface Route

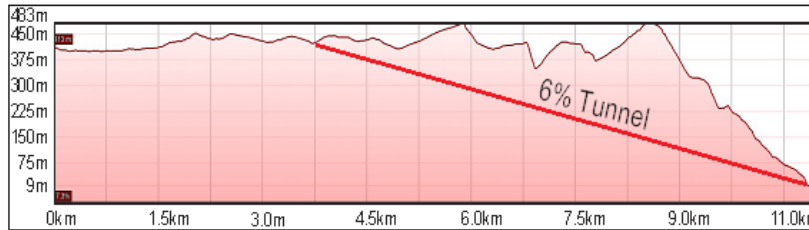
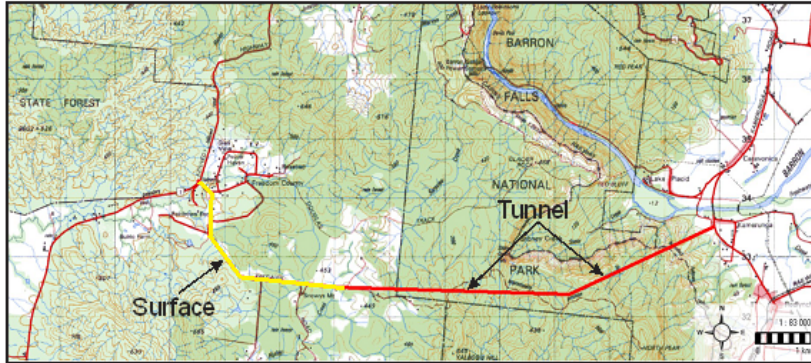
Rd No	To	From	Chg	Chg	KM	Cum
20A	Cairns	Smithfield	0.000	13.069	13.069	13.069
20A	Smithfield	Start Alignment	13.069	16.000	2.931	16.000
	Start Alignment	Barron River Bridge	16.000	26.779	10.779	26.779
32A	Barron River Bridge	Mareeba	23.160	59.469	36.309	63.088
			TOTAL	63.088		





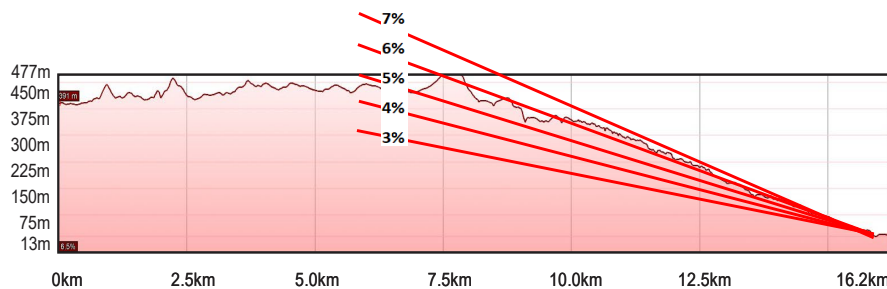
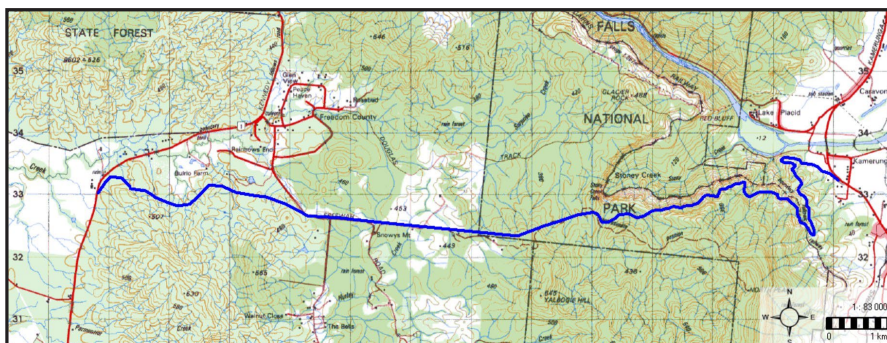
May Tunnel Route

Rd No	From	To	Chg	Chg	KM	Cum
20A	Cairns	Anderson St	0.000	1.708	1.708	1.708
649	Anderson St	Reservoir Rd	2.530	0.000	2.530	4.238
647	Pease St	Kamerunga	2.370	10.538	8.168	12.406
	May Route	Speewah	0.000	11.000	11.000	23.406
32A	Speewah	Mareeba	20.105	48.844	28.739	52.145
			TOTAL		52.145	



Smith's Surface Route to Stoney Creek

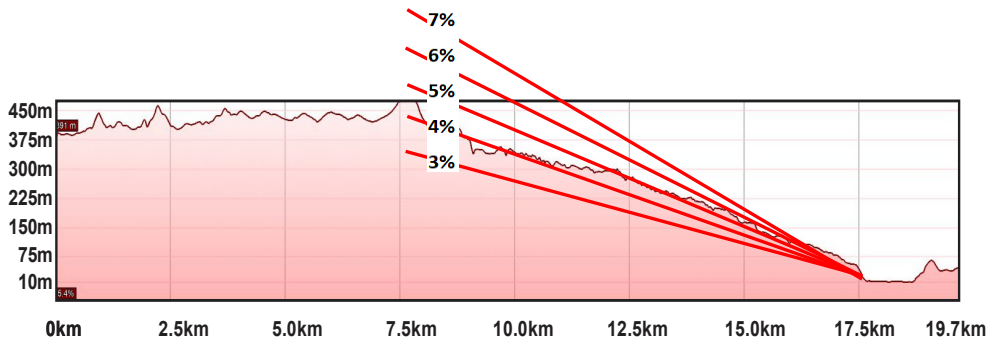
Rd No	From	To	Chg	Chg	KM	Cum
20A	Cairns	Anderson St	0.000	1.708	1.708	1.708
649	Anderson St	Reservoir Rd	2.530	0.000	2.530	4.238
647	Pease St	Kamerunga	2.370	10.538	8.168	12.406
	Smith's Stoney Ck Route	Speewah	0.000	16.200	16.200	28.606
32A	Speewah	Mareeba	20.105	48.844	28.739	57.345
			TOTAL		57.345	





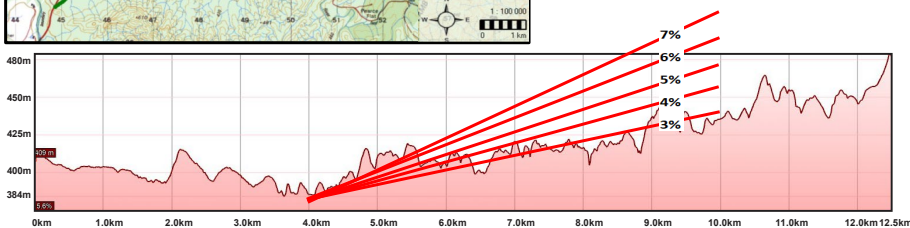
Smith's Surface Route to Redlynch

Rd No	From	To	Chg	Chg	KM	Cum
20A	Cairns	Anderson St	0.000	1.708	1.708	1.708
649	Anderson St	Reservoir Rd	2.530	0.000	2.530	4.238
647	Pease St	Kamerunga	2.370	5.518	3.148	7.386
	Smith's Redlynch Route	Speewah	0.000	19.700	19.700	27.086
32A	Speewah	Mareeba	20.105	48.844	28.739	55.825
			TOTAL		55.825	



Smith's Connection to Kennedy Hwy at Davies Creek

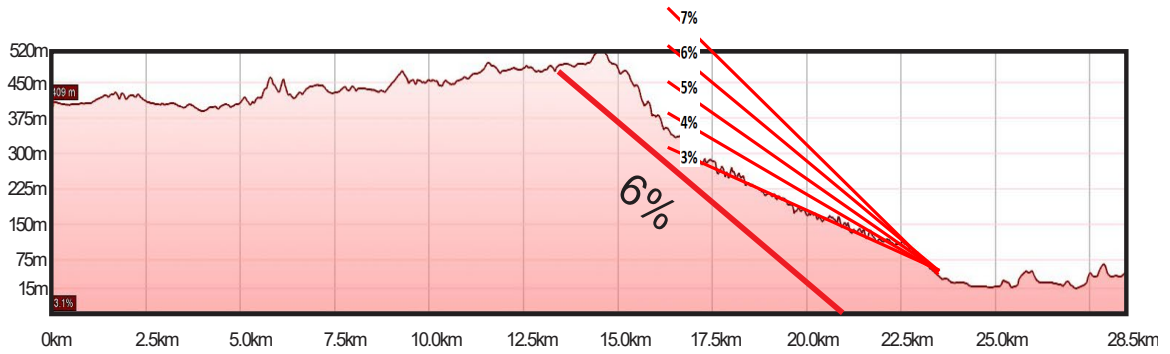
Reduced Distance of 2.218km.





Rediccliffe Route

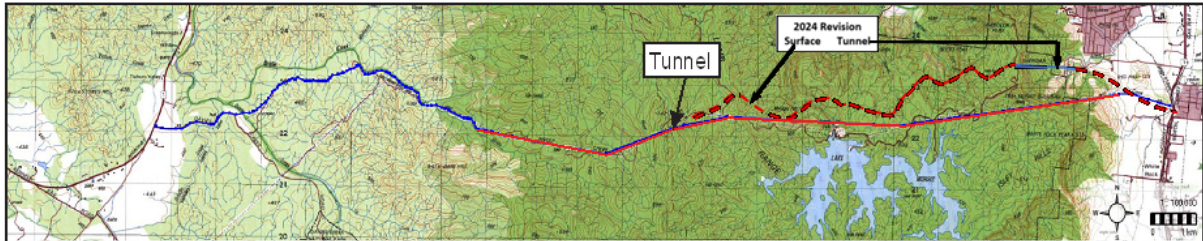
Rd No	To	From	Chg	Chg	KM	Cum
20A	Cairns	Anderson St	0.000	1.708	1.708	1.708
649	Anderson St	Reservoir Rd	2.530	0.000	2.530	4.238
647	Pease St	Brinsmead	2.370	6.000	3.630	7.868
	Rediccliffe Route	Davies Creek	0.000	28.469	28.469	36.337
32A	Davies Creek	Mareeba/Dimbulh I/S	30.391	48.844	18.453	54.790
TOTAL					54.790	





Bridle Tunnel Route (Katter)

Rd No	To	From	Chg	Chg	KM	Cum
809	Sheridan St	Port Conn Rd	5.930	5.451	0.479	0.479
810	Port Conn Rd	Port Conn Rd	1.900	0.000	1.900	2.379
10P	Cairns	Katter Bridle track	85.335	79.065	6.270	8.649
	Katter Bridle track	Tunnel Section	0.000	14.298	14.298	22.947
	Katter Bridle track	Surface Section	14.298	23.837	9.539	36.424
32A	Kennedy Hwy Tichum Ck	Mareeba	35.407	48.884	13.477	36.424
TOTAL					45.963	



Bridle Surface Route (Cummings)

Rd No	To	From	Chg	Chg	KM	Cum
809	Sheridan St	Port Conn Rd	5.930	5.451	0.479	0.479
810	Port Conn Rd	Port Conn Rd	1.900	0.000	1.900	2.379
10P	Cairns	Katter Bridle track	85.335	79.065	6.270	8.649
	Katter Bridle track	Kennedy Hwy Tichum Ck	0.000	32.100	32.100	40.749
32A	Kennedy Hwy Tichum Ck	Mareeba	35.407	48.884	13.477	54.226
TOTAL					54.226	



APPENDIX E – Extract from Digital Documentation Road Alignment (2004)





APPENDIX F – Examples of Road Tunnels

Australia

Name	Locale	Carries	Length	Notes
			m	
Cross City Tunnel	Sydney central business district	Cross City Tunnel	2,100	Two tunnels
Eastern Distributor Tunnel	Between Woolloomooloo and Surry Hills	Eastern Distributor	1,700	Completed in 2000; tolled on exit, northbound only; unique 'piggyback' design with three lanes northbound, stacked on top of three lanes southbound
Lane Cove Tunnel	Lane Cove	M2 Motorway	3,600	
4 East Tunnel	Between Haberfield and Homebush	M4 Motorway	5,500	Dual tunnels
M4-M5 Link (WestConnex)	Between Haberfield and St Peters	M4/M5 /	9,200	Australia's longest road tunnel
M5 East Tunnel	Between Beverly Hills and Arncliffe	M5 Motorway	5,000	
M8 Motorway	Between Beverly Hills and St Peters	M8 Motorway	9,000	
M8 Motorway	Western Harbour Tunnel	M8 Motorway	6,500	Under construction to be
NorthConnex	Between Pennant Hills and Wahroonga	Pacific Motorway /Hills Motorway	9,000	Opened 31 October 2020
Sydney Harbour Tunnel	Between Woolloomooloo and North Sydney under Sydney Harbour	Sydney Harbour Tunnel	2,800	
Airport Link	Between Bowen Hills and Toombul; Brisbane	Airport Link	6,700	Australia's longest road tunnel (at
Clem Jones Tunnel	Between Woolloongabba and Bowen Hills, Brisbane	Clem Jones Tunnel	4,800	Two parallel tubes under the Brisbane River
Legacy Way	Toowong and Kelvin Grove, Brisbane	Linking the Western Freeway with the Inner City Bypass	4,600	Two bored tunnels carrying two motorway grade lanes of traffic in each direction
Domain Tunnel	Richmond, Melbourne	CityLink / Monash Freeway	1,600	
elba Tunnel	Mitcham, Melbourne	Eastern Freeway to EastLink Ringwood	1,600	
Mullum Mullum Tunnel	Mitcham, Melbourne	Eastern Freeway to EastLink Ringwood	1,600	
West Gate Tunnel	Spotswood and Fishermans Bend; Melbourne	West Gate Bridge	3,000	Proposed as part of the Western Distributor, construction
Northbridge Tunnel	Northbridge	Perth	1,600	

World

Name	Locale	Length m	Notes
WestConnex	Sydney, New South Wales, Australia	22,000	Multiple tunnels
Jingpingshan	Sichuan, China	17,500	The deepest transportation tunnel in China
Gotthard Road Tunnel	Lepontine Alps, Switzerland	16,918	
Ryfylke Tunnel	Stavanger–Strand, Norway	14,400	Longest underwater road tunnel in the world
Ovit Tunnel ^[81]	Erzurum Province–Rize Province, Turkey	14,346	
Arlberg Road Tunnel	Arlberg, Austria	13,972	
Xishan Tunnel	Shanxi, China	13,654	Left tube: 13654 meters, right tube: 13570 meters
Mount Erlang Tunnel	Sichuan, China	13,433	Erlangshan extra-long tunnel part of Yakang Expressway
Hongtiguang Tunnel	Shanxi, China	13,122	Left tube: 13122 meters, right tube: 13098 meters