

# **AN ANALYSIS of the COMPARATIVE REVIEW of the FORESTRY ROUTE OPTIONS FOR INLAND RAIL via CECIL PLAINS**

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## **INTRODUCTION**

This analysis was written in July 2021 following careful review of the Inland Rail Information Paper produced by ARTC in August 2020. This paper was the key document provided to GTA Consultants, who were tasked to review the methodology of ARTCs "like for like" assessment of comparative abilities of the routes to meet the Business Case requirements.

It is apparent that there are major errors and important omissions in this ARTC document, and these are documented below. The errors, particularly with respect to route lengths and the Condamine River crossings, are of such significance that most of the resultant comparative presentation is totally inaccurate and misleading. The omissions themselves are mainly concerned with the basic advantages of the Cecil Plains routes e.g. soil suitability, terrain, cleared forestry corridor, etc. These omissions have a direct impact on the Service Offering and estimated Cost of Inland Rail as well as on the engineering challenges during construction.

It needs to be appreciated that the selection of the most appropriate route for this major project should be the reason that reviews and multi-criteria analyses are undertaken. Therefore, the accuracy and inclusion of pertinent data **MUST** be professional, unbiased, and beyond reproach.

With this in mind, the following analysis is presented.

## **BACKGROUND**

By letter dated 29th June 2020, the Deputy Prime Minister "asked for an immediate review of the "forestry route" via Cecil Plains in the Border to Gowrie (B2G) section of Inland Rail against the selected (Inland Rail) route to access its ability to meet the BUSINESS CASE REQUIREMENTS INCLUDING TRANSIT TIME, RELIABILITY, COST COMPETITIVENESS, AND AVAILABILITY (Note-Emphasis added) and to engage an independent consultant to review the assessment process."

The Independent Consultants were GTA Consultants and were commissioned by the Infrastructure Department. In their Review (dated 4th September 2020), Page 3 Chapter 1 - INTRODUCTION, section 1.2 Purpose and Scope, they state that "The purpose of this Review is to provide a report assessing the analysis undertaken by ARTC to confirm whether or not the methodologies used to assess the attributes of each route against the key service criteria for Inland Rail have been applied consistently".

This "Purpose" statement by GTA clearly indicates that their review task was to check the accuracy of the like-for-like comparisons made by ARTC after the actual assessment of the Forestry route was done by ARTC as a comparative exercise with the Reference Route (Reference route).

The Executive Summary at the beginning of GTA's Review states that "*It (the review) is based on ARTC's report Inland Rail Information Paper, Information to support assessment of routes for Inland rail in the Border to Gowrie project section, dated 31st August 2020 (Appendix A ), as well as supporting documents and discussions with ARTC staff*". This summary also states that ARTC's comparative assessment of the routes "*focuses on the service offering and cost differences between the routes*".

Therefore, GTA's Review, which was released on 4th September 2020, was fundamentally dependent on the accuracy of the data supplied to them by ARTC - particularly data pertaining to service offering and cost. It should be noted that there is NO mention in Appendix A that the accuracy of this data was ever confirmed by any independent body.

## **SERVICE OFFERING**

It should be noted that the Reference design was compared with 3 routes via Cecil Plains. From near this town, the "forestry route" follows the closed Oakey - Cecil Plains QR railway. But from Mt Tyson, ARTC examined 3 differing options to Gowrie: -

- a. to Gowrie via Wellcamp airport - called via Cecil Plains direct to Wellcamp;
- b. to Gowrie via Aubigny and Kingsthorpe - called via Cecil Plains to Kingsthorpe
- c. to Gowrie via Oakey - called via Cecil Plains to near Oakey.

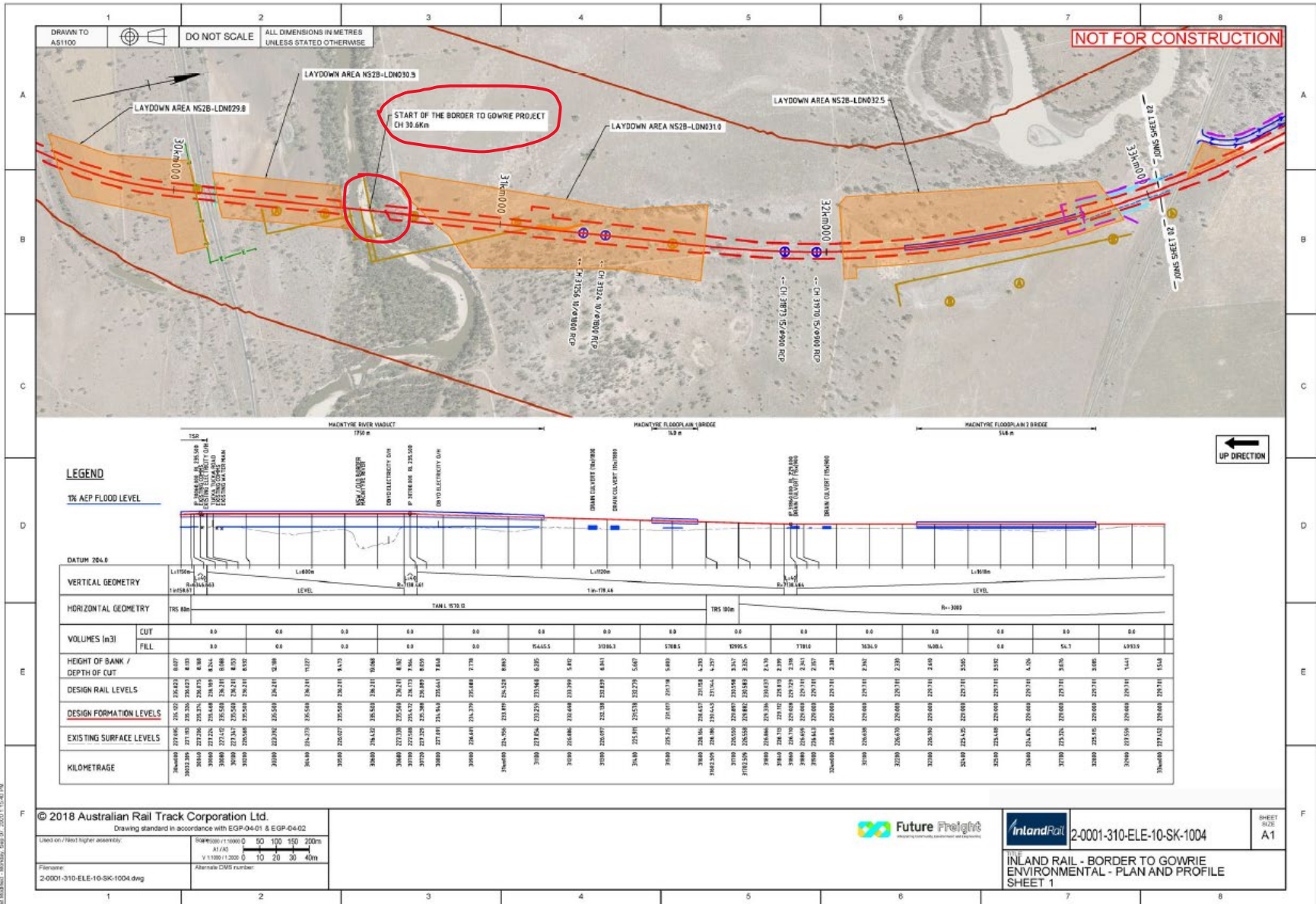
## **INACCURACY of BASELINE ROUTE LENGTH**

On page 7 - Chapter 2 APPROACH to this REVIEW Section 2.4, Table 2.3 summarises the basics of the different alignments (above). This table plainly states the LENGTH of each of the above options and clearly states that the Reference Design is **206.95 km** long. This essential data was supplied by ARTC in Appendix A (the ARTC Information Paper) which also states that the length is **206.9 km**.

However, in the **EIS of B2G**, ARTC have repeatedly stated many times that the length of the Reference Design is actually **216.2 km**. Chapter 5.5 of the B2G E.I.S. ( Project Description) states that "*The Project is a 216.2 km section ... between the NSW/Qld border and Gowrie*" and goes on to state that "*The Project commences at Chainage 30.6 km North Star to Border (NS2B) section at the NSW/Qld border - the medium point at the Macintyre River*". EIS Appendix ZZ, Sheet 1 confirms this by a clear notation indicating the start point of B2G.

However, the Chainage for the B2G does **not** start at this point on the river, as would be expected. The NS2B Chainage continues on into Queensland to finish at **39.85 km and this is where the B2G Chainage commences**. This is shown on Sheet 4 of EIS Appendix ZZ .

# Map Sheet 1 Border to Gowrie EIS





It is, indeed, difficult to understand just why the B2G chainage does NOT start at Chainage 30.6km where the NS2B section ends.

The fact is that there is a **9.25 km (39.85 - 30.6 km)** stretch of B2G route that is **NOT included** in ARTC's stated length of B2G Reference Design.

In reality, then, the actual length of B2G (the Reference Design route) is 206.95 **plus** 9.25 km. This, of course, equals **216.20 km - which is what the EIS states.**

So, in their Information Paper which underpins the Review by GTA, ARTC have **understated the actual length and supplied this data to GTA** - even though this distance was short by 9.25 km. **GTA have accepted this inaccurate data at face value and accordingly based most of their review on it.**

### **RELATIONSHIP AND IMPLICATIONS OF RAIL LENGTH BEING UNDERSTATED TO THE SERVICE OFFERING**

In GTA's review, Service Offering of Inland Rail examines 3 Measures - TRANSIT TIME; RELIABILITY; and AVAILABILITY.

The key component upon which these measures are compared and evaluated is **LENGTH** and, again, GTA were totally dependent on this fundamental data being supplied by ARTC.

Table 4.1 on Page 10 of Appendix A in the GTA report shows the following comparative route distances and differences: -

<b>Design</b>	<b>Difference in length</b>	<b>Actual difference in length</b>
Reference Design - 206.95 km	Baseline	216.2 km
Cecil Plains via Wellcamp - 232.8 km	+ 25.85 km	+ 16.6 km
Cecil Plains via Kingsthorpe - 234.7 km	+ 27.75 km	+ 18.5 km
Cecil Plains via Oakey - 239.8km	+ 32.85 km	+ 23.6 km

However, by comparing the 3 Cecil Plains routes with the actual Reference Design distance of **216.2 km - which is 9.25 km LONGER**, the above differences in distances become reduced and then become: -

- Cecil Plains via Wellcamp - +16.6 km
- Cecil Plains via Kingsthorpe - +18.5 km
- Cecil Plains via Oakey - + 23.6 km

The key to the comparisons of Service Offerings is not so much the actual lengths of the routes, but the **DIFFERENCES** in length of the routes. The above shows that the actual differences have been over-estimated by between 35% to 30% in Table 4.1.

## TRANSIT TIME

Table 1.1 in the GTA report shows that ARTC have estimated that, for the Reference design, this will be 2 hours 50 minutes. But this was for 206.9 km - not for the actual 216.2 km of B2G. Proportionally, then, it is likely that the transit time for B2G would be 2 hours 57 minutes - an increase of 7 minutes. This requires an average speed of 73.3 kph - which is marginally faster than ARTC's calculated average speed of 73.2 kph (Reference Table 6.1 - Page 16 in the GTA report).

However, to achieve the same transit time of 2 hours 57 minutes, the respective speeds of trains on the Cecil Plains routes would only need to be : -

Wellcamp - 78.9 kph

Kingsthorpe - 79.5 kph

Oakey - 81.2 kph

It needs to be stated here that the 3 Cecil Plains options ALL traverse approximately 90 km of uninhabited State Forest and all follow the existing Qld/NSW Interconnector (QNI) Power Line easement/corridor through this forest. The Reference Design only traverses 15 km of intact State Forest. Therefore, higher than average train speeds would be possible through this 90 km forest section. This fact was confirmed by C.E.O. Richard Wankmuller in July 2020 at Pampas when he was asked to comment on the potential of train speed through the forestry section. He said that speeds of up to 105 kph would be possible through this section!

The ability for trains to travel at faster speeds through the 90 km of forestry means, of course, that the average speeds would be markedly increased so that the above 3 average speeds needed to achieve the identical transit time of the Reference Design train, would be easily and realistically achievable. **The transit times on these 3 Cecil Plains routes could easily be LESS than that of the Reference Design train.**

### ***Other factors affecting transit time***

Paragraph 2.2 (Page 6 of Information Paper) states that the following factors also affect transit times: -

- A. Number and distancing of CROSSING LOOPS
- B. Length of any sections within active or rail corridor
- C. Gradients or speed restrictions impacting transit time

#### A. Crossing Loops

The EIS states that there will be **5** Crossing Loops to service the 216.2 km of B2G. But ARTC state in Table 6.2 (Page 17)- that there is a requirement for **6** Crossing Loops for the Cecil Plains options. Why is there a need for an extra loop when there is only a total extra length of 16 to 18 km involved?

Even though the 5 Loops described in the EIS are varying distances apart and the 6 intervals in between vary from 42 to 16 km, the average interval length is 34 km from the NSW border to Gowrie.

A similar calculation involving 5 loops servicing the 234.7 km (Kingsthorpe) route would result in the average interval distance being 37 km in length - again from the NSW border to Gowrie.

So, the intervals need only to be an extra 3 km longer if 5 loops were incorporated rather than 6.

It needs to be also understood that the spacing of loops considers geographic unsuitability (floodplains, for example) as well as distance, but the transit times of trains in between the loops is of primary importance so as to reduce stopping times of trains in the loops and allow other trains to pass. So, whilst it is acknowledged that the intervals on the Cecil Plains routes would have to be longer by an average of 3 km, it would not take any longer for trains to travel this slightly extra distance if their speed was maintained at 80 kph.

### B. Length of Brownfield Sections

Whilst this factor was mentioned in Paragraph 2.2 as being a factor in Transit Time, ARTC have not included any analysis to indicate just how this factor is relevant.

It may well be that transit times would be increased if trains were obliged to slow down whilst passing through or past communities located along brownfield sections. If this is the case, the Reference Route would be affected more than the Cecil Plains options as the alignment of the former passes through both Pampas and Brookstead.

The Cecil Plains options, on the other hand, only currently involve Mt Tyson - but this township could be easily bypassed similarly to Pittsworth on the Reference Route.

### C. Gradients or Speed Restrictions

Again, it is curious that this factor is mentioned (above) but its impact on transit time is NOT explained in the Information Paper.

And yet, these topics are vitally relevant to transit times on all the routes.

GRADIENTS: Appendix B (Page 35) of the Information Paper shows a "Long Section showing the Vertical Rail Height Overlayed for all Three Routes". This is a comparative sectional drawing illustrating the vertical differences between the Reference Route and 2 Cecil Plains options. Although it is obvious that the 2 Cecil Plains routes (and particularly the Kingsthorpe option) are flatter than the Reference Route, the 60 km section from Brookstead to Gowrie is significantly undulating in terrain and, even allowing for the necessary cuttings, embankments, and viaducts, has long gradients of up to 1:84 (Reference EIS Appendix ZZ) which will obviously slow trains down.

SPEED RESTRICTIONS: Again, ARTC have failed to give any explanation as to what these "speed restrictions" refer to. Having differentiated this from gradient, it would be reasonable

to assume that these restrictions would refer to curvature along the route alignments. The fact that, from Cecil Plains eastward to Mt Tyson, the Cecil Plains routes follow the rectilinear alignment of the QR closed railway would preclude any significant speed restrictions along that section alone.

Despite the fact that ARTC have not explained the importance of these restrictions and their impact on transit time, it is significant to note that ARTC C.E.O. Richard Wankmuller stated, in his address to the July 2019 Sydney Inland Rail conference, that to achieve the 24 -hour Service Offering from Melbourne to Brisbane, Inland Rail had to be built "flat and straight".

In this respect, the Cecil Plains route options are superior to the Reference Route

## **RELIABILITY**

Chapter 9.3 (page 31) refers to the routes' ability to achieve the advertised time of destination arrival and " The 2015 Business Case set a target of 98% reliability .. ". This chapter also states that "*Reliability is directly linked to transit time (and hence distance) ....*" and conceded that the 2 Cecil Plains routes both delivered reliability performances of **97%**.

But this "marginally less" ARTC calculation was based on slower transit times of the Cecil Plains routes because of the overstated difference in route lengths compared to the Reference Design route - which has been disputed (see above).

Additionally, the reliability rating of the Reference Design route was quoted as being 98% - in line with the Business Case requirements. Table 3.3 states that the "*results are based on reliability buffer modelling developed for the 2015 Business Case*". There is NO mention made in the Information Paper as to how this modelling was developed and if, in fact, that the 98 % rating was accurate.

**Therefore, the reliability rating of all these routes is unlikely to be different at all to the Reference Route.**

## **AVAILABILITY**

Similarly, with "Reliability" above, Chapter 9.4 (page 31) states that "*Any increase in line-haul transit time by definition therefore impacts freight availability ...*".

**So, therefore, as with reliability, the availability rating is unlikely to be different and, in any case, Table 9.5 (Page 32) indicates that it would take a change of 30 minutes more transit time to influence availability by - 1.8%.**

## **COST**

### **Construction Costs**

Table 2.1 (Page 7) illustrates that 93% of direct construction costs are attributable to :-

- a. Civil Earthworks and Track Construction
- b. Bridges
- c. Culverts



- d. Road - Rail interfaces
- e. Materials

The above estimate is repeated on Page 19 - Chapter 7.1 - ' Like for Like' Comparison of Construction Costs.

No figures are given, however, to indicate just what are the respective proportions of each of the above elements. For example, are these 5 components in descending order of cost impact? Are Civil Earthwork costs twice as expensive as, for example, Bridge costs?

It could easily be seen, therefore, that if Civil Earthworks accounted for, say, half of the costs of all the 5 components listed, then this would be the predominant component to consider in any cost analysis.

### CIVIL EARTHWORKS

Chapter 7.2 (Page 19) states that "*Track construction costs for rail projects is directly proportional to the overall length of the track to be constructed.*" Notation above shows that the extra length of the Cecil Plains routes will only be 16 to 18 km longer than the Reference route but, whilst the above ARTC statement is self-evident, it does not give any insight into just what will be the comparative challenges of terrain between the Reference Design and the Cecil Plains routes. The following is a brief outline of just what the major soil and terrain challenges will actually be.

#### *The Reference Design.*

This route runs through Sodosol soil country south and just east of Millmerran to Yandilla. In between this Sodosol soil is a 20 km belt of Vertosol soil. Sodosol soils have dispersive (unstable) sub-soil characteristics and both Sodosols and Vertosols will have implications for rail foundations and may require excavation and fill with suitable material. ( see below in **SOIL TYPES** for more soil information)

The Condamine floodplain will require embankments 2.7 metres high to ensure flood mitigation.

From Brookstead east to Gowrie, the undulating and often steep terrain is such that it will be necessary to build embankments of up to 16 metres high and excavate cuttings to a depth of 27 metres .

#### *The Cecil Plains Route*

This route passes through Rudosol and Tenosol soil country (the Forestry) for 70 km to south of Cecil Plains. This is rudimentary rock and sand which is eminently suited to rail foundation without major earthworks.

The country east of the North Branch of the Condamine River at Nangwee to Evanslea is subject to shallow overland water flowing from areas around Pittsworth and Irongate. Included in this section is also an area of approximately 16.7 km over which water does not

flow at all. Embankments of **less than 1 metre high** have been calculated by DPI soil scientists to be adequate.

From Mt Tyson east, the gradient is quite flat- as shown in Appendix B (Page 35). There will only be minimal earthwork requirements along this 40 km of track.

### *Summary*

The above notes on the respective routes should indicate that, whilst it is recognized that the Cecil Plains routes are, indeed, up to 18 km longer than the Reference Design, the completely dissimilar soil types and terrain between the 2 routes will be critical in any cost analysis on Civil Earthworks and highly favourable to the Cecil Plains options.

### **Bridges**

The main focus of the Information Paper is on the assessment of the Condamine River and the North Branch. This is found on Pages 20, 21, and 22 and includes Table 7.1 - Condamine floodplain metrics.

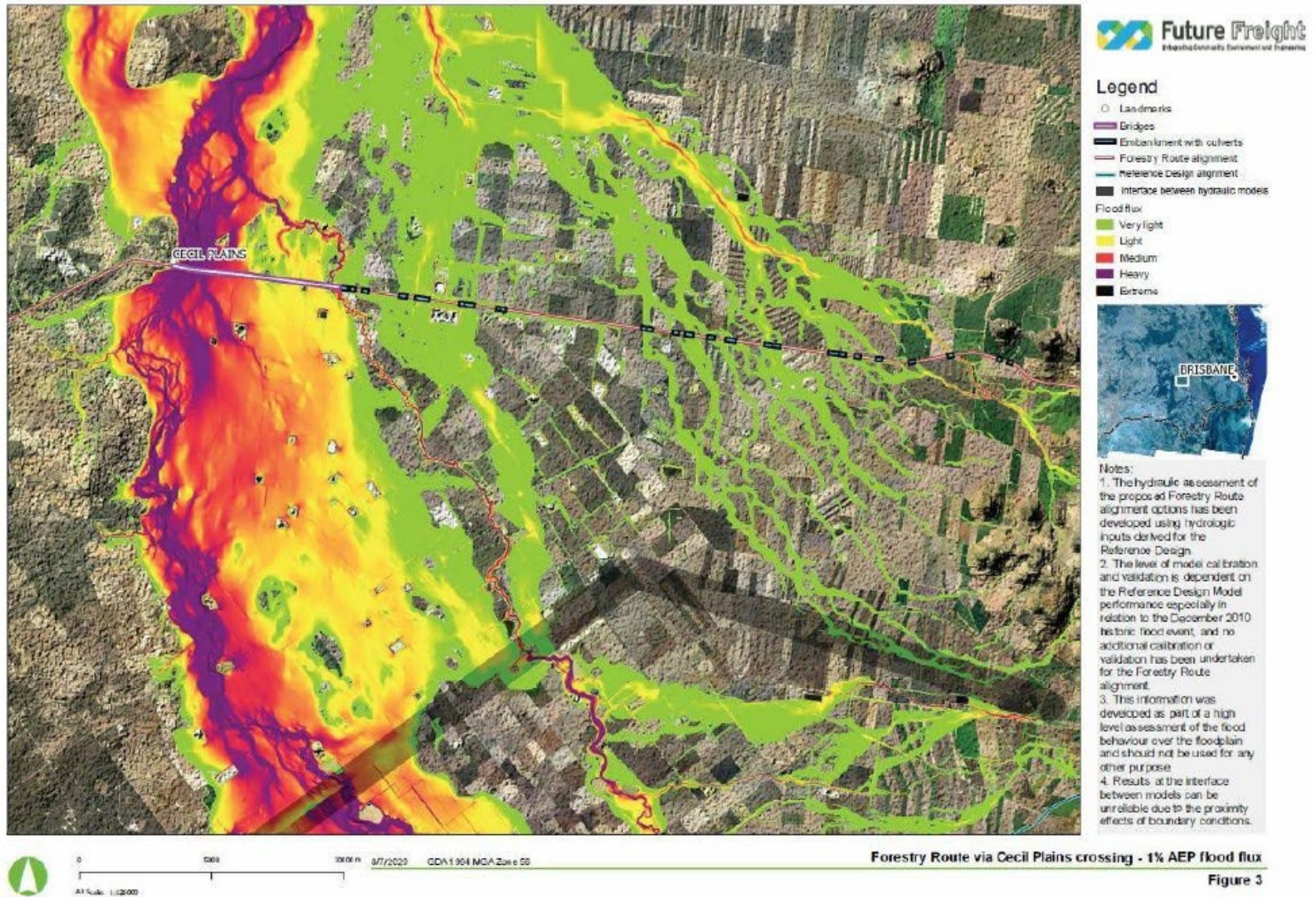
It is necessary, at this point, to mention that ARTC have made reference to their consultation with "locals" who "advised that collectively the two areas of floodplain are known colloquially as the "Condamine Valley floodplain"." And yet perusal of Map D3 (Page 42), which specifically shows the 1% AEP flood flux for the Condamine River east of Cecil Plains, shows that the extent of heavy and medium flooding only extends eastward from Cecil Plains for **3.1 km**. In fact, the crossroads at Horraine (3.6 km from Cecil Plains ) do not flood at all. Any North Branch water east of the Branch itself is marked as being "very light" flood risk.

So, it is puzzling to understand just why ARTC have referred to the 33 km section from Cecil Plains to Evanslea as being the "Condamine Valley floodplain". This nomenclature is obviously an exaggerated misnomer which has been used by ARTC to magnify the nature and actual width of the potential flood zone of Condamine River water. In fact, although the 20 km of country east of Nangwee is flat plainland to Evanslea, Condamine River water does NOT flow across this area at all.

Table 7.1 (page 21) states that ARTC have determined that a 6.3 km viaduct across the floodplain is required. Whilst acknowledging that viaducts will be necessary across both the main stream of the Condamine River and the North Branch, it is difficult to see why a continuous 6.3 km viaduct from Cecil Plains to the east side of the North Branch is essential - particularly in view of the fact that approximately 1 km of that distance is flood free at Horraine.

Why not 2 viaducts - one from Cecil Plains east for 3.1 km and another of 2.0 km over the North Branch? This proposal would bridge ALL the areas of potential heavy and medium flood flux as well as the 2 km area of light flood flux west of the North Branch and would save over a kilometre of unnecessary bridging cost impacting on the comparative costing of the Cecil Plains routes.

# Map D3: Forestry route via Cecil Plains – 1% AEP flood flux



## OPERATIONAL COSTS

ARTC have stated that operational and maintenance costs are directly impacted by changes in transit time and route distance. (Chapter 9.1 - Page 29). Table 9-1 illustrates just which components of these costs are determined by extra distance and which are affected by transit time increase. Fuel consumption is unique in that it *"is predominantly determined by distance but also has a time related component"*.

However, there is no consideration given to the extra fuel which would be required for 4000 + trains to traverse the undulating terrain from Brookstead to Gowrie compared to the relatively flat track profile (particularly to Oakey and Kingsthorpe) of the Cecil Plains routes. Fuel consumption on the Reference Route along this last 60 km to Gowrie is likely to be significant with 3 uphill sections ranging in length from 14 km to 5 km and with gradients of up to 1:84.

There is no doubt that track maintenance would be an extra cost factor because of the extra length of the Cecil Plains routes, but the reduction in length difference of 9.25 km (see Service Offering, above) will proportionally reduce any calculated extra maintenance costs by 30 to 35% (see Implications of Rail Length being Understated to the Service Offering, above). But, in any case, there is NO consideration given to the fact that the Cecil Plains routes would traverse 70 km of Rudosol soil through the forestry section where the nature of this soil would obviously minimize maintenance work/cost on foundation and track.

Table 9-1 indicates that "Transit Time" is the factor that drives the cost of Train Crewing; Loco and wagon maintenance; Freight "value of time"; as well as contributing to fuel cost. However, as stated in TRANSIT TIME (above), with the proven 9.25 km less distance than quoted by ARTC in their Information Paper and the capability for increased train speed through the forestry in particular, Transit Times via Cecil Plains would be rendered **equal**, if not less, than the Reference route. This being the case, then the above factors become irrelevant to any perceived operational cost increase.

ARTC have attempted to quantify the increase in operating and maintenance costs up to mid 2075 - in their Tables 9-2 and 9-3 - which are both found on page 30. This table compares the individual extra costs of the 2 Cecil Plains routes with the Reference Route. But, once again, ARTC have stated, in the preamble to these tables, that " Note that the figures in Tables 9-2 and 9-3 are the resultant increased costs associated with longer distance and transit time, taking the reference design route as the baseline point of comparison".

So, because of the inaccuracy of the base length of the Reference route and the resultant lack of difference in transit time, the figures in these charts cannot be considered as accurate or reliable.

## **COST OF LAND to be RESUMED for INLAND RAIL**

In Chapter 8.3 ( page 27), ARTC have attempted to estimate the value of the land impacted by each route.

They have made a series of "assumptions" including, curiously, that "calculations of land value are based on a desktop assessment by applying an assumed value rate per hectare according to land type/use, the rates based on previous desktop valuation advice"!

ARTC then acknowledge that "desktop assessments carry a greater degree of risk of variation than would be expected from a detailed physical inspection of the impacted properties...".

The chapter ends with Table 8-3 (page 28) which indicates that the estimated value of land impacted is \$30.7 million less via Cecil Plains & Wellcamp and \$ 25.4 million less via Cecil Plains & Kingsthorpe - compared to the B2G Reference Design.

Apart from the above acknowledgement, admission of several assumptions, and seemingly total reliance on the "accuracy" of desktop analyses, there has been no attempt made by ARTC to explain quantitatively how the above figures have been calculated and, indeed, how accurate was the compilation of the comparative data.

It is important to note that, without any supporting data on actual area and land use, these figures are speculative and meaningless.

The following facts, however, are critical in any comparative analysis of the relative cost of land resumption along the different routes: -

- A. Length of Brownfield sections
- B. Length of Forestry sections
- C. Length of Greenfield sections

#### A . BROWNFIELD

Chapter 4.1 (page 11) presents " a brief overview of the major elements of the 3 routes" and states the brownfield distances as being as follows

- |  |          |
|--|----------|
| 1. Reference Route - 71.2 km                   | baseline |
| 2. Cecil Plains & Wellcamp - 78 (approx) km    | + 7 km   |
| 3. Cecil Plains & Kingsthorpe - 87 (approx) km | + 16 km  |

However, the "approximate" distances quoted on the Cecil Plains routes are questionable. Given that all the 3 routes share the same common brownfield alignment distance of the QR South Western Line, the difference in distances (above) of 7 km and 16 km respectively has to be the Brownfield differences on the Millmerran Line of the Reference Route compared to the Brownfield differences on the Cecil Plains Line.

Appendix ZZ of the EIS shows that the Reference Route follows the Millmerran Line for **24 km** from Yandilla to Yarranlea, but yet the Wellcamp route follows the Cecil Plains - Oakey Line

for **40 km** and the Kingsthorpe route follows the Cecil Plains - Oakey Line for **55 km plus** the West Moreton Line for **12 km** - which totals **67 km!**

Therefore, the comparative distances quoted by ARTC are incorrect and should read: -

Route	Difference in distance	Distance of Brownfield Route
Reference Route	24 km - Baseline	71.2 km
Cecil Plains & Wellcamp	40 - 24 km = +16 km	87 km
Cecil Plains & Kingsthorpe	67 - 24 km = +43 km	114 km

Note: optimising brownfield reduces costs, social and environmental impacts. There are NO resumption costs for any section of brownfield as they not privately owned.

### B. FORESTRY

There is a significant difference in the respective lengths of Forestry sections in ARTC's "Major Element" overview (Chapter 4.1 - Page 11) above.

State forest sections are shown as: -

1. Reference Route - 15.2 km
2. The 2 Cecil Plains Routes - 90 km each

Again, being State owned land, there are NO resumption costs to be evaluated through these sections.

### C. GREENFIELD

These areas are where resumption costs will be necessary for the acquiring of privately-owned land.

For a simple determination of actual length of Greenfield, the following formula is, therefore, appropriate: -

$$\text{Greenfield} = \text{Total route length} - \text{Brownfield length} - \text{Forestry length.}$$

$$\text{Reference Route} \quad 216 - 71 - 15 = 130 \text{ km Greenfield}$$

$$\text{Cecil Plains \& Wellcamp} \quad 233 - 87 - 90 = 56 \text{ km Greenfield}$$

$$\text{Cecil Plains \& Kingsthorpe} \quad 235 - 114 - 90 = 31 \text{ km Greenfield}$$

The Greenfield alignments are, of course, where the Government is obliged to pay for the privately-owned land required as well as for compensation for severance, etc. In terms of actual cost, therefore, the Brownfield and Forestry section lengths should be bundled together as sections which do not require resumption cost consideration.

It can easily be seen from the above that the Reference Route will require resumption cost payments for an **extra 74 km** than for the Cecil Plains & Wellcamp route and for an **extra 99 km** than for the Cecil Plains & Kingsthorpe route.

However, not only are these actual extra distances of these Greenfield sections highly significant to costing calculations, but also the NATURE of these necessary resumptions is important as well. In the case of all the above routes, Inland Rail will traverse greenfield in prime central and inner Darling Downs country. This, of course, will mean that resumption costs through this land will be of a premium level as is reflected by potential productivity, lifestyle desirability, and proximity to towns and services.

So, costs of resumptions will be for the very best of rural, rural - residential, and urban land.

ARTC's absence of quantitative data, use of assumptions, and incorrect evaluation of the comparative lengths of the compensable lengths of the routes is reflected in their statement that *"it is not considered that the total (compensable cost) would make a material difference to the assessment of cost competitiveness of the routes via Cecil Plains"*. This dismissive attitude by ARTC towards this very real costing advantage of the Cecil Plains routes appears, therefore, to be mainly speculative; lacking in proper approach; and renders any actual, correct calculation impossible.

Based on the above figures, therefore, it is probable that the - \$30.7 million and - \$25.4 million cost advantages for the Cecil Plains routes have been drastically and, possibly, deliberately underestimated by ARTC and that more significant cost savings than what they have estimated would be likely along these 2 routes.

## **ADDITIONAL FACTS ABOUT THE CECIL PLAINS ROUTES NOT MENTIONED IN THE REVIEW**

**A. The 63 km length of the Oakey - Cecil Plains QR line** (along which the Forestry Routes follow) was closed in 1994. Since that time - 27 years ago - NO maintenance has been carried out on the track, embankments, and wooden trestle bridges at all. To all intents and purposes, it has been abandoned but could be reinstated if there were favourable economic indicators.

And yet, all this infrastructure - some of it dating from 1915 - is INTACT. The major bridges over the Condamine River, the North Branch, Ashall Creek, Linthorpe Creek, and Westbrook Creek are all still intact and appear to have not sustained any damage during the 27 years of neglect. The one exception is a short timber culvert south of Aubigny which was physically removed a decade ago because it had silted up.

The fact that this closed line has withstood the impact of floods over this time without any maintenance is surely a recommendation in itself that this particular route section is superior to the Millmerran Line where extensive damage was sustained in the floods of 2011/12 - leading to the abandonment of this line from Brookstead to Millmerran.

**B. Soil Types** ARTC have not included any analysis or research into the varying soil types and their respective characteristics along the alignments of the Reference and Cecil Plains routes. This exclusion from not only construction but also maintenance costs is difficult to understand given the absolute differences in suitability for rail projects and the resultant increases in costs (initial and ongoing) between differing soil types.

ARTC, on Page 11, have acknowledged that the 2 Cecil Plains routes use the same 90 km corridor between Whetstone and Cecil Plains and this alignment is 90 km long through state forest. Reference to ASRIS (Australian Soil Resource Information Systems) (see attached chart) indicates that this alignment passes primarily through RUDOSOL and TENOSOL soils. Their description is :-

A. RUDOSOL soils - Rocky, shallow soils (infertile, not very erodible, good foundation)

B. TENOSOL soils - Sandy, shallow soils ( infertile, not very erodible, good foundation).

The Reference Route, on the other hand, in the 75 km between Inglewood and Yandilla, traverses mainly SODOSOL and VERTOSOL soils. Their description is: -

C. SODOSOL soils - Duplex soils with sandy or loam A horizon overlaying a B horizon of sodic (dispersive, unstable) clay (very risky for foundation material due to high risk of tunnel erosion).

D. VERTOSOL soils - Cracking clays (fertile, highly erodible, poor foundations).

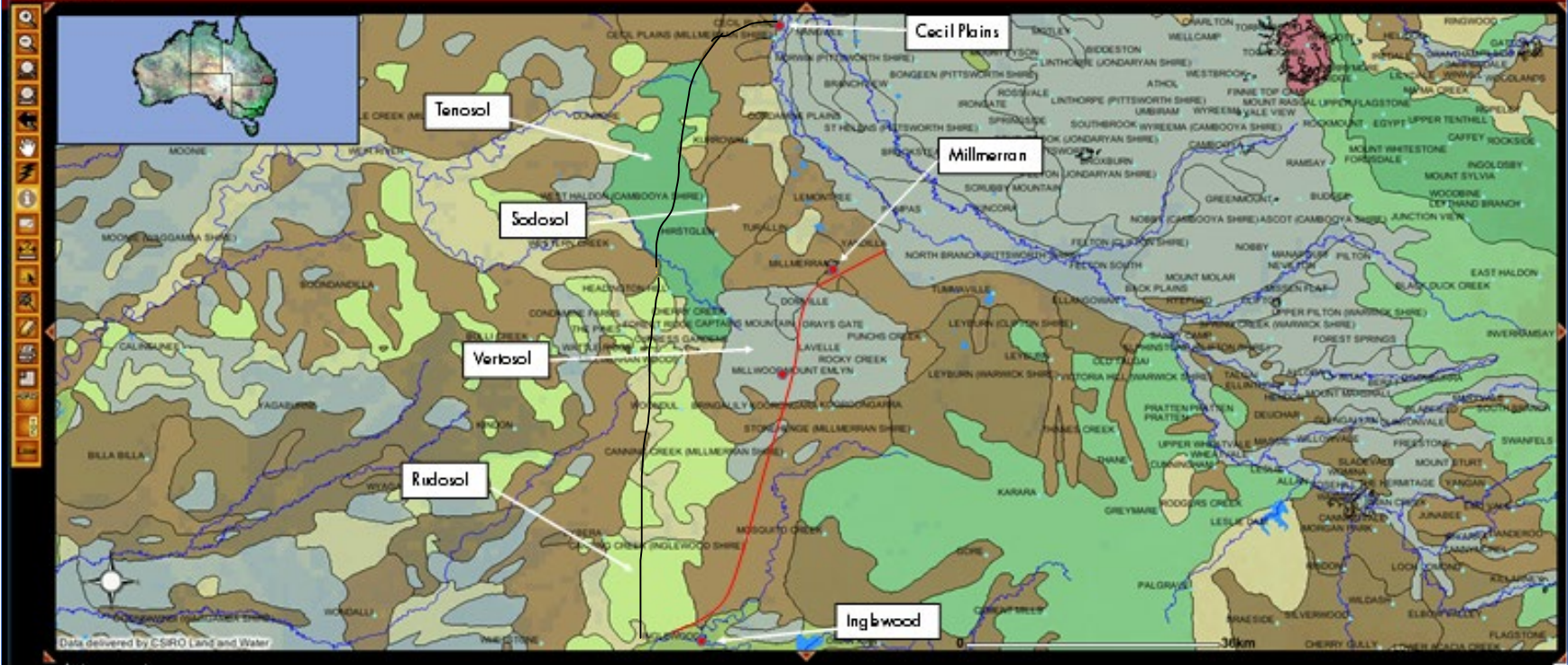


# ASRIS

Australian Soil Resource Information System

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Maps - Identify



The soil type descriptions (above) clearly demonstrate the fundamental difference between the 2 different route alignments. The Cecil Plains routes follow country which is eminently suitable for heavy rail construction at base cost. The need for foundation excavation and fill with suitable material will be consequently eliminated as the soil itself lends itself to actual foundation usage.

The Reference Route, on the other hand, traverses land which is clearly unsuitable for the foundations for this rail track. Land along this corridor will have to be excavated to suitable depth and then filled and compacted with "bought-in" fill - just to have a stable base for the foundation, ballast, and track. The cost and logistic issues will be comprehensive. Where to stockpile and eventually dispose of the excavated material? Where to source suitable, compliant fill and how far to carry this fill to the required site? Where to source adequate and suitable water to properly compact the fill?

It should be obvious that the issue of selecting a route with naturally suitable soil against proposing a route with clearly problematic soils should be a basic requirement of any infrastructure - especially one of the magnitude of Inland Rail. It's not just as simple as considering costs, the route selection process needs also to look at resultant long-term issues that could easily arise from foundations subsiding - with consequent rail failure.

**C. Forestry Alignment** The 90 km section of route between Whetstone and Cecil Plains passes through uninhabited state forest and is common to the 3 "Cecil Plains" routes.



What is not revealed in ARTC's Information Paper is that this route is not just through virgin Cyprus Pine forestry but it is planned to follow an existing Power Line called the Queensland - New South Wales Interconnector (QNI). This major power transmission line runs from the Braemar Power Station and continues in a southerly direction through the forestry and into NSW.

The line was commissioned in 2001 and its construction involved clearing a corridor through the forestry. This is where the Cecil Plains routes are planned to be aligned - within the QNI corridor and parallel to the line itself. The corridor varies in width of cleared forest from 60 metres to 90 metres or more in some places. The actual power line is mainly sited on the western side of the cleared corridor and this would allow the rail line to be built on the eastern side of the corridor. There may have to be an extension in cleared width on the east side of the corridor to allow sufficient width to build and operate the line, but it would be only in the order of 10 to 20 metres in places. Any Cyprus Pine trees needing removal could be milled for lumber use. No privately-owned land would be affected

It is obvious, therefore, that an eminently suitable rail corridor is in existence for 90 km through uninhabited state forest and along country where the soil types are demonstrably the best available for rail construction. These facts were totally overlooked by ARTC and NOT included in their Information Paper.

Map of Proposed Forestry Route



-  Suggested corridor through the forestry between Yelarbon and Cecil Plains
-  An indicative sketch of the forestry districts between Yelarbon and Cecil Plains

**D. Environmental considerations** The Information Paper was drawn up by ARTC who were requested to compare the Cecil Plains routes with the Reference Design route "to access its ability to meet business case requirements". ARTC were not instructed to compare engineering feasibility between the routes, nor were they required to compare the environmental issues of each different route.

However, in comparing the routes in respect to the Business Case - which is primarily all about the projected economic benefits and costs of this railway - it does appear to be remiss not to include subjects such as environmental impacts. Admittedly, this would not directly affect the economies of Inland Rail, but nevertheless, it would be of immense concern and distress to many people for them to know that NO consideration had been given to ensuring that the route chosen was the most environmentally responsible.

Accordingly, and using Koalas as a key example of unique Australian fauna, the following comparison is presented on potential risk to this species.

**REFERENCE DESIGN ROUTE** Concerned citizens and members of Pittsworth Landcare have conducted Koala observations and scat collections in the area along the alignment of this route from south of Millmerran to Wellcamp - a distance of 80 km. Despite ARTC providing "location" maps in the B2G EIS which only indicated Koala activity north of Pittsworth and near Southbrook, ample evidence was submitted to the Office of the Qld Co-ordinator General (OCG) to show that Koalas do exist and, in most cases, thrive along this whole 80 km length of the Reference route and would be at risk if Inland Rail were to follow this alignment.

**CECIL PLAINS ROUTES.** From Whetstone 90 km northwards to Cecil Plains, this alignment passes through Cyprus Pine forest. These trees do NOT provide forage and/or shelter for Koalas so, consequently, they do NOT inhabit this forestry section. From Cecil Plains eastward to Evanslea, the route follows the closed QR railway for 32 km over what has historically always been a treeless plain. The only few trees in existence currently are those that have been planted near houses which are typically distantly separated from property to property. So again, this is not habitat which will support Koalas so there are none there. The 30 km section from Evanslea to Kingsthorpe is the only section capable or likely to support Koalas.

The comparison, therefore, is that the Cecil Plains route does not present any threat to Koalas for 120 km, but there are definite potential concerns for Koalas for at least 80 km along and beside the Reference Route.

## **E. Rail freight potential**

1. ARTC's Information Paper did not mention any potential for extra rail freight income and/or suitability which could be very likely along the Cecil Plains routes. The alignment through to Oakey following the old QR Line passes by 2 major abattoirs - Beef City and Oakey Beef Exports. Beef City abattoir is situated beside its own feed-lot.

The Qld Govt re-opened 1.3 km of this QR line in 2016 to allow prime cattle to be rail freighted from western Qld direct to Oakey Beef Exports for slaughter. If the Cecil Plains route was adopted as the Inland Rail route, then there is obvious potential for Beef City to similarly use rail as well- both from Qld as well as from NSW and Victoria.

Additionally, store cattle from markets at Roma and Dalby could also be freighted south for fattening by rail as well. The Roma sale yards are Australia's largest and southern buyers source thousands of store cattle from there (and Dalby) and currently they go south by road.

**2.** Because it is situated on the eastern edge of substantial Cyprus Pine forestry reserves, Cecil Plains has always been a centre for sawmilling. Logs come in from the adjacent forestry reserves by timber jinkers for milling and the sawn timber is distributed by road. Because the town is beside the rail route alignment, there is obvious potential for this lumber to be railed away- particularly to southern buyers.

**F Groundwater impact** ARTC have stated that the Reference Design will involve major cuttings between Yarreenlea and Athol, which in turn will have a negative effect on groundwater – both recharge and flow. The Reference Design traverses closely settled and rural-residential areas and loss of access to water could make these properties unviable. Within the project footprint provided by ARTC there are at least 404 bores which could be affected. In comparison, because major cuttings are not required on the Cecil Plains routes, there will be no effect on groundwater.

**G Future connection to Gladstone** With governments and industry both considering whether it may be preferable for Inland Rail to extend north to Gladstone via Dalby, Miles, and Banana, the Cecil Plains alignment which terminates at the West Moreton Line at Oakey merits serious consideration. Oakey is 25 km west of Gowrie and so is 25 km closer to Gladstone. There is ample acreage west of Oakey for inter-modal freight terminals - right beside the old QR rail alignment.

From an integrated freight mode perspective, rail freight from the south could be off-loaded at Oakey and road freighted DIRECT to Qld destinations. With trucks now required to use the Toowoomba Bypass, freight destinations in Brisbane, Gold Coast, and Sunshine Coast are only 2 to 3 hours away from Oakey.

By comparison, the Inland Rail concept is to build/ upgrade rail to Acacia Ridge - an existing rail depot which is currently at capacity with no room to expand. The construction from Gowrie to Acacia Ridge involves 3 tunnels and the whole project is estimated to cost 35% of the total cost of Inland Rail.

But the rail transit time from Gowrie to Acacia Ridge is certain to be about 3 hours - in which time road transport would be delivering at the final destination.

So, the concept of Inland Rail following the Cecil Plains route to Oakey and thence to Gladstone - but still being able to service the Brisbane market in equivalent or better time

(and direct to final destination) by integrated road delivery - is a workable and economic compromise to effectively service both markets.

## SUMMARY

With respect to the "Comparative Review of the Forest Route Options of Inland Rail via Cecil Plains", the above analysis shows that the Review and the Information Paper supplied by ARTC is primarily dependent on the extra distances claimed by ARTC between the Reference Design Route and the routes through Cecil Plains.

These extra distances were claimed to be directly or indirectly responsible for eliminating the alternative routes due to the following factors which would affect the Business Case and Service Offering of Inland Rail: -

1. Transit Time
2. Reliability
3. Availability
4. Cost - construction, maintenance, operations

Whilst it is obvious that the length of the rail alignment would be a prime factor in calculating the above, ARTC have based their figures on differences in rail lengths which are incorrect by 30 to 35% and, consequently, these incorrect figures have a corresponding impact on the accuracy of their findings. Additionally, as shown above in this analysis, other essential factors such as ability to maintain faster speeds with safety as well as terrain and soil advantages have not been included in their Information Paper assessment.

It follows, therefore, that the comparative assessment by ARTC between the Reference Design route and the Cecil Plains routes cannot be accurate and the figures therein should not be used as a basis in any future decision on what is the "best" way for Inland Rail to be built from the NSW border to Gowrie.

The exaggerated description of " the Condamine River Valley floodplain" and the spurious claim that it is 33 km in width is not only totally inaccurate by 80 %, but also the way in which this was researched and examined was fundamentally unprofessional. ARTC have devoted 3 pages (Pages 20, 21, and 22) of their Information Report with descriptions and metrics of the differing sections from Cecil Plains to Evanslea and how this compares to the Reference Design route. Whilst the comparative metrics are informative in respect to embankment lengths, etc., no mention is made about the comparative necessary heights of these structures and, again, Table 7-1 (river metrics) is wrong from the start when it states that the Cecil Plains "River Crossing" is 33 km long.

Add to the above the fact that ARTC have not accurately costed the alternative routes; have not accounted for the cost savings of using state owned land or brownfield options; have not overlaid the increase in speed which is able to be achieved by a flat straight route; have not investigated any environmental impacts and have not considered the positive economic benefits of the alternative routes.

The evidence in this report shows unequivocally that the ARTC information upon which the consultants were instructed to rely upon for their analysis was fundamentally flawed to ensure ARTC received the predetermined outcome they required.

The data was at best misleading but has resulted in the best route for the Inland Rail via the forestry, Cecil Plains and Oakey to be dismissed resulting in missed economic opportunities. Ensuring that the Reference Design was the chosen route, means that the insurmountable issues faced by Inland Rail with respect to construction, social and environmental impacts still exist. The only solution is for the route alternatives to be re-visited taking into account the factual data presented in this report.

Therefore, a fresh multi-criteria analysis is required to be commissioned using a proficient, fully independent and unbiased organisation which is willing to incorporate issues and knowledge from local residents into the terms of reference and ultimately into the final report.



## References

1. Inland Rail B2 G Alternative Route Comparison Review – Review of methodologies for like-for-like comparative assessment FINAL – GTA consultants
2. Appendix A ARTC information paper dated 31 August 2020