



8. Route Options



8 Route Options

8 Route Options

This section of the report discusses the various route options. It describes and compares the routes. A summary of the issues evaluated is included in summary tables below. Engineering drawings of the route options are provided in Appendix E. Supporting information in the form of Route Option Report Cards is provided in Appendix F.

8.1 Segment A - Landsborough

The routes described below are shown in Figure 8.1, as well as drawings CS001 to CS005 of Appendix E, with the summary of the evaluations is included in Table 8.1.7. Further supporting information is provided in Appendix F.

All routes in segment A have the following in common:

- Start point at the northern end of the existing station at Landsborough
- End point north of Rose Road
- Grade separation at Gympie Street North, to the north of Landsborough Station (road over rail). This is in close proximity to Landsborough Primary School
- A new crossing of Addlington Creek (in close proximity to the existing rail crossing). This creek has been identified as important habitat for the federally listed (Endangered, EPBC Act 1999) Giant Barred Frog (*Mixophyes iteratus*)
- Impact the western edge of the Landsborough Recreation Reserve to varying degrees
- Varying extents of impact to Dularcha National Park
- Varying lengths of construction within/adjacent to the existing rail corridor
- New tunnel under the ridge at Rose Road
- Varying degrees of construction complexity, due to the need to start from the existing operational rail corridor at Landsborough, and the environmental and topographical constraints through Dularcha National Park.

8.1.1 Route A1

Route A1, shown on drawing CS001 of Appendix E, follows the existing rail corridor for approximately 1 km. It would impact on properties to the north of Landsborough Station, on the western side of the existing rail corridor. It then diverts slightly, crossing over the existing rail corridor to the west, and traversing the eastern portion of Dularcha National Park. This would create two fragmented portions of National Park between the existing rail corridor and route A1. Route A1 would require a new tunnel

to the west of the existing operational tunnel under Rose Road. It fragments areas of 'Of Concern' Regional Ecosystems, and would also require two complex crossings of the existing rail corridor.

Route A1 impacts on a total of 30 properties¹¹, including:

- 19 Township Residential: the eastern boundary of properties adjoining the existing rail corridor, and several to the east of the Landsborough School oval
- Two Community Purpose (Landsborough Primary School Oval and a property adjoining exiting parkland on the eastern side of the existing rail corridor, on Gympie Street North on a QR owned property outside of the existing rail
- Five Open Space (Conservation and Water Ways) including Dularcha National Park, and two parkland areas associated with residential developments on the western side of the existing rail corridor
- Three Rural properties: on Rose Road, at the tunnel crossing point
- One Open Space (Sport and Recreation): this route impacts on the western boundary of the Landsborough Recreation Reserve.

Route A1 has a minimum curve speed of 160 km/hr (for non-tilt trains).

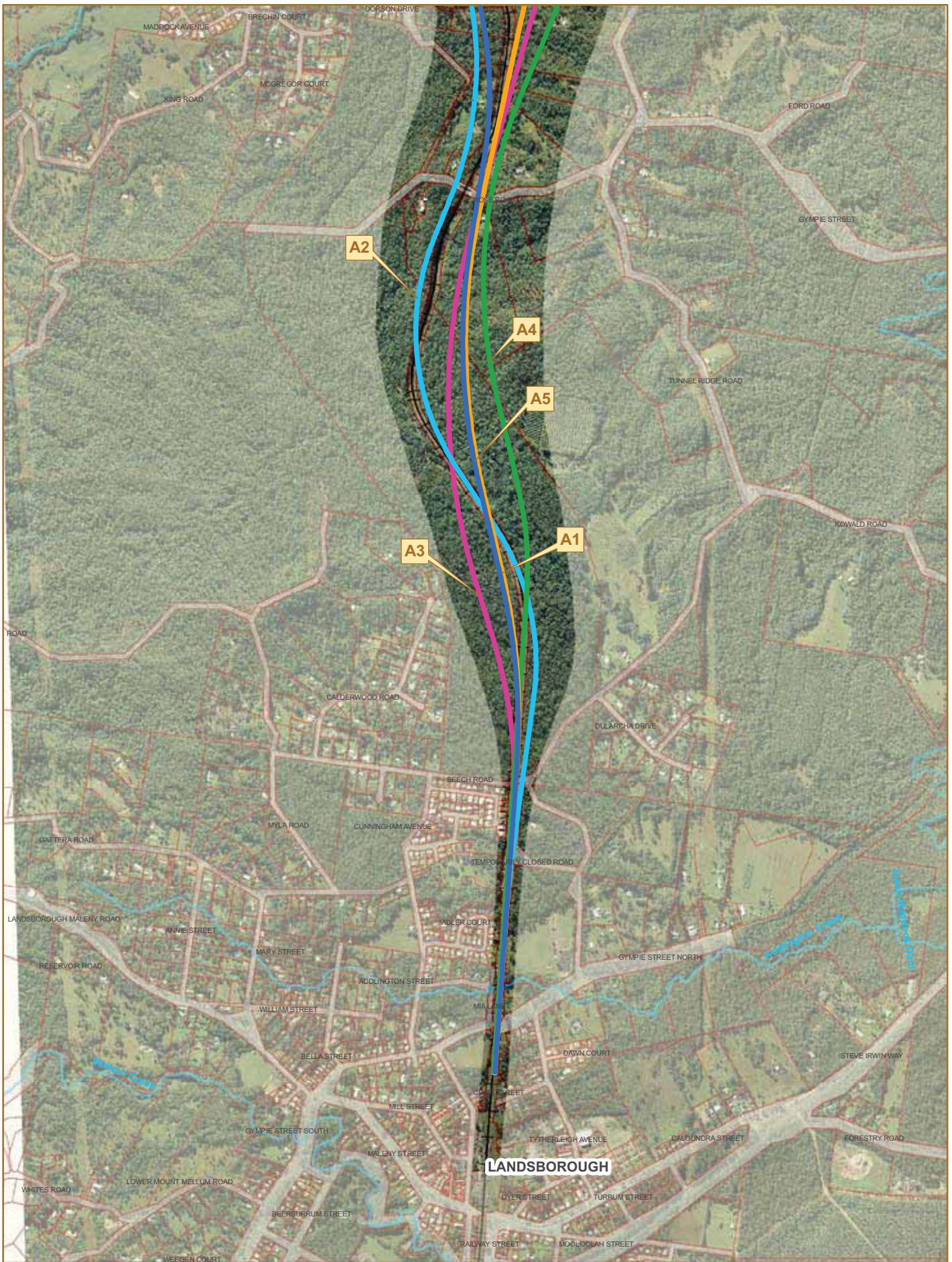
8.1.2 Route A2

Route A2, shown on drawing CS002 of Appendix E, follows the existing rail corridor as closely as possible through Dularcha National Park. Impacts to the National Park will include edge effects through the widening of the existing rail corridor. Route A2 crosses the existing alignment once, at the approach to the tunnel under the ridge at Rose Road, and has several areas where it runs parallel and within the existing corridor. The levels of route A2 are similar to that of the existing rail corridor. A new tunnel would be required under Rose Road, to the west of the existing operational rail tunnel.

Route A2 impacts on a total of 17 properties, including:

- Five Township Residential, to the east of the Landsborough Primary School Oval (on the eastern side of the existing railway)
- Two Community Purpose (including Landsborough Primary School oval)
- Four Open Space (Conservation and Water Ways) including Dularcha National Park, and two parkland areas associated with residential developments on the western side of the existing rail corridor.

¹¹ Property impact calculations do not include land that already forms part of the existing rail corridor



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Legend

— A1	— A4	— Creeks
— A2	— A5	 Property Boundaries
— A3	— Existing Rail Line	 Roads

**Landsborough to Nambour
Rail Corridor Study**

Note: All routes shown are centrelines, detailed corridor widths will be provided within the report.

**Figure 8.1
Landsborough (Segment A) Route Options**

While every care is taken to ensure the accuracy of this data, Queensland Transport makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the plan being inaccurate or incomplete in any way and for any reason. Base information supplied by Maroochy and Caloundra Councils and Department of Natural Resources and Water. The areas shown in this figure are subject to change and final refinements during further assessment and preliminary design.

8 Route Options

- Five Rural, four of which are accessed via Rose Road, at the tunnel crossing point
- One Open Space (Sport and Recreation): this route impacts on the western boundary of the Landsborough Recreation Reserve.

Route A2 has a minimum curve speed of 100 km/hr (for non-tilt trains).

8.1.3 Route A3

Route A3, shown on drawing CS003, Appendix E, generally follows the existing rail corridor for approximately 1 km, before diverting slightly to the west. This creates a fragmented portion of National Park between the existing rail corridor and route A3, which is approximately 100m wide. It then curves back to the east, crossing the existing rail corridor, and creating another fragmented portion of National Park, approximately 80 m wide. Route A3 then passes out of the National Park through private property which is close the existing tunnel under Rose Road. There will be new tunnel construction under Rose Road on the eastern side of the existing operational tunnel.

Route A3 impacts on a total of 33 properties including:

- 20 Township Residential - the eastern boundary of properties adjoining the existing rail corridor), and several to the east of the Landsborough School oval
- Two Community Purpose (Landsborough Primary School Oval and a property adjoining exiting parkland on the eastern side of the existing rail corridor, on Gympie Street North on a QR owned property outside of the existing rail)
- Five Open Space (Conservation and Water Ways) including Dularcha National Park, and two parkland areas associated with residential developments on the western side of the existing rail corridor
- Five Rural in the vicinity of the tunnel under Rose Road
- One Open Space (Sport and Recreation): this route impacts on the western boundary of the Landsborough Recreation Reserve.

Route A3 has a minimum curve speed of 140 km/hr (based on curve radii, for non-tilt trains).

8.1.4 Route A4

Route A4, shown on drawing CS004, Appendix E, follows the existing rail corridor for approximately 1.6 km, before diverting east through Dularcha National Park and passing through several private properties. This creates a new corridor through the National Park, creating a new central fragment between the existing rail corridor and route A4. Route A4 is the most easterly of the alignments considered in segment A, and requires a tunnel approximately 50 m to the east of the existing operational rail tunnel under Rose Road.

Route A4 impacts on a total of 33 properties including:

- 19 Township Residential - the eastern boundary of properties adjoining the existing rail corridor), and several to the east of the Landsborough School oval
- Two Community Purpose (Landsborough Primary School Oval and a property adjoining exiting parkland on the eastern side of the existing rail corridor, on Gympie Street North on a QR owned property outside of the existing rail)
- Five Open Space (Conservation and Water Ways) including Dularcha National Park, and two parkland areas associated with residential developments on the western side of the existing rail corridor
- Six Rural in the vicinity of the tunnel under Rose Road
- One Open Space (Sport and Recreation): this route impacts on the western boundary of the Landsborough Recreation Reserve

Route A4 has a minimum curve speed of 120 km/hr (for non-tilt trains).

8.1.5 Route A5

Route A5, shown on drawing CS005, Appendix E, follows the existing rail corridor for approximately 1.3 km, before crossing the railway to the west, and then crossing again to the east. This creates two fragmented portions of Dularcha National Park, one small and one large. Route A5 then leaves the National Park and passes through private property close the existing tunnel under Rose Road. At this point route A5 would require significant cut (up to 20 m) just prior to the proposed tunnel to the east of the existing operational tunnel under Rose Road.

Route A5 impacts on a total of 32 properties including:

- 20 Township Residential - the eastern boundary of properties adjoining the existing rail corridor), and several to the east of the Landsborough School oval
- Two Community Purpose (Landsborough Primary School Oval and a property adjoining exiting parkland on the eastern side of the existing rail corridor, on Gympie Street North on a QR owned property outside of the existing rail)
- Five Open Space (Conservation and Water Ways) including Dularcha National Park, and two parkland areas associated with residential developments on the western side of the existing rail corridor
- Four Rural in the vicinity of the tunnel under Rose Road
- One Open Space (Sport and Recreation): this route impacts on the western boundary of the Landsborough Recreation Reserve.

Route A5 has a minimum curve speed of 140 km/hr (for non-tilt trains).

8.1.6 Key Considerations for Segment A

The route options within segment A are constrained due to the following factors:

- As with any linear infrastructure upgrade, the starting point must connect the new infrastructure to the existing infrastructure
- The proximity of the Landsborough Station (the starting point) to Dularcha National Park
- Existing urban development that extends up to the rail corridor
- Location of Dularcha National Park in relation to the existing rail corridor
- Topography and existing tunnel location
- The need to construct in close proximity to existing operational railway
- The need to cross the existing operational railway.

As the routes in segment A generally closely follow the existing alignment they have minimal impact on the existing transport network, pedestrian and cycle access and individual property access rights.

Segment A includes the OLC at Gympie Road North, which is a sub-arterial road and includes a dedicated cycle lane. This OLC will require replacement with a grade separated crossing. An initial review suggests it may be possible to achieve the new crossing in the existing road corridor with minimal property impacts.

All routes impact to varying degrees on the Landsborough Recreational Reserve, this impact will need to be carefully managed.

Further north, Rose Road crosses above the rail tunnel. It is not expected this will be impacted by the new alignment as it is proposed that the rail line will remain in tunnels in the area.

8.1.7 Evaluation

Table 8.1.7 summarises the evaluation of routes within segment A. Supporting information is presented in Appendix F.

Table 8.1.7: Segment A- Summary of Route Option Comparisons

SEGMENT A	A1	A2	A3	A4	A5
Ecology					
Remnant vegetation affected - m ²					
• Endangered	E 77	E 77	E 77	E 358	E 77
• Of Concern	OC 44847	OC 26378	OC 41815	OC 42001	OC 45224
• Not of Concern	NoC 58593	NoC 74453	NoC 68934	NoC 83241	NoC 60739
• Total	Total 103518	Total 100910	Total 110827	Total 125601	Total 106042
Area of essential habitat affected (m ²).	19009	207	42019	0	23319
Area of State significant vegetation (BPA mapping) affected (m ²).	72304	94950	62788	57604	73947
Length of new 'edge' (m) created by route (i.e. where the route dissects an area of remnant vegetation and creates a new 'edge').	6790	7308	6990	7853	6876
Area of riparian vegetation removed	26160	18844	14343	32902	25767
Area of wetland removed	N/A	N/A	N/A	N/A	N/A
Name, number and type of protected area affected.	Dularcha National Park, 1, National Park	Dularcha National Park, 1, National Park	Dularcha National Park, 1, National Park	Dularcha National Park, 1, National Park	Dularcha National Park, 1, National Park
Flooding					
Number of gully, creek and river crossings, with significant upstream catchment (>1ha)	11	8	9	10	11

8 Route Options

SEGMENT A	A1	A2	A3	A4	A5
Number and approximate opening area of culverts required to allow cross-drainage with minimum impact (assumed 0.3m localised increased in upstream flood levels in average)	11 culverts corresponding to 128 m ² of opening area	8 culverts corresponding to 115 m ² of opening area	9 culverts corresponding to 123 m ² of opening area	10 culverts corresponding to 124 m ² of opening area	11 culverts corresponding to 128 m ² of opening area
Total cumulative width of bridges across floodplain required to pass the design flood with no negative impact (0mm afflux)	0m	0m	0m	0m	0m
Water Quality					
Number of creeks traversed	1	1	1	1	1
Number of crossings	1	1	1	1	1
Creek names	Addlington Ck	Addlington Ck	Addlington Ck	Addlington Ck	Addlington Ck
Length of rail within 50m of waterway	103	103	103	106	103
Cultural Heritage					
Aboriginal cultural heritage sites – known sites	1x Direct Potential Impact	-	1x Direct Potential Impact	-	-
Aboriginal cultural heritage sites – Areas of CH potential (Based on desk-based studies)	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP
Historic Heritage Features	5x Direct Potential Impacts	5x Direct Potential Impacts	5x Direct Potential Impacts	5x Direct Potential Impacts	5x Direct Potential Impacts
Historic Heritage Precincts/Areas	-	-	-	-	-
Land use and Planning					
Area of corridor within Urban Footprint	Comparable for all options				
Area of corridor within Rural Production and Open Space category	Comparable for all options				
Property Impacts					
Number of properties wholly or partially under the route	30 19 Township Residential 2 Community Purpose 5 Open Space – Conservation and Water Ways (including Dularcha National Park) 3 Rural 1 Open Space – Sport and Recreation	17 5 Township Residential 2 Community Purpose 4 Open Space – Conservation and Waterways (including Dularcha National Park) 5 Rural 1 Open Space – Sport and Recreation	33 20 Township Residential 2 Community Purpose 5 Open Space – Conservation and Waterways (including Dularcha National Park) 5 Rural 1 Open Space – Sport and Recreation	31 19 Township Residential 1 Community Purpose 4 Open Space – Conservation and Waterways (including Dularcha National Park) 6 Rural 1 Open Space – Sport and Recreation	32 20 Township Residential 2 Community Purpose 5 Open Space – Conservation and Waterways (including Dularcha National Park) 4 Rural 1 Open Space – Sport and Recreation

SEGMENT A	A1	A2	A3	A4	A5
Number of properties where habitable structures are within route	15	6	15	18	16
Number of properties adjacent to the route	6	8	6	5	9
Number of properties within 100m of route	47	49	47	47	48
Number of habitable structures within 100m of the route	27	28	27	27	27
Geology					
Tunnel conditions	Tunnel at Rose Road likely to be in similar ground conditions to existing tunnel.	Tunnel at Rose Road likely to be in similar ground conditions to existing tunnel. Undulating cut to fill, moderate heights/depths, max < 10m	Tunnel at Rose Road likely to be in similar ground conditions to existing tunnel. Minor earthworks to tunnel portal	Tunnel at Rose Road likely to be in similar ground conditions to existing tunnel.	Tunnel at Rose Road likely to be in similar ground conditions to existing tunnel. Minor earthworks to tunnel portal
Landscape and Visual					
- Length (m) of route through residential or rural residential areas	Length 517	Length 319	Length 521	Length 621	Length 518
- Length (m) of new route created (centreline of greater than 30m from existing centreline).	Length 3304	Length 3444	Length 3390	Length 3445	Length 3218
Noise (predicted)					
Community Noise Burden (existing: 25.2)	22.0	20.8	22.0	22.0	21.8
LAeq Exceedences (existing: 0)	1	1	0	0	0
LAmx Exceedences (existing: 28)	21	21	21	19	21
Technical/ Engineering					
Number of road crossings	1	1	1	1	1
Number of existing rail crossings	3	1 + 600m parallel	2 + 250m parallel	1.7km parallel	3
Number of river crossings	0	0	0	0	0
Chainages	82+000 – 85+450	82+000 – 85+565	82+000 – 85+470	82+000 – 85+447	82+000 – 85+445
Curve Speed (Km/h)	Two 160 km/hr curves 1484m of Straight	One 160 km/hr curves Two 100 km/hr curves 127m of Straight	Two 140 km/hr curves 1266m of Straight	One 120 km/hr curve One 140 km/hr curve 1848m of Straight	One 160 km/hr curve One 140 km/hr curve
Length of Tunnel	270m	280m	270m	320m	370m

8 Route Options

SEGMENT A	A1	A2	A3	A4	A5
Utilities	Rising Mains Sewer runs perpendicular across alignment May need protection.	Rising Mains Sewer runs perpendicular across alignment May need protection or relocation.	Rising Mains Sewer runs perpendicular across alignment May need protection. Up to 350m of rising main will need relocating.	Rising Mains Sewer runs perpendicular across alignment May need protection or relocation.	Rising Mains Sewer runs perpendicular across alignment. Up to 1km of rising main will need relocating.
Transport					
Overall effect on the surrounding road network (including pedestrian access)	Improved safety and movement of traffic by construction of grade separated crossing on Gympie St North	Improved safety and movement of traffic by construction of grade separated crossing on Gympie St North	Improved safety and movement of traffic by construction of grade separated crossing on Gympie St North	Improved safety and movement of traffic by construction of grade separated crossing on Gympie St North	Improved safety and movement of traffic by construction of grade separated crossing on Gympie St North
Number of low road bridges or road crossings eliminated	1 x OLC replaced with grade separated crossing	1 x OLC replaced with grade separated crossing	1 x OLC replaced with grade separated crossing	1 x OLC replaced with grade separated crossing	1 x OLC replaced with grade separated crossing
Access to stations	Access unchanged	Access unchanged	Access unchanged	Access unchanged	Access unchanged
Walk up catchments/ walkability	Unchanged	Unchanged	Unchanged	Unchanged	Unchanged
Cost Estimate					
Comparative cost ratio (1 being the lowest cost option)	1.36	1.06	1.27	1	1.49

8.2 Segment B - Mooloolah

All routes in segment B have the following in common:

- Start point to the north of the tunnel under Rose Road
- End point to the north of the tunnel at Pinch Lane (in the vicinity of Nobels Road)
- Cross the south branch of the Mooloolah River (though at varying locations)
- Cross the Mooloolah River (again at varying locations).

Routes B1, B3 and B4 follow the eastern side of segment B in the study focus area. Routes B2 and B5 follow the western side, and are closest to the existing rail corridor and Mooloolah Station.

Segment B encompasses Mooloolah, where a number of key road network elements will need to be addressed, including the existing OLC, Mooloolah Connection Road, Brays Road and Neill Road, and the existing rail bridge at Neill Road, just to the north of Mooloolah.

As mentioned the three primary road connections in Mooloolah include; the Mooloolah Connection Road, a designated sub-arterial road providing access to the east and south including to Bruce Highway; Neill Road a sub-arterial road which becomes the Mooloolah-Eudlo Road and is the main connection to the northern townships; and Bray Road, a rural collector road that is a continuation of the Mooloolah Connection Road servicing properties to the west of Mooloolah and forming part of the main street in Mooloolah. These three roads intersect immediately west of the existing rail line in the centre of Mooloolah township where the rail crossing is an OLC. The intersection is a T-junction however approximately 10 m west is Jones Street which provides access to a number of commercial properties. It is likely that a historic pedestrian rail overpass in Mooloolah would want to be retained by the community.

The majority of businesses and services in Mooloolah gain direct or indirect access from Bray Road or the Mooloolah Connection Road. These three roads are also used by freight vehicles, emergency services and buses. When the OLC is closed to road traffic there is substantial congestion in the township as all three roads are affected by the closure associated with the OLC. As the frequency and speed of rail services increases replacement of the OLC with a grade separated crossing will become a priority, both for safety reasons and to prevent the delays to traffic flow that cause congestion in the town centre and impede emergency vehicle access.

Approximately 2 km north of the township along Neill Road the existing rail corridor crosses Eudlo Road in the vicinity

of the Neill Road-Eudlo Road intersection. This intersection is characterised by poor geometry and low overhead clearance to the rail bridge. Both this crossing and the OLC are likely to require upgrading to improve safety and maintain appropriate access.

The route options shown in Figure 8.2 and drawings CS001 to CS005 of Appendix E are described below, and their evaluation is summarised in Table 8.2.7. Further supporting information is provided in Appendix F.

8.2.1 Route B1

Route B1, shown on drawing CS001 of Appendix E, runs adjacent to the existing rail corridor for approximately 500 m, north of the tunnel under Rose Road. It then deviates away from the existing rail corridor to the east. Through this area the railway is approximately 10 m above the existing levels. Route B1 runs directly adjacent to the South Branch of the Mooloolah River, before crossing over Mooloolah Connection Road at the same point where the road crosses over the river. This section of route running adjacent to the river would require either significant earthworks, or possibly realignment of the watercourse. Mooloolah Station would be located in this vicinity on this eastern route. Continuing north, there would be a small section of cut, followed by a second bridge, over the Mooloolah River. Route B1 generally skirts the rural residential areas of Birdsong Drive and Eagle View Heights, before curving back to the west towards the existing rail corridor.

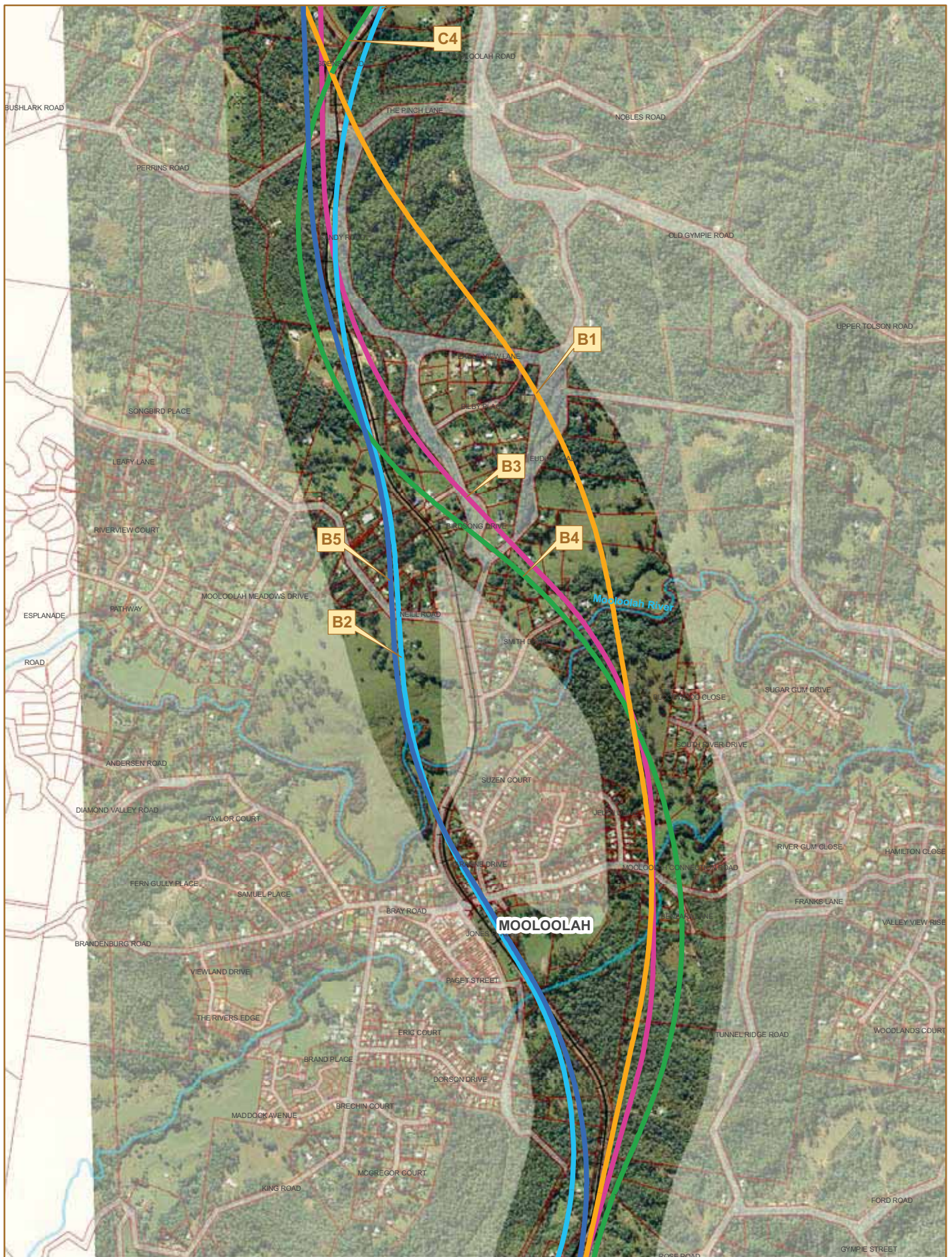
To the north, the route would rise and the topography becomes more undulating, requiring deeper areas of cut (up to approximately 30 m) before continuing into a section of new tunnel under the ridge line at Pinch Lane.

Route B1 impacts on 31 properties including:

- Eight Open Space – Conservation and Waterways
- Eight Rural Residential Settlement
- Eight Rural/General Rural Lands (including one property designated as Nature Refuge)
- Seven Township Residential.

In terms of environmental impacts, route B1 fragments several large areas recognised as State significant areas for biodiversity. This alignment is also recognised as having 17 creek and flowpath crossings. It also passes through the Ga'ri djaa ga'wun Nature Refuge, which is a protected tenure under the *Nature Conservation (Protected Areas) Regulation 1994*.

The proposed relocation of the station approximately 600 m to the east would significantly reduce existing pedestrian accessibility



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Legend

B1	B4	Creeks
B2	B5	Property Boundaries
B3	Existing Rail Line	Roads

Landsborough to Nambour Rail Corridor Study

Figure 8.2

Mooloolah (Segment B) Route Options

Note: All routes shown are centrelines, detailed corridor widths will be provided within the report.

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to the station, particularly for elderly residents and children. It would potentially have major adverse affect on visual amenity at South Mooloolah River for residents, drivers and users of South River Park and major adverse affects on amenity for residents in the Birdsong Drive and Smith Drive estates.

Additionally, the Northern Pipeline Interconnector (NPI) is a major issue for this route, with two pipes at approximately 1.3 m diameter and 1.4 km length running along significant stretches of route B1. This is a major constraint on design, construction, and operation of both the railway on this route and the pipeline.

Route B1 also crosses the existing railway in two locations. It has a minimum curve speed of 160 km/hr (for non-tilt trains).

8.2.2 Route B2

North of the tunnel under Rose Road route B2 (shown on drawing CS002, Appendix E) follows the existing rail corridor on the western side for approximately 200 m. This section is also on fill approximately 10 m high. It then crosses the existing rail corridor in close proximity to the existing rail crossing of the south branch of the Mooloolah River, and continues to Mooloolah Station on the eastern side of the existing rail corridor. The proposed location of Mooloolah Station on route B2 is similar to the position as the existing station.

Route B2 then continues on the eastern side of the existing rail corridor to the north of Mooloolah Station for approximately 250 m, where it crosses the existing rail corridor and continues on the western side, approximately 300 m from the existing rail corridor. This section of the route would generally be on fill, before crossing the Mooloolah River. An overpass for Neill Road would also be required. Route B2 then closely follows the existing rail corridor, passing in tunnel under Pinch Lane at the ridge that defines the boundary of Caloundra City and Maroochy Shire. The tunnel is in close proximity to the existing tunnel in this location. This route has several crossings of the existing rail corridor within this section.

Route B2 will require grade separation of Bray Road/Mooloolah Connection Road and the rail.

Route B2 directly impacts on 34 properties including:

- Three Open Space – Conservation and Waterways
- 11 Rural Residential Settlement
- Six Rural/General Rural Lands
- 10 Township Residential
- Three Local Business Centre

Route B2 crosses the Mooloolah River at a hairpin bend, which

will require further design and environmental assessment considerations. Additionally, ecological field surveys in this area have identified the presence of Giant Barred Frogs (*Mixophyes iteratus*) in the vicinity, indicating further environmental assessment will be necessary in this location. Route B2 traverses a total of 12 creek/flowpath crossings.

Route B2 also creates fragmentation of a major State significant area for biodiversity, however the extent of impact is lessened as the route follows the existing rail corridor within this location.

Route B2 has the potential to generate a significant impact on the Mooloolah business centre though direct property impacts and disruption, subject to the location of grade separation of Bray Road/Mooloolah Connection Road and the route. Visual amenity and accessibility would also be affected, particularly in the town centre and in the vicinity of the crossing of Neill Road.

The Mooloolah waiting shed and pedestrian overbridge would also potentially be affected by this route.

The grade separation of Bray Road/Mooloolah Connection Road and the rail would have a positive effect on traffic flow around the town. However, this would require further planning and consultation with the local community to determine the most appropriate solution for this area.

Route B2 crosses the existing track four times, and has a section running parallel to the existing rail corridor for approximately 1.3 km. It has a minimum curve speed of 100 km/hr (for non-tilt trains).

8.2.3 Route B3

North of the tunnel at Rose Road, route B3 (shown on drawing CS003, Appendix E) runs adjacent to the existing alignment for approximately 750 m. It then deviates away from the existing alignment to the east around Mooloolah. The proposed station location will be raised approximately 10 m above the existing levels.

Route B3 runs directly adjacent to the south branch of the Mooloolah River, before crossing over Mooloolah Connection Road at the same point where the road crosses over the river. This section of route running adjacent to the river would require either significant earthworks, or possibly realignment of the watercourse. Mooloolah station would be located in this vicinity on this eastern route. Continuing north, route B3 then crosses Eudlo Road (Mooloolah–Eudlo Road) and then passes through a rural residential estate (Birdsong Drive), before curving back towards the existing rail corridor and continuing into a section of new tunnel under the ridge line at Pinch Lane.

8 Route Options

Route B3 impacts on 39 properties including:

- Eight Open Space (Conservation and Waterways)
- 18 Rural Residential Settlement
- Seven Rural/General Rural Lands
- Six Township Residential.

In terms of environmental impacts, route B3 fragments several large areas recognised as State significant areas for biodiversity. This alignment is also recognised as having 17 creek and flowpath crossings.

The proposed relocation of the station approximately 600 m to the east would significantly reduce existing pedestrian accessibility to the station, particularly for elderly residents and children. It would potentially have major adverse affect on visual amenity at South Mooloolah River for residents, drivers and users of South River Park and major adverse affect on amenity for residents in the Birdsong Drive and Smith Drive estates.

Route B3 would have a significant impact on local access roads to residential areas, and would require further consideration of the reprovision of these roads.

Additionally, the Northern Pipeline Interconnector (NPI) is a major issue for this route, with two pipes at approximately 1.3 m diameter and 1.4 km length running along significant stretches of route B3. This is a major constraint on design, construction, and operation of both the railway on this route and the pipeline.

Route B3 also crosses the existing railway once. It has a minimum curve speed of 120 km/hr (for non-tilt trains).

8.2.4 Route B4

North of the tunnel at Rose Road, route B4 (shown on drawing CS004, Appendix E) is the most eastern of the routes. It runs to the east of the south branch of the Mooloolah River, before crossing over Mooloolah Connection Road, passing through the Marie Higgs (Mooloolah) Conservation Park and the South River Park. It then crosses the south branch of the Mooloolah River. Mooloolah Station would be located in this vicinity on this eastern route. Continuing north, route B3 then crosses Eudlo Road (Mooloolah–Eudlo Road) and then passes through a rural residential estate (Birdsong Drive), before curving back towards the existing rail corridor and continuing into a section of new tunnel under the ridge line that lines forms the boundary of Caloundra City and Maroochy Shire (in the vicinity of Pinch Lane).

Route B4 impacts on 34 properties including:

- Seven Open Space – Conservation and Waterways
- 21 Rural Residential Settlement
- Six Rural/General Rural Lands.

In terms of environmental impacts, route B4 fragments several large areas recognised as State significant areas for biodiversity. This alignment is also recognised as having 17 creek and flowpath crossings. It also passes through a portion of the Marie Higgs (Mooloolah) Conservation Park, which is protected tenure under the *Nature Conservation (Protected Areas) Regulation 1994*.

The proposed relocation of the station approximately 850 m to the east would significantly reduce existing pedestrian accessibility to the station, particularly for elderly residents and children. It would potentially have a major adverse affect on visual amenity at South Mooloolah River for residents, drivers and users of South River Park and a major adverse affect on amenity for residents in the Birdsong Drive and Smith Drive estates.

Route B4 would have a significant impact on local access roads to residential areas, and would require further consideration of the reprovision of these roads.

Additionally, this route runs in parallel to the Northern Pipeline Interconnector (NPI) for a significant distance. This could be a further constraint on design, construction, and operation of both the railway on this route and the pipeline.

Route B4 crosses the existing rail corridor once. It has a minimum curve speed of 120 km/hr (for non-tilt trains).

8.2.5 Route B5

Route B5, shown on drawing CS005 of Appendix E, follows the existing rail corridor on the western side for approximately 200m. This section is also on fill approximately 10 m high. It then crosses the existing rail corridor in close proximity to the existing rail crossing of the south branch of the Mooloolah River, and continues to Mooloolah Station on the eastern side of the existing rail corridor. The proposed location of Mooloolah Station on route B5 is similar to the position of the existing station.

Route B5 then continues on the eastern side of the existing rail corridor to the north of Mooloolah station for approximately 250 m, where it crosses the existing rail corridor and continues on the western side, approximately 300 m from the existing rail corridor. This section of the route would generally be on fill, before crossing the Mooloolah River. An overpass for Neill Road would also be required. Route B5 then closely follows the existing rail corridor for approximately 1.3 km, passing in tunnel under Pinch Lane at the ridge that defines the boundary of Caloundra City and Maroochy Shire. The new tunnel would be on the western side of the existing rail tunnel in this location.

Route B5 will require grade separation of Bray Road/Mooloolah Connection Road and the rail.

Route B5 directly impacts on 36 properties including:

- Three Open Space (Conservation and Waterways) including another portion of Dularcha National Park
- 15 Rural Residential Settlement
- Six Rural/General Rural Lands
- Nine Township Residential
- Three Local Business Centre.

Route B5 also crosses the Mooloolah River at a hairpin bend, which will require further design and environmental assessment considerations. Additionally, ecological field surveys in this area have identified the presence of Giant Barred Frogs (*Mixophyes iteratus*) in the vicinity, indicating further environmental assessment will be necessary in this location. Route B5 traverses a total of 12 creek/flowpath crossings.

Route B5 also creates fragmentation of a major State significant area for biodiversity, however the extent of impact is lessened as the route following the existing rail corridor within this location.

Route B5 has the potential to generate a significant impact on the Mooloolah business centre though direct property impacts and disruption, subject to the location of grade separation of Bray Road/Mooloolah Connection Road and the route. Visual amenity and accessibility would also be affected, particularly in the town centre and in the vicinity of the crossing of Neill Road.

The Mooloolah waiting shed and pedestrian overbridge would also potentially be affected by this route.

The grade separation of Bray Road/Mooloolah Connection Road and the rail would have a positive effect on traffic flow around the town. However, this would require further planning and consultation with the local community to determine the most appropriate solution for this area.

Route B5 crosses the existing rail corridor twice, and has a section of parallel running within the existing rail corridor of approximately 500 m. It has a minimum curve speed of 140 km/hr (for non-tilt trains).

8.2.6 Key Considerations for Segment B

The key issues influencing selection of the corridor location through segment B include:

- The need to maintain access to Mooloolah's businesses and minimise the physical and visual segregation of the township by a grade separated crossing
- Limited availability of alternative commercial land in the town centre

- Provision of walkable access to the rail station, particularly from the retirement villages and school located within walking distance to the current rail station
- Flooding associated with South Mooloolah River and Mooloolah River
- Minimising impacts on the visual quality of the landscape, particularly in the vicinity of the South Mooloolah River
- Avoiding fragmentation of large areas of State significant biodiversity
- Minimising impacts on protected tenures and areas of conservation value
- Avoiding alignments that run parallel to sections of major waterways, resulting in either realignment of the waterway or massive earthworks
- Minimising impacts on the visual quality of the landscape, particularly in the vicinity of the South Mooloolah River
- Minimising the impact on the local road network (residential estate accesses).

The options to the east of the existing corridor and town centre (B1,B3 and B4) are more suited to a road over rail solution at Bray Road than the options in the town centre (B2 and B5) and separate the rail crossing from the T-junction. However a station in this location would compromise pedestrian access to the station, putting it beyond reasonable walking distance for many residents, particularly elderly residents and young school children.

Options B2 and B5, although preferable for pedestrian access, pose a challenge for a grade separated crossing, as a road bridge on Bray Road would significantly impede traffic (and possibly pedestrian) access to the majority of local businesses and services. The necessary bridge (either road or rail) is also likely to have an unacceptable visual impact on the town centre and may require resumption of numerous properties in the commercial area to provide connections back into the local network. Possible alternatives have been identified to construct a road bridge via extension of Hatten or Paget Streets. These cause other issues for traffic movements which will need to be resolved, but would appear to have less overall impact on the activities and visual character of the main street.

Car and bus parking areas adjacent to the station would be accessed via the proposed road bridge access to provide easy access for commuters arriving from either side of the rail line. The provision of both the rail bridge and parking areas may require resumption of some of the open space reserve to the east of the rail line.

8 Route Options

It is preferable to retain pedestrian access over the rail on the Bray Street alignment, even if traffic is diverted, due to the location of businesses on either side of the rail. Ideally this access would utilise in some way the existing heritage structure.

Options B2 and B5 will also impact on the Neill Road access to Mooloolah. Given the importance of this road in connecting Mooloolah to the northern towns in the study area it will be necessary to identify a diversion and/or crossing that maintains this access. There may be some property impacts as a result of this. Options B2 and B5 cross Neill Road a second time to the north of Mooloolah. At this point Neill Road is designated as a rural collector. A formal rail crossing, ideally grade separated, will be required to maintain access to properties in the Mooloolah and Diamond Valleys.

There is an existing pedestrian/cycle pathway along Neill Road and the CityPlan includes proposals to extend this in the future both to the north and south. Accordingly the crossings will need to be designed to safely accommodate pedestrian and cyclists on dedicated paths.

North of Mooloolah options B1, B3 and B4 cross Eudlo Road in the vicinity of Birdsong Drive. A grade separated crossing is recommended at this crossing. These three options also have varying impact on local streets including Benzara Lane (B1, B3 and B4), Bilby Place and Eagle View Lane (B1), and Smith Drive, Birdsong Drive and Platypus Court (B3 and B4). This could compromise access for some residents but could largely be resolved (in the long term) by construction of a new road adjacent to the rail corridor.

Routes to the east (B1, B3 and B4) have comparatively greater environmental impacts, including impacts on protected tenures, and fragmentation of areas of State significant Biodiversity. These also impact on comparatively larger tracts of endangered and 'Of Concern' Regional Ecosystems than western routes.

All routes have a similar degree of property impact.

Community consultation has indicated that the retention of the station within the existing town centre is preferable, however the options that achieve this (B2 and B5) will require significant work to minimise property, visual and accessibility effects.

Consultation with residents has also indicated that the station works well in its current location for the convenient combination of drop-offs and pick-ups with retail and business services. Mooloolah has a range of retail businesses on either side of the rail line that would be directly impacted by a road over rail structure, while a number of options would displace a number of businesses to the east of the current alignment. The extent

of such grade separated structures could seriously impact on the operation of the town centre and have significant economic impacts, such that an alignment to the east may be a better economic option depending on the design outcomes of the road/rail crossing. Any new retail development at a new station to the east would be desirable for convenience, activation, and surveillance of the station, however this would need to be strictly controlled to ensure the ongoing dominance and traditional role of the existing centre. As noted in section 5.6.1, respondents to the Community Values and Transportation Survey from Mooloolah indicated 61% 'strongly agreed' with the statement of 'the rail station is in a good location in my town' whilst 41% agreed or strongly disagreed with the statement 'the rail station plays a large role for local business'.

8.2.7 Evaluation of Routes in Segment B

The following Table 8.2.7 summarises the evaluation of routes within segment B. Supporting information is presented in Appendix F.

Table 8.2.7: Segment B: Summary of Route Option Comparisons

SEGMENT B	B1	B2	B3	B4	B5
Ecology					
Area of remnant vegetation (m2): <ul style="list-style-type: none"> Endangered Of Concern Not of Concern Total 	E 35462 OC 5077 NoC 84060 Total 124599	E 17126 OC 9651 NoC 77044 Total 103822	E 23698 OC 10578 NoC 71056 Total 105332	E 29262 OC 400 NoC 82665 Total 112327	E 14897 OC 0 NoC 58769 Total 73667
Area of essential habitat (m2).	0	0	0	0	0
Area of State significant vegetation (BPA mapping) (m2).	47052	108856	56227	57083	71454
Length of new 'edge' (m) created by route (i.e. where the route dissects an area of remnant vegetation and creates a new 'edge').	8192	7318	7336	6403	4955
Area of riparian vegetation removed	37971	17126	24609	29662	14897
Area of wetland removed	N/A	N/A	N/A	N/A	N/A
Name, number and type of protected area affected.	Ga'ri djaa ga'wun Nature Refuge	N/A	N/A	Mooloolah (Marie Higgs) Conservation Park, 1, National Park	N/A
Cultural Heritage					
Aboriginal cultural heritage sites - known sites	-	-	-	-	-
Aboriginal cultural heritage sites - Areas of CH potential (Based on desk based studies)	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP
Historic heritage Features	3x Direct Potential Impacts	1x Direct Potential Impacts	2x Direct Potential Impacts	2x Direct Potential Impacts	1x Direct Potential Impacts
Historic Heritage Precincts/ Areas	-	-	-	-	-
Land Use and Planning					
Area of route within Urban Footprint	Is contained within less, and services less of, the urban footprint than the other 4 options	This option and B5 are contained within more of the urban footprint than the other options	Is contained within less of urban footprint than B2 and B5, but more than B1	Is contained within less of urban footprint than B2 and B5, but more than B1	This option and B5 are contained within more of the urban footprint than the other options
Area of route within Rural Production and Open Space (RP&OS) category	Impacts on more RP&OS land than the other 4 options	B2 and B5 impact on less RP&OS land than the other 3 options	Impacts on more RP&OS land than the other B2 and B5 but less than B1	Impacts on more RP&OS land than the other B2 and B5 but less than B1	B2 and B5 impact on less RP&OS land than the other 3 options

8 Route Options

SEGMENT B	B1	B2	B3	B4	B5
Number of residential properties within 400m of railway station	Poor location for pedestrian access, particularly residents of retirement villages	Pedestrian access remains very similar to existing, and is in good proximity to independent living units, school and childcare	Poor location for pedestrian access, particularly residents of retirement villages	Poor location for pedestrian access, particularly residents of retirement villages	Pedestrian access remains very similar to existing, and is in good proximity to independent living units, school and childcare
Number of community and commercial activities within 500m of railway station	Remote from main commercial/ community precinct	Very good proximity to existing businesses, however road access may impact on businesses (see discussion elsewhere)	Remote from main commercial/ community precinct	Remote from main commercial/ community precinct	Very good proximity to existing businesses, however road access may impact on businesses (see discussion elsewhere)
Number of residential properties within 1km of railway station	Lowest of all options	Maximises residential access to station	Mid-range	Mid-range	Maximises residential access to station
Compliance with planning intent	Location of station not very consistent with planned commercial centre, however is located adjacent to the main commercial street and does not create traffic access problems for existing businesses	Location of station is consistent with planned commercial centre if access issues can be addressed.	Location of station not very consistent with planned commercial centre, however is located adjacent to the main commercial street and does not create traffic access problems for existing businesses	Location of station not very consistent with planned commercial centre, however is located adjacent to the main commercial street and does not create traffic access problems for existing businesses	Location of station is consistent with planned commercial centre if access issues can be addressed.
Properties					
Number of properties wholly or partially under the route	31 8 Open Space – Conservation and Waterways 8 Rural Residential Settlement 8 Rural/ General Rural Lands 7 Township Residential	34 3 Open Space – Conservation and Waterways 11 Rural Residential Settlement 6 Rural/ General Rural Lands 10 Township Residential 3 Local Business Centre	39 8 Open Space – Conservation and Waterways 18 Rural Residential Settlement 7 Rural/ General Rural Lands 6 Township Residential	34 7 Open Space – Conservation and Waterways 21 Rural Residential Settlement 6 Rural/ General Rural Lands	36 3 Open Space – Conservation and Waterways 15 Rural Residential Settlement 6 Rural/ General Rural Lands 9 Township Residential 3 Local Business Centre
Number of properties where habitable structures are within the route	10	17	13	19	16
Number of properties adjacent to the route	42	45	47	49	39

SEGMENT B	B1	B2	B3	B4	B5
Number of properties within 100m of route	84	87	88	83	85
Number of habitable structures within 100m of the route	45	51	58	43	49
Geology					
Geotechnical Constraints / issues to address	Routes to east of Mooloolah likely to be underlain by similar extents of soft, compressible alluvial soils. Tunnel at Pinch Lane likely to be in similar ground conditions to existing tunnel. High fill (11m)	Routes through Mooloolah likely to be underlain by similar extents of soft, compressible alluvial soils. Tunnel at Pinch Lane likely to be in similar ground conditions to existing tunnel.	Routes to east of Mooloolah likely to be underlain by similar extents of soft, compressible alluvial soils. Tunnel at Pinch Lane likely to be in similar ground conditions to existing tunnel. Earthworks up to 10m, some likely underlain by soft and compressible soils, possible stability and consolidation issues.	Routes to east of Mooloolah likely to be underlain by similar extents of soft, compressible alluvial soils. Tunnel at Pinch Lane likely to be in similar ground conditions to existing tunnel.	R through Mooloolah likely to be underlain by similar extents of soft, compressible alluvial soils. Tunnel at Pinch Lane likely to be in similar ground conditions to existing tunnel. Deep cut to tunnel portal.
Flooding/ Hydrology					
Number of gully, creek and river crossings, with significant upstream catchment (>1ha)	17	12	12	15	12
Number and approximate opening area of culverts required to allow cross-drainage with minimum impact (assumed 0.3m localised increased in upstream flood levels in average)	11 culverts corresponding to 18 m ² of opening area	8 culverts corresponding to 43 m ² of opening area	6 culverts corresponding to 17 m ² of opening area	8 culverts corresponding to 13 m ² of opening area	8 culverts corresponding to 43 m ² of opening area
Total cumulative width of bridges across floodplain required to pass the design flood with no negative impact (0mm afflux)	730m	395m	960m	725m	446m
Water Quality					
Number of creeks traversed	2	2	2	2	2
Number of crossings	4	4	4	4	4
Creek names	South Mooloolah River, Mooloolah River	South Mooloolah River, Mooloolah River	South Mooloolah River, Mooloolah River	South Mooloolah River, Mooloolah River	South Mooloolah River, Mooloolah River
Length of rail within 50m of waterway	494	500	540	322	498

8 Route Options

SEGMENT B	B1	B2	B3	B4	B5
Landscape and visual					
- Length of corridor through residential or rural residential areas	Length 1555	Length 1391	Length 1852	Length 1561	Length 1420
- Length of new rail corridor created (centreline of greater than 30m from existing centreline).	Length 4200	Length 3975	Length 4333	Length 4305	Length 3898
Property impacts, severance, disruption to community activities or plans	Line and station outside of town limit property and overpass negatives on town centre but create potential for competing centre unless well controlled (some small level retail would be a benefit for amenity, convenience and activation	Station location supports town centre, but some direct property impacts on business and potential business impacts of overpass in town centre	Line and station outside of town limit property and overpass negatives on town centre but create potential for competing centre unless well controlled (some small level retail would be a benefit for amenity, convenience and activation	Line and station outside of town limit property and overpass negatives on town centre but create potential for competing centre unless well controlled (some small level retail would be a benefit for amenity, convenience and activation	Station location supports town centre, but some direct property impacts on business and potential business impacts of overpass in town centre
Noise (predicted)					
Community Noise Burden (existing: 24.4)	17.3	24.6	20.1	19.0	23.0
LAeq Exceedences (existing: 0)	1	3	3	3	1
LAmx Exceedences(existing: 19)	6	15	14	14	12
Technical/Engineering					
Number of road crossings	2	3	The new alignment runs along Sandy Lane for approximately 400m. There are three road crossings	2	3
Number of existing rail crossings	2	Proposed alignment runs in existing rail corridor for approximately 500m. This may create constructability issues. In addition there are four rail crossings. The alignment clashes with the existing tunnel.	The alignment runs within the existing rail corridor for approximately 500m. There is one rail crossing	1	The alignment runs within the existing rail corridor for approximately 500m. There are two rail crossings

SEGMENT B	B1	B2	B3	B4	B5
Number of river crossings	1	There is one river crossing at Mooloolah Creek. The alignment crosses the creek at a hairpin, therefore affecting approximately 180m of creek.	There are two river crossings. The crossing across Mooloolah Creek would need a structure of approximately 200m	1	There is one crossing. The alignment runs parallel to the creek and affects approximately 350m of creek.
Chainages	85+450 – 89+705	85+565 – 89+680	85+470 – 89+800	85+447 – 89+925	85+445 – 89+576
Curve Speed (Km/h)	3 No curves 160km/hr Total Length of Straight = 1294m	2 no curve 140 km/hr (Approx 736m of 1 No. 100km/hr curve) (Approx 1000m of 1 No. 160km/hr curve) Total Length of Straight =572.6m	2 no curve 140 km/hr 1 no curve 120 km/hr Total Length of Straight =1221m	1 no curve 120 km/hr 1 no curve 140 km/hr Total Length of Straight =266.5m	(Approx 600m of 1 No.130km/hr curve) 1 no curve 160 km/hr 2 no curve 140 km/hr Total Length of Straight =1197m
Length of structures required across Flood Plain	730m	395m	960m	725m	446m
Access to stations/Development of station access opportunities	Mooloolah Station to be relocated approximately 700m to the east from existing station.	The alignment ties into the existing station.	A new station at Mooloolah is required approximately 600m to the east	Mooloolah Station to be relocated approximately 850m to the east from existing station	The alignment ties into the existing station.
Length of Tunnel	270m	220m	280m	480m	550m

8 Route Options

SEGMENT B	B1	B2	B3	B4	B5
Utilities	<p>Northern Pipeline Interconnector (NPI) Drought relief Main 1.4km length approx running within proposed rail corridor.</p> <p>Two pipes at approx 1.3m dia</p> <p>Proposed APT Allgas Gas Pipeline runs across rail corridor. Gas main may need protection Not a major influence on corridor option.</p> <p>Aquagen Water Trunk Main Pipeline runs across rail corridor. Water main may need protection. Not an influence on corridor option. The main is on top of a ridge above tunnel.</p>	<p>Telstra Metropolitan main Cable runs across rail corridor. Large optical fibre and copper cable. Main to be relocated or further protection maybe required. Not a major influence on corridor option.</p> <p>Proposed APT Allgas Gas Pipeline runs across rail corridor. Gas main may need protection Not a major influence on corridor option.</p> <p>Aquagen Water Trunk Main Pipeline runs across rail corridor. Water main may need protection. Not an influence on corridor option. The main is on top of a ridge above tunnel.</p>	<p>Northern Pipeline Interconnector (NPI) Drought relief Main 1.4km length approx running within proposed rail corridor.</p> <p>Two pipes at approx 1.3m dia. 800m to be realigned or offset by 75m. Major influence on corridor option</p> <p>Proposed APT Allgas Gas Pipeline runs across rail corridor. Gas main may need protection Not a major influence on corridor option.</p> <p>Telstra Metropolitan main Cable runs across rail corridor. Large optical fibre and copper cable. Up to 300m of main to be relocated or further protection maybe required.</p> <p>Aquagen Water Trunk Main Pipeline runs across rail corridor. Water main may need protection. Not an influence on corridor option. The main is on top of a ridge above tunnel.</p>	<p>Northern Pipeline Interconnector (NPI) Drought relief Main 1.4km length approx running within proposed rail corridor.</p> <p>Two pipes at approx 1.3m dia. 800m to be realigned or offset by 75m. Major influence on corridor option</p> <p>Proposed APT Allgas Gas Pipeline runs across rail corridor. Gas main may need protection Not a major influence on corridor option.</p> <p>Telstra Metropolitan main Cable runs across rail corridor. Large optical fibre and copper cable.</p> <p>Aquagen Water Trunk Main Pipeline runs across rail corridor. Water main may need protection. Not an influence on corridor option. The main is on top of a ridge above tunnel.</p>	<p>Sewer Rising Main Sewer runs perpendicular across alignment.</p> <p>Pump Station.</p> <p>Telstra 2xMetropolitan main Cable Cables runs across rail corridor. Large optical fibre and copper cable. Main to be relocated or further protection maybe required Minor influence on corridor option.</p> <p>Proposed APT Allgas Gas Pipeline runs across rail corridor. Gas main may need protection Not a major influence on corridor option.</p> <p>Aquagen Water Trunk Main Pipeline runs across rail corridor. Water main may need protection. Not an influence on corridor option. The main is on top of a ridge above tunnel.</p>

SEGMENT B	B1	B2	B3	B4	B5
Transport and Road Networks					
Overall effect on the surrounding road network (including ped access)	<p>Less overall benefit</p> <p>Removal of railway from town centre will improve safety and ease congestion.</p> <p>However detrimental for pedestrians because station is outside of acceptable walking distances</p> <p>Detrimental impact on some local access.</p>	<p>More overall benefit</p> <p>Could substantially improve safety at three-way intersection in Mooloolah and remove delays and congestions.</p> <p>Detrimental impact on some local access.</p>	<p>Less overall benefit</p> <p>Removal of railway from town centre will improve safety and ease congestion.</p> <p>However detrimental for pedestrians because station is outside of acceptable walking distances</p> <p>Substantial detrimental impact on local access. In Birdsong Drive area</p>	<p>Less overall benefit</p> <p>Removal of railway from town centre will improve safety and ease congestion.</p> <p>However detrimental for pedestrians because station is outside of acceptable walking distances</p> <p>Substantial detrimental impact on local access. In Birdsong Drive area</p>	<p>More overall benefit</p> <p>Could substantially improve safety at three-way intersection in Mooloolah and remove delays and congestions.</p> <p>Detrimental impact on some local access.</p>
Number of low road bridges or road crossings eliminated	<p>One OLC and one rail bridge crossing eliminated</p> <p>Two new grade separated crossings required</p>	<p>One OLC eliminated</p> <p>One rail bridge crossing eliminated or upgraded</p> <p>Two/three new grade separated crossings required</p>	<p>One OLC and one rail bridge crossing eliminated</p> <p>At least two new grade separated crossings required</p>	<p>One OLC and one rail bridge crossing eliminated</p> <p>At least two new grade separated crossings required</p>	<p>One OLC eliminated</p> <p>One rail bridge crossing eliminated or upgraded</p> <p>Two/three new grade separated crossings required</p>
Access to stations	<p>Pedestrian access reduced</p> <p>Vehicle access mostly unchanged</p>	<p>Access Unchanged</p> <p>Vehicle access re-configured by nil effect</p>	<p>Pedestrian access reduced</p> <p>Vehicle access mostly unchanged</p>	<p>Pedestrian access reduced</p> <p>Vehicle access mostly unchanged</p>	<p>Access Unchanged</p> <p>Vehicle access re-configured by nil effect</p>
Walk up catchments/ walkability	Poor	Unchanged	Poor	Poor	Unchanged
Cost Ratio					
Comparative cost ratio (1 being the lowest cost option)	1.14	1.32	1.17	1.04	1

8 Route Options

8.3 Segment C - Eudlo

Segment C of the study focus area splits into two, providing for eastern and western route options.

All routes in segment C have the following in common:

- Varying crossings of Eudlo Creek
- The 132kV transmission line traverses segment C from east-west, therefore all routes must cross under this infrastructure
- All routes will be considered to provide a station in this segment
- All routes avoid the area of steep ground between the eastern and western sections of the study focus area.

The route options described below are shown in Figure 8.3, and also drawings CS001 to CS006 of Appendix E. The summary of evaluations is included in Table 8.3.8, and supporting information is provided in Appendix F.

8.3.1 Route C1

Just north of the second tunnel (at the local government boundary) route C1 crosses the existing railway. Route C1, shown on drawing CS001 of Appendix E, is the westernmost route as it passes the township of Eudlo. A bridge crossing would be required for the rail over the top of Logwoods Road and Highlands Road. Eudlo Station would be relocated to the north of the Highlands Road bridge crossing, approximately 175 m west of the existing station location. At the end of the station the route changes from being on fill to being in cut for approximately 1 km before returning to fill. A bridge crossing would be required for Eudlo School Road, then this route passes under the existing 132kV transmission line and then crosses Leons Road. The crossing will be grade separated which will require Leons Road to cross over the railway via a bridge. The alignment continues generally in cut from Leons Road until bridging over Palmwoods School Road and Paskins Road. Route C1 then follows the existing rail corridor into the Palmwoods Station area.

The alignment runs directly through the confluence of where several creeks/flowpaths run into Eudlo Creek. This would require significant earthworks/bridge structures, or realignment of this section of the creek. In total, section C1 has 15 creek/flowpath crossings.

Route C1 also fragments an area recognised as Regional significance for biodiversity. It also directly impacts on the western fringe of Eudlo Creek National Park (in the vicinity of Paskins Road).

Route C1 directly impacts on 40 properties, including:

- 27 General Rural Lands/Sustainable Horticultural Lands
- One portion of Eudlo Creek National Park
- 12 Neighbourhood Residential.

Route C1 crosses the existing rail corridor twice, and also has a short section where construction would encroach on the existing rail corridor, in the vicinity of Paskins Road. It has a minimum curve speed of 140 km/hr (for non-tilt trains).

8.3.2 Route C2/C5

Routes C2 and C5, shown on drawing CS003 of Appendix E have been assessed as one as they form one continuous route through segment C, thus making for a fair comparison of routes.

North of the tunnel at the southern limit of segment C, route C2/C5 runs adjacent to the existing rail corridor for approximately 800m. In this short distance there are two crossings of the existing rail corridor, one close to parallel, one close to perpendicular, and the alignment of Cogdens Road would be affected. Continuing on, a road over rail bridge would be required for Mooloolah Road, just to the west of the existing bridge.

The alignment then moves away to the east from the existing alignment by approximately 1 km. This area is lower lying and the alignment is generally on fill of approximately 4-10 m. Route C2/C5 then crosses Ilkley Road, Slaughter Yard Road, and passes under the 132kV transmission lines. Continuing north, it then crosses the intersection of Tania Avenue and Tecoma Road. It then curves back to the west and on approach to Palmwoods, and then also crosses the Palmwoods-Mooloolah Road.

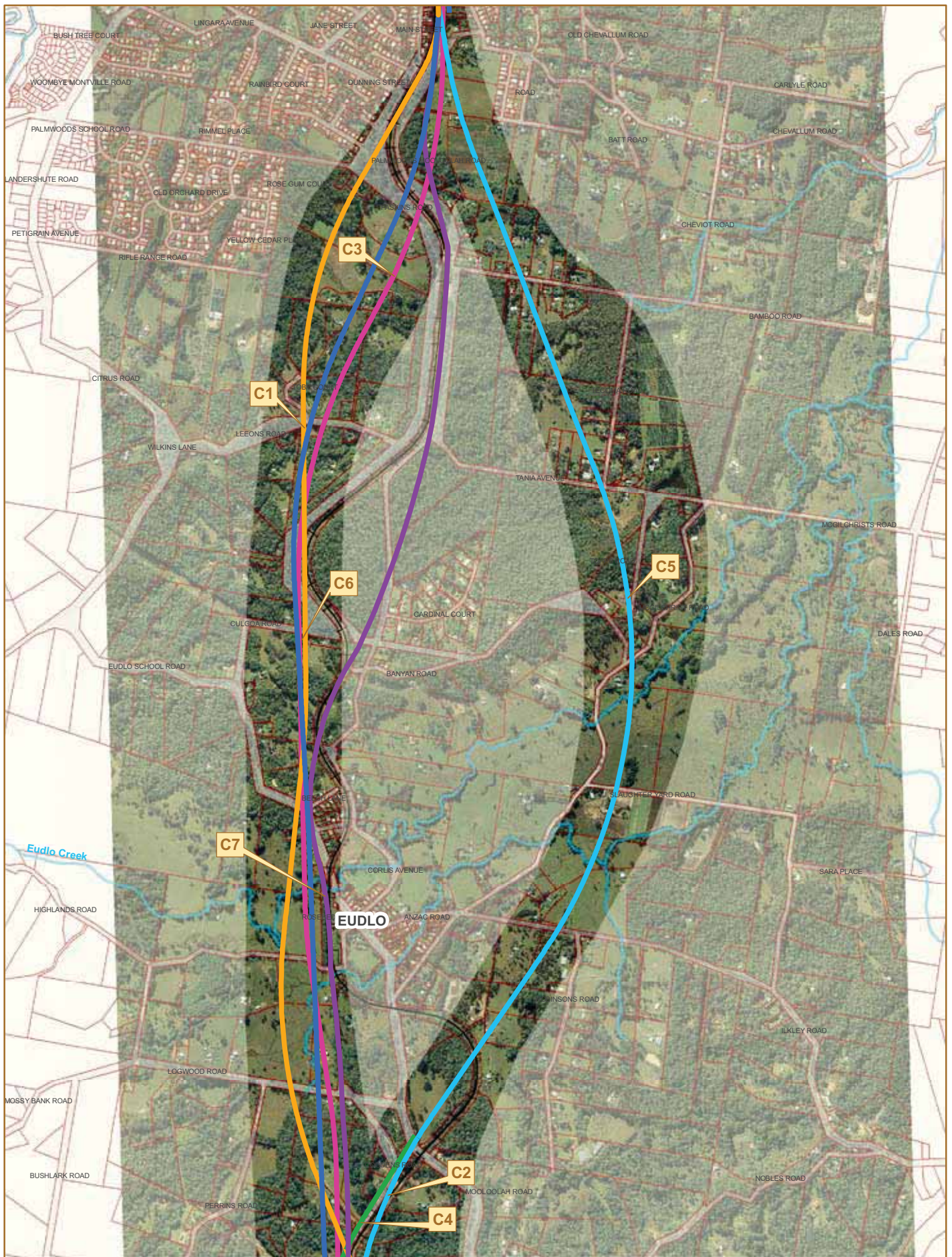
Route C2/C5 avoids impacting on Eudlo Creek National Park. However it would require extensive re-provision of the local road network, and long sections of structure to address flood issues.

A new station on this route would be located approximately 1 km east of Eudlo township. This is outside the extent of the urban footprint, and therefore opportunities for consolidation around a new station are limited.

Route C2/C5 crosses 16 creeks/flowpaths, including Acrobat Creek and Eudlo Creek. It also directly impacts on 45 properties, including:

- 41 General Rural/ Sustainable Horticulture
- Four Neighbourhood Residential.

Route C2/C5 crosses the existing rail corridor twice within a short distance. It has a minimum curve speed of 160 km/hr (for non-tilt trains).



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Legend

- C1 (orange line)
- C2 (green line)
- C3 (pink line)
- C4 (light blue line)
- C5 (dark blue line)
- C6 (purple line)
- C7 (yellow line)
- Existing Rail Line (black line with cross-ticks)
- Creeks (blue line)
- Property Boundaries (red dashed line)
- Roads (grey line)

Landsborough to Nambour Rail Corridor Study

Figure 8.3

Eudlo (Segment C) Route Options

Note: All routes shown are centrelines, detailed corridor widths will be provided within the report.

0 200 400 600 800 Meters

While every care is taken to ensure the accuracy of this data, Queensland Transport makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the plan being inaccurate or incomplete in any way and for any reason. Base information supplied by Maroochy and Caloundra Councils and Department of Natural Resources and Water. The areas shown in this figure are subject to change and final refinements during further assessment and preliminary design.

8 Route Options

8.3.3 Route C3

North of the new tunnel route C3 (shown on drawing CS004 of Appendix E) remains on the western side of the existing rail corridor passing Eudlo township approximately 75 m west of the current rail corridor. The station would be located in this area. Where route C3 runs to the west of Eudlo it is generally on fill. Bridges will be required for local roads to cross under the railway (Logwoods Road and Eaglewood Road). Highlands Road would require an overpass over the railway, as from the end of the station through this section for approximately 150 m the alignment is in cut. From here to Palmwoods the alignment is a mixture of cut and fill, but there is slightly more cut.

Continuing north of Eudlo township, a bridge crossing would be required for Eudlo School Road, then this route passes under the existing 132kV transmission line and then crosses Leeons Road, and also affects Toby Court. The crossing will be grade separated which will require Leeons Road to cross over the railway via a bridge. The alignment continues generally in cut from Leeons road until bridging over Palmwoods-Mooloolah Road and Paskins Road. Route C3 then takes a more eastern alignment than C1 or C6 towards Palmwoods, before rejoining the existing rail corridor into Palmwoods.

Route C3 runs parallel to a tributary of Eudlo Creek. This could require significant earthworks/ bridge structures, or realignment of this section of the creek. In total, section C3 has 15 gully/ creek/flowpath crossings.

Route C3 also fragments an area recognised as Regional significance for biodiversity. It also directly impacts on the western fringe of Eudlo Creek National Park (in the vicinity of Paskins Road).

Route C3 directly impacts on 39 properties, including:

- 26 General Rural Lands/Sustainable Horticultural Lands
- One portion of Eudlo Creek National Park
- 12 Neighbourhood Residential.

Route C3 crosses the existing rail corridor once, and also has a short section where construction would encroach on the existing rail corridor, in the vicinity of Paskins Road. It has a minimum curve speed of 140 km/hr (for non-tilt trains).

8.3.4 Route C4/C5

Routes C4 and C5 (shown on both shown on drawing CS002 and CS003 of Appendix E) have been assessed as one as they form one continuous route through segment C, thus making for a fair comparison of routes.

North of the tunnel at the southern limit of segment C, Route

C4/C5 runs adjacent and on the western side to the existing rail corridor for approximately 800 m, with one crossing of the existing rail corridor.

Route C4/C5 directly impacts 46 properties, including:

- 44 General Rural/ Sustainable Horticulture
- Four Neighbourhood Residential.

The rest of route C4/C5 is the same as for C2/C5.

8.3.5 Route C6

North of the new tunnel route C6 (shown on drawing CS005 of Appendix E) remains on the western side of the existing rail corridor passing Eudlo township approximately 75 m west of the current rail corridor. The station would be located in this area. Where route C6 runs to the west of Eudlo it is generally on fill. Bridges will be required for local roads to cross under the railway (Logwoods Road and Eaglewood Road). Highlands Road would require an overpass over the railway, as from the end of the station through this section for approximately 150 m the alignment is in cut. From here to Palmwoods the alignment is a mixture of cut and fill, but there is slightly more cut.

Continuing north of Eudlo township, a bridge crossing would be required for Eudlo School Road, this route then passes under the existing 132kV transmission line and then crosses Leeons Road, and also affects Toby Court. The crossing will be grade separated which will require Leeons Road to cross over the railway via a bridge. The alignment continues generally in cut from Leeons Road until bridging over Palmwoods-Mooloolah Road and Paskins Road. Route C6 then takes a similar alignment to C3 towards Palmwoods, before rejoining existing rail corridor into Palmwoods.

Route C6 runs parallel to a tributary of Eudlo Creek. This could require significant earthworks/bridge structures, or realignment of this section of the creek. In total, section C6 has 15 creek/ flowpath crossings.

Route C6 also fragments an area recognised as Regional significant for biodiversity. It also directly impacts on the western fringe of Eudlo Creek National Park (in the vicinity of Paskins Road).

Route C6 directly impacts on 39 properties, including:

- 26 General Rural Lands/Sustainable Horticultural Lands
- One portion of Eudlo Creek National Park
- 13 Neighbourhood Residential.

Route C6 crosses the existing rail corridor once, and also has a short section where construction would encroach on the existing rail corridor, in the vicinity of Paskins Road. It has a minimum curve speed of 160 km/hr (for non-tilt trains).

8.3.6 Route C7

Route C7, shown on drawing CS006 of Appendix E (also described as ‘the central option’), was based on a proposed route alignment provided in a submission during the community consultation process. This route has been developed to the same standard as other routes developed and assessed in this process. That is, the corridor objectives and design standards defined in section 3.1 of this report have been applied to this route.

Route C7 directly impacts on 41 properties, including:

- 25 General Rural Lands/Sustainable Horticultural Lands
- 12 Neighbourhood residential
- Three Special Purpose (three portions of Eudlo Creek National Park)
- One reserve for Park and Recreation.

This route also crosses the existing rail corridor up to five times, and also has significant lengths of parallel construction within the existing rail corridor. The vertical alignment of the existing route conflicts at several of these crossing points, making construction of the new route whilst ensuring the existing route remains operational extremely difficult. It also requires significant realignment of lengths of Palmwoods-Mooloolah Road (as it passes through the National Park).

8.3.7 Key Consideration for Segment C

The key issues influencing the corridor location through segment C include:

- Maintaining station location within proximity of the heart of Eudlo township to reflect the township’s history and accessibility
- Flooding issues associated with Acrobat Creek and Eudlo Creek
- Environmental values of the fauna and flora associated with Acrobat Creek and Eudlo Creek
- Fragmentation of Regional significant biodiversity area
- Visual and noise impacts associated with a new corridor traversing Eudlo Valley
- Fragmentation of horticultural lands
- Limiting effects on Eudlo Creek National Park and surrounds.

The westerly route options (C1, C3 and C6) remain mostly to the west of the Mooloolah-Eudlo Road/Eudlo Road (a District Collector). C1 does not cross this road at all thus negating the need for any crossings. Options C3 and C6 cross the road just to the south of Palmwoods and a grade separation may be required. Alternatively a new alignment could be developed to the east of the new rail line, connecting Paskins Road to Chevallum Road or the Palmwoods-Mooloolah Road. This would negate the need for a crossing at Paskins Road as discussed below.

However these alignments do cross the following roads which

provide access to a significant number of properties; Logwoods Road, Highlands Road, Eudlo School Road, and Paskins Road. It is envisaged a grade separated crossing will be required at some or all of these locations. The options also variously cross or impact on the following local streets; Cogden Road, Beech Lane, Ash Lane, and Leeons Road. Alternative access can be provided from other parts of the road network or along the proposed new alignment for most affected properties in these localities. This may be a more cost-effective option than a crossing given the small number of properties involved. There may be one or two properties to which access can not reasonably be provided, this will be determined by a more detailed road planning exercise. The impacts of each route on the transport network are discussed in more detail in the evaluation tables.

The easterly options (C2, C4 and C5) cross the Mooloolah Road once to the south of Eudlo in a similar location to one of the existing bridges. They also cross Ilkey Road (designated as a neighbourhood collector) and Chevallum Road (a district collector). Grade separated crossing will be required in these locations.

Local streets potentially affected by these alignments include Cogden Road, McGilchrist Road, Slaughter Yard Road, Tania Avenue, Tecoma Road, and Bamboo Road. Alternative access can be provided from other parts of the road network or along the proposed new alignment for most affected properties in these localities, although a crossing at McGilchrist Road would assist in maintain connectivity and permeability in the road network. Provision of alternative accesses may be a more cost-effective option than construction and maintenance of a safe crossing when a small number of properties are involved. However in some cases the provision of new accesses will impact on other properties and so the relative merits and costs will need to be weighed up in a more detailed road planning exercise. There may also be one or two properties to which access can not reasonably be provided.

Route C7 requires significant reprovision of Palmwoods-Mooloolah Road, as well as similar bridging requirements as routes C1, C3 and C6 to the south of this segment.

In this case route options near the town centre would not impact directly on existing business properties for resumption nor is there any road/rail crossing near the town centre. Route options near the existing alignment (to the west) should consider placement of the station to maintain visual links and access to the existing centre.

Eudlo also has very limited land available for development within its “Urban Footprint” and is not sewered. There are currently (within the 20 year planning horizon) limited opportunities to promote development around a new rail station to the east, unless strategic planning changes. Any new retail development at a new station to the east would be desirable for convenience, activation, and surveillance of the station, however this would need to be strictly controlled to ensure the ongoing dominance and traditional role of the existing centre.

8 Route Options

8.3.8 Evaluation of Routes in Segment C

Table 8.3.8 summarises the evaluation of routes within segment C. Supporting information is presented in Appendix F.

Table 8.3.8: Segment C Evaluations

SEGMENT C	C1	C2/C5
Ecology		
Area of remnant vegetation (m2):		
<ul style="list-style-type: none"> Endangered Of Concern Not of Concern Total 	E 0 OC 77507 NoC 60368 Total 137875	E 0 OC 36704 NoC 27606 Total 64311
Area of essential habitat (m2).	60270	43040
Area of State significant vegetation (BPA mapping) (m2).	10093	124
Length of new 'edge' (m) created by new route (i.e. wherever the route dissects an area of remnant vegetation and creates a new 'edge').	8847	4152
Area of riparian vegetation removed	23663	16725
Area of wetland removed	-	-
Name, number and type of protected area affected.	Eudlo Creek National Park, 1, National Park	-
Cultural Heritage		
Aboriginal cultural heritage sites – known sites	-	-
Aboriginal cultural heritage sites - Areas of CH potential (Based on desk based studies)	To be determined by CHMP	To be determined by CHMP
Historic heritage Features	2x Direct Potential Impacts	1x Direct Potential Impacts
Historic Heritage Precincts/ Areas	-	-
Land Use and Planning		
Area of corridor within Urban Footprint	Options C1, 3 and 6 are comparable in this regard, and contained in more urban footprint than 2, 4 and 6.	Is contained within less, and services less of, the urban footprint than options 1,3 and 6
Area of corridor within Rural Production and Open Space category (RP&OS)	Options C1, 3 and 6 are comparable in this regard and impact on less RP&OS land than the other 2, 4 and 6	Substantial impact on RP&OS land, including land identified for horticulture in regional plan
Number of residential properties within 400m of railway station	Proposed station is a little further from town than existing and in comparison to C3 and 6, but reasonable.	No station access at town, no useful pedestrian access
Number of community and commercial activities within 500m of railway station	Fair proximity to existing businesses and community activities	No proximity to businesses
Number of residential properties within 1km of railway station	Maximises residential access to station	Limited

C3	C4/C5	C6	C7* 'the central option'
E 0 OC 73472 NoC 89430 Total 162905	E 0 OC 39424 NoC 31568 Total 70992	E 0 OC 54444 NoC 80673 Total 135117	E 0 OC 85366 NoC 61165 Total 146531
90670	43040	71981	81849
0	124	0	102234
8030	5293	7624	9106
21946	2805	16725	29964
-	-	-	-
Eudlo Creek National Park, 1, National Park	-	Eudlo Creek National Park, 1, National Park	Eudlo Creek National Park, 3 portions, National Park
-	-	-	-
To be determined by CHMP	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP
2x Direct Potential Impacts	1x Direct Potential Impacts	1x Direct Potential Impacts	
-	-	-	-
Options C1, 3 and 6 are comparable in this regard, and contained in more urban footprint than 2, 4 and 6.	Is contained within less, and services less of, the urban footprint than options 1,3 and 6	Options C1, 3 and 6 are comparable in this regard, and contained in more urban footprint than 2, 4 and 6.	C7 is comparable with C1, C3 and C6
Options C1, 3 and 6 are comparable in this regard and impact on less RP&OS land than the other 2, 4 and 6	Substantial impact on RP&OS land, including land identified for horticulture in regional plan	Options C1, 3 and 6 are comparable in this regard and impact on less RP&OS land than the other 2, 4 and 6	C7 is comparable with C1, C3 and C6
Similar level of pedestrian access to existing	No station access at town, no useful pedestrian access	Similar level of pedestrian access to existing	Similar level of pedestrian access to existing
Good proximity to existing businesses and community activities	No proximity to businesses	Good proximity to existing businesses and community activities	Good proximity to existing businesses and community activities
Maximises residential access to station	Limited	Maximises residential access to station	Maximises residential access to station

8 Route Options

SEGMENT C	C1	C2/C5
Compliance with planning intent	Location of station is consistent with planned commercial centre	Location of station inconsistent with town centre activities as planned and alienates land identified for sustainable agriculture.
Properties		
Number of properties wholly or partially under the corridor	40 27 General Rural Lands/ Sustainable Horticultural Lands 1 portion of Eudlo Creek National Park 12 Neighbourhood Residential	45 41 General Rural/ Sustainable Horticulture 4 Neighbourhood Residential
Number of properties where habitable structures are within the corridor	12	14
Number of properties adjacent to the corridor	27	40
Number of properties within 100m of corridor edge	97	100
Number of habitable structures within 100m of the corridor edge	67	66
Geology/ Geotech		
	High (4-5m) fill and deep cut (7m)	Earthworks/fill to 10m, likely underlain by soft/compressible soils, possible stabilising and reassessment issues. 2 Deep cuts- 34m and 22m. Deep Cut (max 30m) in side-long ground, and significant cut and fill
Flooding/ hydrology		
Number of gully, creek and river crossings, with significant upstream catchment (>1ha)	15	16
Number and approximate opening area of culverts required to allow cross-drainage with minimum impact (assumed 0.3m localised increased in upstream flood levels in average)	12 culverts corresponding to 30 m ² of opening area	12 culverts corresponding to 63 m ² of opening area
Total cumulative width of bridges across floodplain required to pass the design flood with no negative impact (0mm afflux)	440m	670m
Water Quality		
Number of creeks traversed (does not gullies/flowpaths as above)	1	2
Creek names	Eudlo Ck	Eudlo Ck, Eudlo Ck tributary
Length of rail within 50m of waterway	315	273
Landscape and visual		
- Length of corridor through residential or rural residential areas	Length 1433	Length 445
- Length of new rail corridor created (centreline of greater than 30m from existing centreline).	Length 5314	Length 5406

C3	C4/C5	C6	C7* 'the central option'
Location of station is consistent with planned commercial centre	Location of station inconsistent with town centre activities as planned and alienates land identified for sustainable agriculture.	Location of station is consistent with planned commercial centre	Location of station is consistent with planned commercial centre
39 26 General Rural/ Sustainable Horticulture 12 Neighbourhood Residential 1 portion of Eudlo Creek National Park	46 42 General Rural/ Sustainable Horticulture 4 Neighbourhood Residential	36 26 General Rural/ Sustainable Horticulture 13 Neighbourhood Residential 1 portion of Eudlo Creek National Park	41 25 General Rural Lands/ Sustainable Horticultural Lands 12 Neighbourhood residential 3 portions of Eudlo Creek National Park 1 reserve for Park and Recreation
18	16	20	16
38	40	33	58
98	115	98	64
75	66	62	72
Cut to 30m in side long ground, need to consider stability issues. Significant earthworks, cuts to 15m	Earthworks/fill to 10m, likely underlain by soft/compressible soils, possible stabilising and reassessment issues. 2 Deep cuts- 34m and 22m Deep Cut (max 30m) in side-long ground, and significant cut and fill	Cut to 30m in side long ground, need to consider stability issues. Significant earthworks, cuts to 15m	Similar issues to western routes, but reduced cut/fill need due to utilisation of existing corridor
15	13	15	Similar to western options
13 culverts corresponding to 37 m ² of opening area	10 culverts corresponding to 75 m ² of opening area	13 culverts corresponding to 37 m ² of opening area	Similar to western options
685m	1,115m	691m	650m
2	2	2	2 + drainage lines
Eudlo Ck, Eudlo Ck tributary	Eudlo Ck, Eudlo Ck tributary	Eudlo Ck, Eudlo Ck tributary	Eudlo Ck, Eudlo Ck tributary
519	273	633	Assume similar to western options
Length 1118	Length 445	Length 1216	Length 1562
Length 5266	Length 5406	Length 5283	3299

8 Route Options

SEGMENT C	C1	C2/C5
Social and Economic		
Property impacts, severance, disruption to community activities or plans	Eudlo - Corridor and station location supports town centre, without direct property impacts, but care needs to be given to maintain visual link and access between new station and town centre	Property impacts, affects on local commercial activities, and considerations surrounding the constraints of urban development should a new station be required.
Noise (predicted)		
Community Noise Burden (existing: 30.8)	29.8	20.8
LAeq Exceedences (existing: 1)	3	1
LAmx Exceedences (Existing: 27)	14	13
Technical/Engineering		
Number of road crossings	8	1
Number of existing rail crossings	2	1
Chainages	89+705 – 95+110	89+680 – 90+175
Average Speed (Km/h)	2 No curves 160km/hr 1 No curves 140km/hr (11m of 80km/hr Curve) Total Length of Straight = 2312m	C2 (Approx 500m of 1 No. 160km/hr curve) C5 (Approx 50m of 1 No. 160km/hr curve) 2 no curve 160 km/hr Total Length of Straight =2077m
Length of structures required across Flood Plain	440m	1115m
Access to stations/Development of station access opportunities	New railway station is relocated approximately 175m to the west from existing station	New railway station is relocated up to 1km to the east from existing station

C3	C4/C5	C6	C7* 'the central option'
Eudlo - Corridor and station location supports town centre, without direct property impacts, but care needs to given to maintain visual link and access between new station and town centre	Property impacts, affects on local commercial activities, and considerations surrounding the constraints of urban development should a new station be required.	Eudlo - Corridor and station location supports town centre, without direct property impacts, but care needs to given to maintain visual link and access between new station and town centre	Eudlo - Corridor and station location supports town centre, without direct property impacts, but care needs to given to maintain visual link and access between new station and town centre
25.0	3.0	25.9	33.3
2	2	3	3
13	3	19	29
5	5	6	5
The proposed alignment runs in existing rail corridor for approximately 300m. This may create constructability issues. In addition there is one rail crossing.	The proposed alignment runs with the existing rail corridor for approximately 250m. This could create constructability issues. In addition there is one rail crossing.	There is one rail crossing.	There could be constructability issues with the proposed alignment since the alignment runs within existing rail for approximately 2500m. There are up to 5 crossings of the existing corridor.
89+800 – 95+155	89+925 + 95+710	90+175 – 95+325	89+576 – 94+910
C3 2 no curve 160 km/hr 2 no curve 140 km/hr Total Length of Straight =1901m	C4: 2 no curve 160 km/hr Total Length of Straight =3381.5m C5: (Approx 50m of 1 No. 160km/hr curve) 2 no curve 160 km/hr Total Length of Straight =2077m	C6 2 no curve 160 km/hr (Approx 1000m of 1 No.160km/hr curve) Total Length of Straight =2893m	Similar design speeds to that of C6
685m	1800m	691m	650m
New station required at Eudlo approximately 75m to the west.	New railway station is relocated up to 1km to the east from existing station	New railway station is relocated approximately 75m to the west	New railway station is relocated approximately 75m to the west

8 Route Options

SEGMENT C	C1	C2/C5
Utilities	<p>Energex Large 132kV tower. Towers run across rail corridor. Large lattice electrical towers and overhead lines. Towers must be avoided Very costly Major influence on corridor option- but not affected by this option.</p> <p>Telstra Metropolitan main Cable runs across rail corridor. Large optical fibre and copper cable. Main to be relocated or further protection maybe required. Influence on corridor option.</p>	<p>Proposed APT Allgas Gas Pipeline runs across rail corridor. Gas main may need protection. Not a major influence on corridor option. This is a future gas main. The proposed design is in planning stage.</p> <p>Energex Large 132kV tower. Towers run across rail corridor. Large lattice electrical towers and overhead lines. Towers must be avoided Very costly Major influence on corridor option- but not affected by this option.</p> <p>Energex 33kV cables. Overhead cables run across rail corridor. The 33kV may require need relocating.</p>
Transport and Road Network		
Overall effect on the surrounding road network (including ped access)	<p>More overall benefit</p> <p>Several local streets and district collectors cross the alignment</p> <p>Will require several grade separated crossings to maintain accessibility</p> <p>No impact on pedestrian access</p>	<p>Less overall benefit</p> <p>Several local streets and district collectors cross the alignment</p> <p>Will require several grade separated crossings to maintain accessibility</p> <p>Substantial impact on pedestrian access to station</p>
Number of low road bridges or road crossings eliminated	<p>2 low bridges eliminated or replaced</p> <p>3 new grade separated crossings</p>	<p>2 low bridges eliminated or replaced 4 new grade separated crossings</p>
Access to stations	Station location similar to existing	Station is remote from urbanised areas
Walk up catchments/ walkability	Good	Poor
Cost Ratio		
Comparative cost ratio (1 being the lowest cost option)	1.31	1.36

C3	C4/C5	C6	C7* 'the central option'
<p>Energex Large 132kV tower. Towers run across rail corridor. Large lattice electrical towers and overhead lines. Towers must be avoided Very costly Major influence on corridor option- but not affected by this option.</p> <p>Energex 33kV cables. Overhead cables run across rail corridor. The 33kV may require need relocating.</p>	<p>Proposed APT Allgas Gas Pipeline runs across rail corridor. Gas main may need protection. Not a major influence on corridor option. This is a future gas main. The proposed design is in planning stage.</p> <p>Energex Large 132kV tower. Towers run across rail corridor. Large lattice electrical towers and overhead lines. Towers must be avoided Very costly Major influence on corridor option- but not affected by this option.</p> <p>The 33kV may require need relocating as overhead cables run within alignment for approximately 500m. Northern Pipeline Interconnector (NPI) Drought relief Main 800m length approx running within proposed rail route. Two pipes at approx 1.3m dia. 800m to be realigned or offset by 75m. Major influence on corridor option. Major constraint – Non feasible.</p>	<p>Energex Large 132kV tower. Towers run across rail corridor. Large lattice electrical towers and overhead lines. Towers must be avoided Very costly Major influence on corridor option- but not affected by this option.</p> <p>Energex 33kV cables. Overhead cables run across rail corridor. The 33kV may require need relocating.</p> <p>Telstra Metropolitan main Cable runs across rail corridor. Large optical fibre and copper cable. Main to be relocated or further protection maybe required .</p>	<p>Proposed APT Allgas Gas Pipeline runs across rail corridor. Gas main may need protection. Not a major influence on corridor option. This is a future gas main. The proposed design is in planning stage.</p> <p>Energex Large 132kV tower. Towers run across rail corridor. Large lattice electrical towers and overhead lines. Towers must be avoided Very costly Major influence on corridor option- but not affected by this option.</p>
<p>More overall benefit</p> <p>Several local streets and district collectors cross the alignment</p> <p>Will require several grade separated crossings to maintain accessibility</p> <p>No impact on pedestrian access</p>	<p>Less overall benefit</p> <p>Several local streets and district collectors cross the alignment</p> <p>Will require several grade separated crossings to maintain accessibility</p> <p>Substantial impact on pedestrian access to station</p>	<p>More overall benefit</p> <p>Several local streets and district collectors cross the alignment</p> <p>Will require several grade separated crossings to maintain accessibility</p> <p>No impact on pedestrian access</p>	<p>Significant impact on alignment of Palmwoods- Mooloolah Road.</p> <p>Several local streets and district collectors cross the alignment</p> <p>Will require several grade separated crossings to maintain accessibility</p> <p>No impact on pedestrian access</p>
<p>2 low bridges eliminated or replaced</p> <p>3 new grade separated crossings</p>	<p>2 low bridges eliminated or replaced 4 new grade separated crossings</p>	<p>2 low bridges eliminated or replaced</p> <p>3 new grade separated crossings</p>	<p>2 low bridges eliminated or replaced</p> <p>3 new grade separated crossings</p>
<p>Station location similar to existing</p>	<p>Station is remote from urbanised areas</p>	<p>Station location similar to existing</p>	<p>Station location similar to existing</p>
<p>Good</p>	<p>Poor</p>	<p>Good</p>	<p>Good</p>
<p>1</p>	<p>1.08</p>	<p>1.10</p>	<p>1.07</p>

8 Route Options

8.4 Segment D – Palmwoods to Woombye

All routes in segment D have the following in common:

- Pass through the constrained urban area of Palmwoods. All routes are considered likely to have an impact on amenity within the town centre, including the potential impact of a prominent elevated railway and an elevated structure across edge of Kolora Park lake (the 'duck pond')
- Varying crossings of Paynter Creek
- Two stations to be provided in this segment- Palmwoods and Woombye.

All options in segment D impact on access between Chevallum Road (a district collector), the Palmwoods-Woombye Road (a controlled distributor), Jubilee Road (a district collector) and the Palmwoods-Montville Road (via Margaret Street in the Palmwoods township). Presently these four roads intersect adjacent to a rail bridge with low clearance. The road at this intersection is subject to inundation and forms an unsafe intersection with poor sight distance.

All alignments in segment D are to the west of the existing rail alignment at Woombye. The only impact on the road network in this vicinity is Mullers Road, a district connector which provides access between properties in West Woombye and Woombye. Currently Mullers Road crosses under a rail bridge with low clearance. This intersection is a tight hairpin bend and it is considered more appropriate that a road bridge be constructed over the rail corridor connecting Blackall Street with Mullers Road. Woombye Back Road is identified as a local cycle route and the route could potentially be maintained with a rail underpass or provision could be made on the new bridge for cyclists.

Station access for private vehicles, buses, cyclists and pedestrians would remain via Blackall Street and it is anticipated that parking would be on the Blackall Street side of the new alignment.

Local streets in segment D potentially affected by the new alignments include Railway Street and Spackman Lane in the Palmwoods area and Taintons Road south of Woombye. These streets provide access to a small number of properties and investigation of alternative accesses utilising the existing road network, existing rail corridor and/or new corridor would be required.

The route options described below are shown in Figure 8.4 and drawings CS001-CS005 of Appendix E with the summary of the evaluations is included in Table 8.4.6. Supporting information is provided in Appendix F in the form of route option report cards.

8.4.1 Route D1

Route D1, shown in drawing CS001 of Appendix E, follows the existing alignment most closely of all the options in this segment. However, this means it has a significantly lower curve speeds, ranging from a minimum curve speed of 80 km/hr, to a maximum curve speed of 120 km/hr, based on curve radii, for non-tilt trains. Route D1 impacts on an area of wetland, to the north of the Woombye-Palmwoods Road. There are also sections of route D1 directly adjacent to a major tributary of Paynter Creek which would require realignment of the tributary or major earthworks. In total, this route has five creek/flowpath crossings.

Route D1 impacts on a total of 32 properties, including:

- Three zoned for Village Centre purposes
- 11 General Rural/Sustainable Horticultural
- 17 Neighbourhood Residential
- Kolora Park.

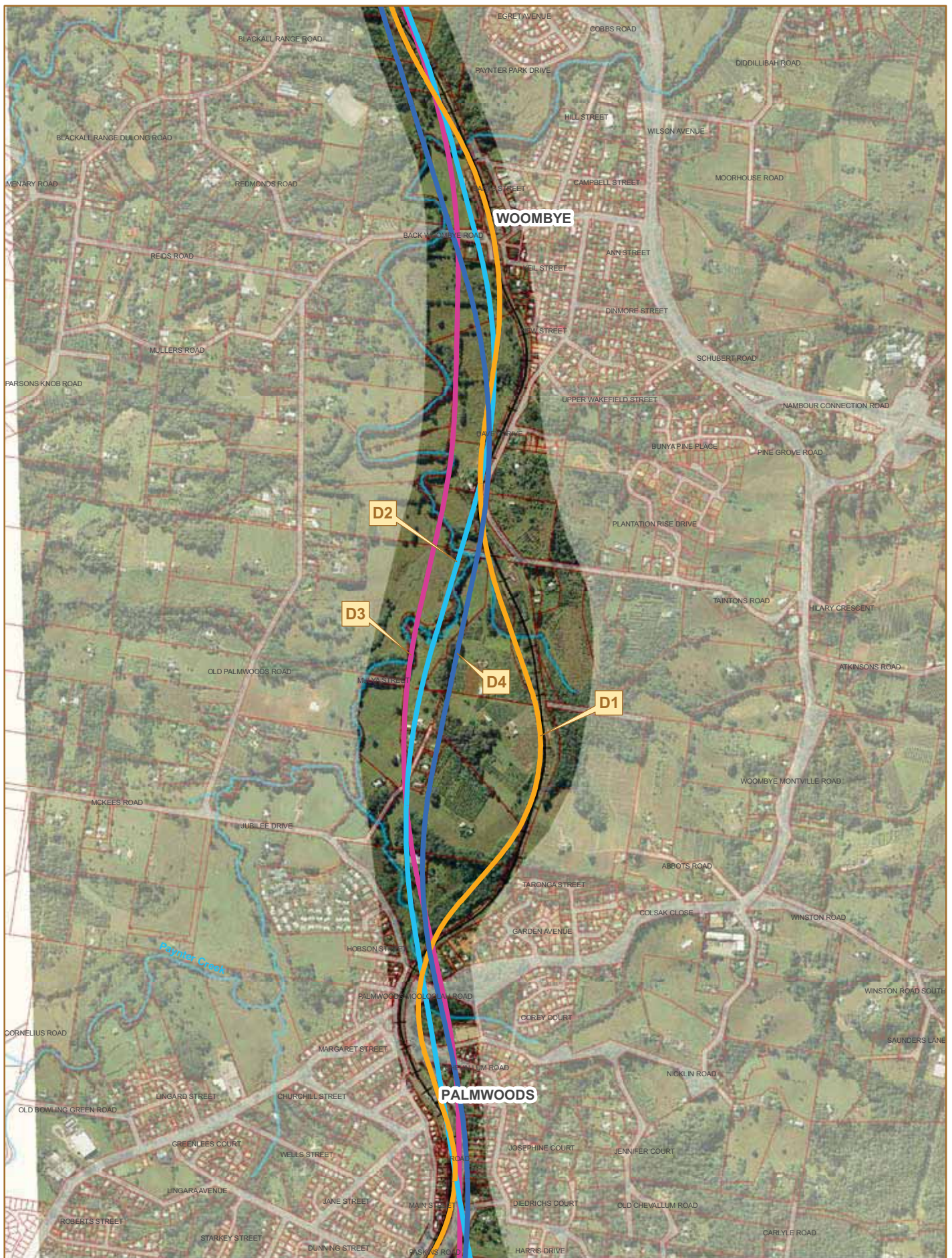
A rising sewer main runs through the alignment for approximately 500 m and this considered a major issue for this alignment. This rising main would need relocating to an offset of approximately 75 m from its current location.

Route D1 is also recognised as potentially having an impact on 14 sites with identified historical heritage features and one direct potential impact on identified historical heritage precincts/areas.

Route D1 crosses the existing rail corridor five times, and runs along the existing rail corridor for approximately 1.650 km which would be a constructability issue.

8.4.2 Route D2

D2, shown in drawing CS003 of Appendix E, follows a similar alignment as the existing rail corridor through Palmwoods station, though on a more easterly location. In the north of Palmwoods D2 crosses Kolora Park (the 'duck pond' area) and the existing alignment to the west. Route D2 then deviates away up to 700 m from the existing alignment for approximately 1.7 km. After 1.7 km, the proposed alignment runs adjacent to the existing rail corridor for approximately 300 m before deviating to the west for approximately 1 km. This is the approximate location of Woombye Station, which is located within 100 m to the west of the existing station. The levels are generally on fill for this section with a couple of sections of cut. In Woombye where route D2 runs close to the existing rail corridor, the levels are similar to the existing railway levels.



March 2008

Legend

— D1	— D3	— Creeks
— D2	— D4	 Property Boundaries
— Existing Rail Line	 Roads	

**Landsborough to Nambour
Rail Corridor Study**

Figure 8.4

Palmwoods and Woombye (Segment D) Route Options

Note: All routes shown are centrelines, detailed corridor widths will be provided within the report.

While every care is taken to ensure the accuracy of this data, Queensland Transport makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the plan being inaccurate or incomplete in any way and for any reason. Base information supplied by Maroochy and Caloundra Councils and Department of Natural Resources and Water. The areas shown in this figure are subject to change and final refinements during further assessment and preliminary design.

8 Route Options

Route D2 impacts on a total of 26 properties, including:

- 15 General Rural/Sustainable Horticultural
- Nine Neighbourhood Residential
- The Palmwoods Bowls Club
- Kolora Park.

Route D2 crosses Paynter Creek twice, including one section of the route that runs directly along a portion of the creek. Departing Palmwoods township, it also crosses a major tributary of Paynter Creek, which would require realignment of the waterway or major earthworks. In total route D2 has six creek or flowpath crossings.

Heritage analysis indicates that route D2 may affect an identified Aboriginal cultural heritage site and possibly four sites with identified historical heritage features.

Route D2 also has a potential impact on the amenity of Woombye showgrounds. This would result in a partial loss of visual connection between town centre and the railway.

This route also affects a sewer pumping station (136) by the western side of earthworks for route D2.

Local streets potentially affected by route D2 include Railway Street and Spackman Lane in the Palmwoods area and Taintons Road south of Woombye. These streets service a relatively small number of properties and so investigation of alternative accesses utilising the existing road network, existing rail corridor and/or new corridor are recommended.

Route D2 would require a new station at Palmwoods approximately 40 m to the east of the current station, and a new station at Woombye approximately 50 m to the west of the current Woombye station. It runs twice for approximately 200 m in the existing rail corridor which would be a constructability issue. In addition there are four rail crossings. It has a minimum curve speed of 140 km/hr (for non-tilt trains).

8.4.3 Route D3

From Palmwoods Station north route D3, shown on drawing CS004 of Appendix E, is generally on fill with occasional sections of cut up to Woombye. It crosses through the middle of the 'duck pond' within Kolora Park, which would require significant bridging. Route D3 is the second most eastern alignment through Palmwoods town centre.

Just north of Palmwoods there are two bridges for crossing over Chevallum and Woombye-Palmwoods Roads. Continuing north, route D3 crosses the existing railway and curves to the west. It crosses Paynter Creek a several times and then enters

Woombye to the west. Route D3 requires the relocation of Woombye Station to approximately 100 m west of its current location. Route D3 would require a bridge over the existing road to maintain east-west access.

Route D3 crosses Paynter Creek multiple times, including some sections where it runs along the creek. In total, route D3 has seven creek/flowpath crossings.

Route D3 impacts on a total of 37 properties, including:

- 15 General Rural/ Sustainable Horticultural
- 20 Neighbourhood Residential
- The Palmwoods Bowls Club
- Kolora Park.

Route D3 also potentially impacts on one identified Aboriginal cultural heritage site, 13 direct potential impacts on sites with identified historical heritage features and one direct potential impact on identified historic heritage precincts/areas.

Local streets potentially affected by route D3 include Railway Street and Spackman Lane in the Palmwoods area and Taintons Road south of Woombye. These streets service a relatively small number of properties and so investigation of alternative accesses utilising the existing road network, existing rail corridor and/or new corridor is recommended.

Route D3 also has a potential impact on the amenity of Woombye showgrounds. This would result in a partial loss of visual connection between town centre and the railway.

Route D3 would require a new station at Palmwoods 80 m to the east of the existing station, and a new station at Woombye 100 m to the west of the existing station. It has three crossings of the existing rail corridor, and achieves a minimum curve speed of 160 km/hr (for non-tilt trains).

8.4.4 Route D4

Route D4, shown in drawing CS005 of Appendix E, places the new Palmwoods Station approximately 50 m to the west of the existing station location. From the start of this route up to the crossing of the existing rail corridor, the route is generally in cut (up to 10 m). Continuing north, it is generally on fill (up to 10 m) until the end of segment C of the study focus area (to the north of Woombye).

Route D4 takes the most eastern alignment from the southern limit of the study focus, meaning a relocated Palmwoods Station would be likely 100 m away from its current location. Existing roads could be realigned to create station access opportunities.

Route D4 runs to the east of the existing alignment for approximately 500 m, and then crosses the existing rail corridor. Route D4 then continues along to the west of the existing rail corridor until the end of this segment. In this section there are several bridges for the railway to cross Paynter Creek and local roads.

Local streets potentially affected by route D4 include Railway Street and Spackman Lane in the Palmwoods area and Taintons Road south of Woombye. These streets service a relatively small number of properties and so investigation of alternative accesses utilising the existing road network, existing rail corridor and/or new corridor are recommended.

Route D4 has several crossings of Paynter Creek, particularly towards the northern end of segment D. It also directly impacts on 33 properties, including:

- 10 General Rural/Sustainable Horticultural
- 21 Neighbourhood Residential
- Kolora Park
- The Palmwoods Bowls Club.

Sewer pumping station 136 is affected by western earthworks and considered a major constraint.

Route D4 runs for approximately 250 m in the existing rail corridor which would be a constructability issue. There are two rail crossings. It has a minimum curve speed of 140 km/hr (for non-tilt trains).

8.4.5 Key Considerations for Segment D

The key issues influencing the corridor location through Segment D include:

- Maintaining a rail station within the heart of the Palmwoods township to:
 - Maintain walkability to the rail station
 - Enable the provision of safer pedestrian access to the rail station
- Provide for future opportunities to create a more cohesive town centre as envisaged in documents such as the Palmwoods Town Centre Plan
- Minimise physical, environmental and visual impacts to Kolora Park (i.e. 'the duck pond') and the Bowls Club, which have been identified by the community as valued features
- Conservation of wetland habitat as it is the only habitat of its type in locality
- Appropriate management of major waterway crossings

- Utilise the topography of Palmwoods to provide safe and flood-free vehicular access across the rail line, and eliminate the current height restriction for trucks in a manner that has minimal visual impact on the township
- Minimising impacts on the Woombye Recreational Grounds
- Consider possibilities for a grade separated crossing closer to the centre of the Woombye township, that could provide easier access to the west and also provide better linkages between the sports fields and the township.

8 Route Options

8.4.6 Segment D - Evaluation

The following Table 8.4.6 summarises the evaluation of routes within segment D. Supporting information is presented in Appendix F.

Table 8.4.6: Segment D Evaluations

SEGMENT D	D1	D2	D3	D4
Ecology				
Area of remnant vegetation (m2): <ul style="list-style-type: none"> Endangered Of Concern Not of Concern Total 	E 0 OC 8434 NoC 28508 Total 36942	E 0 OC 20437 NoC 18115 Total 38552	E 0 OC 23421 NoC 25003 Total 48424	E 0 OC 27801 NoC 19022 Total 46824
Area of essential habitat (m2).	16698	4279	5783	5902
Area of State significant vegetation (BPA mapping) (m2).	2669	12078	27748	11153
Length of new 'edge' (m) created by route (i.e. wherever the route dissects an area of remnant vegetation and creates a new 'edge').	2049	2804	3911	3723
Area of riparian vegetation removed	8434	20437	23421	27801
Area of wetland removed	16698	4279	5783	5902
Name, number and type of protected area affected.	N/A	N/A	N/A	N/A
Cultural Heritage				
Aboriginal cultural heritage sites – known sites	-	1x Direct Potential Impacts	1x Direct Potential Impacts	1x Direct Potential Impacts
Aboriginal cultural heritage sites - Areas of CH potential (Based on desk based studies)	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP
Historic heritage Features	14x Direct Potential Impacts	9x Direct Potential Impacts	13x Direct Potential Impacts	12x Direct Potential Impacts
Historic Heritage Precincts/ Areas	1x Direct Potential Impact	1x Direct Potential Impact	1x Direct Potential Impact	1x Direct Potential Impact
Land use and Planning				
Area of corridor within Urban Footprint	Comparable for options D1, 2 and 5, better than 3 and 4	Comparable for options D1, 2 and 5, better than 3 and 4	Less than options D1,2 and 5	Less than options D1,2 and 5
Area of corridor within Rural Production and Open Space category (RP&OS)	Comparable for options D1, 2 and 5, better than 3 and 4	Comparable for options D1, 2 and 5, better than 3 and 4	More impact on rural land than options D 1, 2 and 5	More impact on rural land than options D 1, 2 and 5
Number of residential properties within 400m of railway station	Close to existing position – good access maintained	Close to existing position – good access maintained	Not within easy walking distance of town and main residential area	Close to existing position – good access maintained
Number of community and commercial activities within 500m of railway station	Remains accessible from town centre	Remains accessible from town centre	Remains accessible from town centre	Remains accessible from town centre

SEGMENT D	D1	D2	D3	D4
Number of residential properties within 1km of railway station	Good residential catchment	Good residential catchment	Fair residential catchment	Good residential catchment
Compliance with planning intent for township	D1 is closest to the existing alignment and therefore is most compatible with the town plan and has the least property impacts, particularly on rural and on recreational lands.	Alienates recreational land identified in the plan, otherwise supports/ reinforces pattern of urban development	Alienates recreational land and does not reinforce town centre, could disperse pattern or urban/commercial development	Alienates recreational land and does not reinforce town centre, could disperse pattern or urban/commercial development.
Number of properties wholly or partially under the corridor	32 3 Village Centre 11 General Rural/ Sustainable Horticultural 17 Neighbourhood Residential 1 community facility	26 16 General Rural/ Sustainable Horticultural 9 Neighbourhood Residential 2 community facilities	37 15 General Rural/ Sustainable Horticultural 20 Neighbourhood Residential 2 community facilities	33 10 General Rural/ Sustainable Horticultural 21 Neighbourhood Residential 2 community facilities
Number of properties where habitable structures are within the corridor	6	13	13	15
Number of properties adjacent to the corridor	32	12	17	20
Number of properties within 100m of corridor edge	147	145	106	104
Number of habitable structures within 100m of the corridor edge	76	83	60	64
Geology/ Geotech				
	Fill to 10m, likely underlain by soft/ compressible soils, possible stability and reassessment issues	Fill to 10m, likely underlain by soft/ compressible soils, possible stability and reassessment issues	Fill likely underlain by soft compressible soils, potential stability and reassessment issues	Fill to 10m, likely underlain by soft/ compressible soils, possible stability and reassessment issues
Flooding				
Number of gully, creek and river crossings, with significant upstream catchment (>1ha)	7	8	7	8
Number and approximate opening area of culverts required to allow cross-drainage with minimum impact (assumed 0.3m localised increased in upstream flood levels in average)	2 culverts corresponding to 4 m ² of opening area	3 culverts corresponding to 22 m ² of opening area	3 culverts corresponding to 21 m ² of opening area	3 culverts corresponding to 22 m ² of opening area
Total cumulative width of bridges across floodplain required to pass the design flood with no negative impact (0mm afflux)	1,205m	2,110m	1,955m	1,605m
Number of gully, creek and river crossings, with significant upstream catchment (>1ha)	7	8	7	8

8 Route Options

SEGMENT D	D1	D2	D3	D4
Water Quality				
Number of creeks traversed	3	2	2	3
Number of crossings	5	6	7	3
Creek names	Paynter Ck, 2 Paynter Ck tributaries	Paynter Ck, Paynter Ck tributary	Paynter Ck, Paynter Ck tributary	Paynter Ck, 2 Paynter Ck tributaries
Length of rail within 50m of waterway	761	1178	1211	1127
Landscape and Visual				
- Length of corridor through residential or rural residential areas	Length 1697	Length 1589	Length 1473	Length 1874
- Length of new rail corridor created (centreline of greater than 30m from existing centreline).	Length 3544	Length 3802	Length 3789	Length 3563
Socio-economic				
Property impacts, severance, disruption to community activities or plans	<p>Palmwoods business centre – All options avoid direct property impact on business centre – potential for new grade separated crossing and adjustment to road to network to strengthen town centre connectivity. This option is closest to town centre to provide good connectivity between station and town centre.</p> <p>Woombye business centre - Explore options for relocated grade separated crossing and therefore better access into centre of town from the west and better connectivity between town centre and sports fields – this option is on the existing alignment and is closest to the town centre without creating direct property impacts. Lesser impact than other routes on sports fields.</p>	<p>Palmwoods business centre – All options avoid direct property impact on business centre – potential for new grade separated crossing and adjustment to road to network to strengthen town centre connectivity. This option is second closest to town centre to provide good connectivity between station and town centre.</p> <p>Woombye business centre - Explore options for relocated grade separated crossing and therefore better access into centre of town from the west and better connectivity between town centre and sports fields – this option is just west of the existing alignment and is close to the town centre without creating direct property impacts. More impact to sports fields than D1 but less than D3 and D4.</p>	<p>Palmwoods business centre – All options avoid direct property impact on business centre – potential for new grade separated crossing and adjustment to road to network to strengthen town centre connectivity. This option is further from the town centre than other options creating a greater distance between station and town centre.</p> <p>Woombye business centre - Explore options for relocated grade separated crossing and therefore better access into centre of town from the west and better connectivity between town centre and sports fields – this option is too far from the town centre for good connectivity and also has the biggest impact on the sports fields.</p>	<p>Palmwoods business centre – All options avoid direct property impact on business centre – potential for new grade separated crossing and adjustment to road to network to strengthen town centre connectivity. This option is further from the town centre than other options creating a greater distance between station and town centre.</p> <p>Woombye business centre - Explore options for relocated grade separated crossing and therefore better access into centre of town from the west and better connectivity between town centre and sports fields – this option is too far from the town centre for good connectivity and also has a large impact on the sports fields.</p>
Noise (predicted)				
Community Noise Burden(Existing: 43.7)	37.8	35.4	33.8	34.3
LAeq Exceedences (existing: 0)	0	0	3	1
LAmx Exceedences (Existing: 45)	16	15	23	20

SEGMENT D	D1	D2	D3	D4
Technical/ Engineering				
Number of road crossings	2	4	This alignment runs for approximately 300m on top of Eudlo Road. In addition there are three other road crossings	2
Number of existing rail crossings	This alignment runs for approximately 1.650km in the existing rail corridor which would be a constructability issue. In addition there are 5 rail crossings	This alignment runs twice for approximately 200m in the existing rail corridor which would be a constructability issue. In addition there are 4 rail crossings	3	This alignment runs for approximately 250m in the existing rail corridor which would be a constructability issue. There are two rail crossings.
Number of river crossings	5	There are 6 waterway crossings. In one instance the rail alignment runs parallel and through the Paynter Creek for approximately 300m	There are seven waterway crossings. In one instance the rail alignment runs through the hairpin at Paynter Creek. This could effect approximately 300m of the creek	3
Chainages	95+110 – 99+160	95+325 – 99+235	95+155 – 99+023	94+910 – 98+785
Average Speed (Km/h)	D1 2 No curves 120km/hr 3 No curves 80km/hr Total Length of Straight = 753m	D2 1 no curve 140 km/hr 1 no curve 160 km/hr (Approx 100m of 1 No. 160km/hr curve) Total Length of Straight =1440m	D3 3 no curve 160 km/hr (Approx 575m of 1 No. 160km/hr curve) Total Length of Straight =539m	D4 (Approx 400m of 1 No.160km/hr curve) 1 no curve 140 km/hr 1 no curve 160 km/hr Total Length of Straight =1037m
Length of structures required across Flood Plain	1205m	2110m	1955m	1605m
Access to stations/Development of station access opportunities	Proposed alignment runs into existing station. Existing roads could be realigned to create station access opportunities	The alignment will involve a new station at Palmwoods 40m to the east and a new station at Woombye 50m to the west.	The alignment will involve a new station at Palmwoods 80m to the east and a new station at Woombye 100m to the west.	Proposed alignment runs into existing station. At Palmwoods. Proposed alignment runs 100m to the west of Woombye station. Existing roads could be realigned to create station access opportunities

8 Route Options

SEGMENT D	D1	D2	D3	D4
Utilities	Rising Sewer main runs across and along route and may need protection. Telstra Metropolitan main Cable runs across and parallel to route. Large optical fibre and copper cable. Main to be relocated or further protection maybe required.	Rising Sewer main runs across and along route and may need protection. Telstra Metropolitan main Cable runs across and parallel to route. Large optical fibre and copper cable. Main to be relocated or further protection maybe required. Sewer Pumping station 136 affected by western earthworks. Expensive to relocate, may require retaining walls to minimise impact.	Telstra Metropolitan main Cable runs across and parallel to route. Large optical fibre and copper cable. Main to be relocated or further protection maybe required.	Rising Sewer main runs across and along route and may need protection. Telstra Metropolitan main Cable runs across and parallel to route. Large optical fibre and copper cable. Main to be relocated or further protection maybe required. Route runs through sewer Pumping station 136. Expensive to relocate, impact on this route.
Transport and Road Network				
Overall effect on the surrounding road network (including ped access)	More overall benefit Potentially significant, but manageable, impacts on access to east of Palmwoods. Will also improve road safety and reliability substantially in this locality. Works could also improve safety at Woombye. No other substantial impacts for roads or pedestrians.	Less overall benefit Potentially significant, but manageable, impacts on access to east of Palmwoods. Will also improve road safety and reliability substantially in this locality. Works could also improve safety at Woombye. Resolution of access in Spackman Lane requires further attention. No other substantial impacts for roads or pedestrians.	Less overall benefit Potentially significant, but manageable, impacts on access to east of Palmwoods. Will also improve road safety and reliability substantially in this locality. Works could also improve safety at Woombye. Resolution of access in Spackman Lane requires further attention. No other substantial impacts for roads or pedestrians.	Less overall benefit Potentially significant, but manageable, impacts on access to east of Palmwoods. Will also improve road safety and reliability substantially in this locality. Works could also improve safety at Woombye. Resolution of access in Spackman Lane requires further attention. No other substantial impacts for roads or pedestrians.
Number of low road bridges or road crossings eliminated	Two low rail bridges eliminated 3 new grade separated crossings required or 2 crossings and a new bridge/causeway	Two low rail bridges eliminated 3 new grade separated crossings required or 2 crossings and a new bridge/causeway	Two low rail bridges eliminated 3 new grade separated crossings required or 2 crossings and a new bridge/causeway	Two low rail bridges eliminated 3 new grade separated crossings required or 2 crossings and a new bridge/causeway
Access to stations	Access unchanged	Access unchanged	Access unchanged	Access unchanged
Walk up catchments/ walkability	Good - Closer to existing than other options at both Palmwoods and Woombye	Good – approximately 50m further from town centre than existing	Fair – approximately 100m further from town than existing, and potentially further downhill	Fair – approximately 100m further from town than existing, and potentially further downhill
Cost Ratio				
Comparative cost ratio (1 being the lowest cost option)	1.09	1.50	1.21	1

All alignments in segment D are to the west of the existing rail alignment at Woombye. The only impacted road in this vicinity is Mullers Road, a district connector providing access from western properties to Woombye. Currently Mullers Road crosses under a rail bridge with low clearance. This intersection is a tight hairpin bend. It is recommended that a road bridge be constructed over the rail, connecting Blackall Street to Mullers Road. Woombye Back Road is identified as a local cycle route, this could potentially be maintained with a rail underpass, or provision made on the new bridge for cyclists.

Station access for private vehicles, buses, cyclists and pedestrians will remain via Blackall Street and it is anticipated that parking would be on the Blackall Street side of the new alignment. It is understood that Woombye has been identified as the possible location for a park and ride facility to ease congestion in Nambour. Whilst there is sufficient land to accommodate parking at Woombye Station, this proposal requires further consideration to determine the traffic impacts on Pine Grove Road in light of the recent changes to the road network in Woombye. Options to 'spread' the park and ride load amongst all stations may be preferable.

It is recommended that:

- A road bridge be constructed to connect Margaret Street to the Palmwoods-Woombye Road
- The Jubilee Drive/Margaret Street intersection be upgraded to improve sight lines and flood immunity
- Options for Chevallum Road be investigated in consultation with the community including: construction of new causeway or bridge to the east of Kolora Park connecting to the Palmwoods-Woombye Road at a T-intersection, or provision of a road bridge over the rail linking to Main Street in Palmwoods.

As these streets form part of an identified local cycle route all roads, bridges and intersections should make provision for safe use by cyclists. Works in the Margaret and Main Streets area must also take into account the high pedestrian traffic in these areas and ideally will contribute to improving the safety and amenity in this area for pedestrians, particularly linking to the new railway. Provision for bus movements and parking and passenger parking can be made adjacent to the proposed new station, ideally accessed from Main Street, but subject to detail planning and consultation as above.

8.5 Segment E - Nambour

All routes in segment E have the following in common:

- Generally run in parallel to the existing alignment
- Constrained by the urban development surrounding Nambour
- Constrained by the need to tie back in before Nambour Station (the end point of the study)
- Two Telstra Metropolitan main cables run parallel in the existing rail corridor.

The route options described below are shown in Figure 8.5 and drawings CS001-CS005 of Appendix E, with the summary of the evaluations included in Table 8.5.7.

8.5.1 Route E1

From the north of Woombye Station to Nambour, route E1 (shown on drawing CS001 of Appendix E) is similar to the existing alignment, and will be at similar levels to the existing railway with the alignment generally on fill. From north of Paynter Creek the alignment is generally on fill. Blackall Range Road crosses the railway using an overpass and Arundell Avenue would remain as an underpass. Nambour Station would remain in a similar location as the existing with some upgrade works required.

Route E1 has one potential crossing of Petrie Creek and associated areas of riparian vegetation.

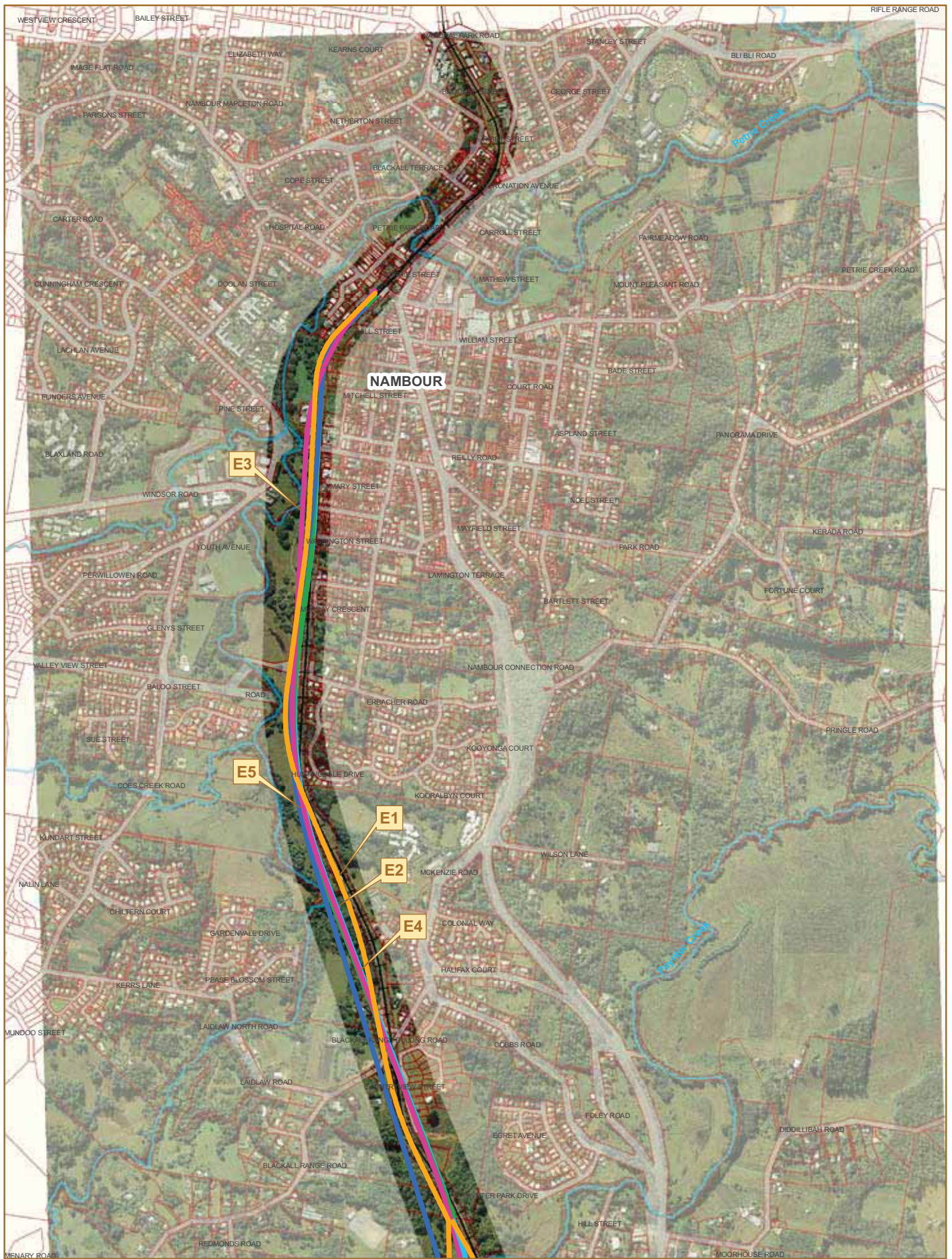
It directly impacts upon 28 freehold properties, including:

- Three Core Industry
- Seven General Rural Lands
- Three Neighbourhood Residential
- 15 Town Centre Frame – these properties have been identified as potentially directly affected as a result of land requirements for station upgrading
- 11 direct potential impacts on sites with identified historical heritage features and three direct potential impacts on identified historic heritage precincts/areas.

The Telstra Metropolitan main cable runs parallel in rail corridor for approximately 1.5 km. This is considered a major constraint.

The proposed alignment runs with the existing rail corridor for approximately 3.5 km, therefore generating constructability issues, particularly at Blackall Range Road.

It has a minimum curve speed of 80 km/hr, due to constrained geometry into Nambour Station (for non-tilt trains).



March 2008

Legend

— E1	— E4	— Creeks
— E2	— E5	 Property Boundaries
— E3	— Existing Rail Line	 Roads

**Landsborough to Nambour
Rail Corridor Study**

**Figure 8.5
Nambour (Segment E) Route Options**

Note: All routes shown are centrelines, detailed corridor widths will be provided within the report.

While every care is taken to ensure the accuracy of this data, Queensland Transport makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the plan being inaccurate or incomplete in any way and for any reason. Base information supplied by Maroochy and Caloundra Councils and Department of Natural Resources and Water. The areas shown in this figure are subject to change and final refinements during further assessment and preliminary design.

8.5.2 Route E2

To the north of Woombye route E2 (shown in drawing CS002 of Appendix E) is adjacent to the existing alignment north to Nambour. It then moves slightly to the east for approximately 500 m, then crosses back to the west for approximately 1.5 km, at the crossing of Blackall Range Road. It then follows the existing alignment and levels closely into Nambour Station. Blackall Range Road crosses the railway using an overpass and Arundell Avenue would remain as an underpass. Nambour Station would remain in a similar location as the existing with some upgrade works required.

Route E2 avoids crossing or encroachments on Petrie Creek, but runs parallel to it. It does however impact on an area of 'Of Concern' remnant vegetation associated with Petrie Creek.

Route E2 directly impacts on 48 properties, including:

- One Town Centre Frame
- Five Mixed Housing
- 22 Neighbourhood Residential
- Two Core Industry
- 6 General Rural Lands
- 12 Town Centre Frame properties have been identified as potentially affected as a result of station land requirements. The majority of these are understood to be commercial premises
- 11 direct potential impacts on sites with identified historical heritage features and three direct potential impacts on identified historic heritage precincts/areas.

Route E2 would have a significant effect on the newly established Rangebrook Estate, impacting on properties, access and visual amenity.

Route E2 may suffer from constructability issues with the proposed alignment at Blackall Range Road. It also runs within the existing rail corridor for approximately 650 m, with crossings of the existing track.

It has a minimum curve speed of 80 km/hr, due to constrained geometry into Nambour station) (for non-tilt trains).

8.5.3 Route E3

E3 (shown on drawing CS003 of Appendix E) runs in a similar position to E2, until just before Nambour Station where it swings out to the west in order to improve the design speed for the curve on the approach to the station. This adjustment in the route impacts upon Petrie Creek, as the route runs parallel for a short distance over the creek.

This route option directly impacts on 47 properties including:

- Six Town Centre Frame
- 16 Neighbourhood Residential
- Six Core Industry
- Six General Rural Lands
- One Business and Industry
- 12 Town Centre Frame properties as a result of potential impacts from possible station land requirements at Nambour Station. The majority of these are understood to be commercial premises.

It has a greater property impact on businesses near Colless Lane and Price Street.

Route E3 impacts on an area of 'Of Concern' remnant vegetation associated with Petrie Creek. It also has potential impacts on 10 sites with identified historical heritage features and two direct potential impacts on identified historic heritage precincts/areas.

There could be constructability issues with the proposed alignment at Blackall Range Road. The alignment runs within the existing rail for approximately 650 m, with two rail crossings. The alignment also runs within the existing rail corridor for approximately 500 m on the approach to Nambour.

Route E3 would have a significant effect on the newly established Rangebrook Estate, impacting on properties, access and visual amenity.

This route has a minimum curve speed of 100 km/hr (for non-tilt trains).

8.5.4 Route E4

Route E4 (shown on drawing CS004 of Appendix E1) follows a similar alignment as route E2, although slightly offset to the west. It has a total of 40 property impacts, as follows:

- Two Town Centre Frame
- Two Mixed Housing
- 16 Neighbourhood Residential
- Two Core Industry
- Six General Rural Lands
- 12 Town Centre Frame properties have been identified as potentially affected as a result of station land requirements. The majority of these are understood to be commercial premises.

This route has a minimum curve speed of 80 km/hr, due to the constrained geometry on the approach to Nambour Station (for non-tilt trains).

All other impacts and issues are similar to those of route E2.

8 Route Options

8.5.5 Route E5

At the southern limit of segment E, route E5 (shown on drawing CS005 of Appendix E) is the most western route option. As it continues north, it begins to run in a similar alignment as route E2. Generally this route is adjacent to the west of the existing rail corridor. There will be some cut and fill (both up to 15 m) along this section and the proposed alignment is generally at similar levels as the existing alignment. There are three bridges in this section for crossing two local roads (Blackall Range Road and Erbacher Road) and Petrie Creek. The alignment ties in to the existing Nambour Station, which will remain in a similar location.

Route E5 runs close to, but does not cross Petrie Creek.

It directly impacts upon 31 properties, including:

- One Town Centre Frame
- Eight Neighbourhood Residential
- Three Core Industry
- Seven General Rural Lands
- 12 Town Centre Frame properties have been identified as potentially affected as a result of station land requirements. The majority of these are understood to be commercial premises.

This route has the greatest impact on a nursery business to the west of the existing rail corridor of all of the options. It also potentially affects nine sites with identified historical heritage features and three direct potential impacts on identified historic heritage precincts/areas.

This route was developed to address constructability issues at the Blackall Ridge Road bridge. It also crosses the existing rail corridor twice.

This route has a minimum curve speed of 80 km/hr, due to the constrained geometry on the approach to Nambour Station (for non-tilt trains).

8.5.6 Consideration for Segment E

The key issues influencing the corridor location through segment E include:

- The corridor being constrained by the corridor through segment D of the corridor and the Palmwoods pinch-point, and the end point being Nambour Rail Station (which is to be retained in its current position)
- Ensure the local road network is contained within the road reserve (i.e. not on Queensland Rail owned land)

- Urban residential development at Nambour is located towards the east of the existing rail line
- Petrie Creek, with its 100 year ARI and environmentally sensitive surrounds, is located towards the west of the existing rail line.

The alignments in segment E closely follow the existing alignments, with minimal new impacts on the road network. A new road bridge will be required on Blackall Range Road to replace the existing narrow bridge. This may have some impacts on surrounding properties, dependant on the final rail alignment. The rail bridges at Arundell Avenue and Railway Terrace in Nambour may also need to be upgraded in conjunction with the works.

8.5.7 Segment E – Evaluation

The following Table 8.5.7 summarises the evaluation of routes within segment E. Supporting information is presented in Appendix F.

Table 8.5.7: Segment E Evaluations

SEGMENT E	E1	E2	E3	E4	E5
Ecology					
Area of remnant vegetation removed by corridor (m2):					
• Endangered	E 4512	E 2636	E 2792	E 4795	E 5657
• Of Concern	OC 12872	OC 17929	OC 24659	OC 17039	OC 14223
• Not of Concern	NoC 3273	NoC 1425	NoC 1874	NoC 1852	NoC 5296
• Total	Total 20658	Total 21991	Total 29327	Total 23687	Total 25177
Area of essential habitat removed by corridor (m2).	0	0	0	0	0
Area of State significant vegetation (BPA mapping) removed by corridor (m2).	65	463	4812	1426	2786
Length of new 'edge' (m) created by rail corridor (i.e. wherever the alignment dissects an area of remnant vegetation and creates a new 'edge').	1621	1745	2318	1899	2108
Length of rail within 50m of waterway	100m parallel to Petrie Creek	100m parallel to Petrie Creek	100m parallel to Petrie Creek	100m parallel to Petrie Creek	100m parallel to Petrie Creek
Area of riparian vegetation removed	17385	20566	27452	21834	17825
Area of wetland removed	N/A	N/A	N/A	N/A	N/A
Name, number and type of protected area affected.	N/A	N/A	N/A	N/A	N/A
Cultural Heritage					
Aboriginal cultural heritage sites – known sites	-	-	-	-	-
Aboriginal cultural heritage sites – Areas of CH potential (Based on desk based studies)	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP	To be determined by CHMP
Historic Heritage Features	11x Direct Potential Impacts	11x Direct Potential Impacts	10x Direct Potential Impacts	11x Direct Potential Impacts	9x Direct Potential Impacts
Historic Heritage Precincts/Areas	3x Direct Potential Impacts	3x Direct Potential Impacts	2x Direct Potential Impacts	3x Direct Potential Impacts	3x Direct Potential Impacts

8 Route Options

SEGMENT E	E1	E2	E3	E4	E5
Land Use and Planning					
Area of corridor within Urban Footprint	Comparable for all options except E5 which is contained within less urban footprint	Comparable for all options except E5 which is contained within less urban footprint	Comparable for all options except E5 which is contained within less urban footprint	Comparable for all options except E5 which is contained within less urban footprint	Contained within less urban footprint than the other options
Area of corridor within Rural Production and Open Space category	Comparable for all options except E5	Comparable for all options except E5	Comparable for all options except E5	Comparable for all options except E5	Impact on more rural/ag land than the other options.
Compliance with planning intent	E1 is closest to the existing alignment and therefore is most compatible with the town plan and has the least property impacts.	Options are generally comparable	Options are generally comparable	Options are generally comparable	Options are generally comparable
Properties					
Number of properties wholly or partially under the corridor	28 3 Core Industry 7 General Rural Lands 9 neighbourhood residential 12 town centre for possible station requirements	48 1 town centre frame 9 mixed housing 22 neighbourhood residential 2 core industry 6 General Rural Lands 12 town centre for possible station requirements	47 6 town centre frame 16 neighbourhood residential 6 core industry 6 General Rural Lands 1 business and industry 12 town centre for possible station requirements	40 2 town centre frame 2 mixed housing 16 neighbourhood residential 2 core industry 6 General Rural Lands 12 town centre for possible station requirements	31 1 town centre frame 8 neighbourhood residential 3 core industry 7 General Rural Lands 12 town centre for possible station requirements
Number of properties where habitable structures are within the corridor	21	31	17	29	10
Number of properties adjacent to the corridor	41	44	63	36	30
Number of properties within 100m of corridor edge	223	224	351	224	194
Number of habitable structures within 100m of the corridor edge	101	102	149	102	86

SEGMENT E	E1	E2	E3	E4	E5
Flooding					
Number of gully, creek and river crossings, with significant upstream catchment (>1ha)	10	10	10	10	10
Number and approximate opening area of culverts required to allow cross-drainage with minimum impact (assumed 0.3m localised increased in upstream flood levels in average)	10 culverts corresponding to 45 m ² of opening area	10 culverts corresponding to 45 m ² of opening area	10 culverts corresponding to 45 m ² of opening area	10 culverts corresponding to 45 m ² of opening area	10 culverts corresponding to 45 m ² of opening area
Total cumulative width of bridges across floodplain required to pass the design flood with no negative impact (0mm afflux)	305m	295m	720m	415m	441m
Water Quality					
Number of creeks traversed	1	0	1	0	1
Number of crossings	1	0	2	0	1
Creek names	Petrie Creek	-	Petrie Creek	-	Petrie Creek
Length of rail within 50m of waterway	200	175	766	210	374
Landscape and Visual					
- Length of corridor through residential or rural residential areas	Length 2637	Length 2521	Length 2294	Length 2552	Length 1864
- Length of new rail corridor created (centreline of greater than 30m from existing centreline).	Length 3583	Length 3692	Length 3674	Length 3736	Length 3526

8 Route Options

SEGMENT E	E1	E2	E3	E4	E5
Socio-Economic					
Noise (predicted)					
Community Noise Burden (Existing: 84.9)	65.2	66.1	79.5	66.0	59.7
LAeq Exceedences (Existing: 2)	3	4	4	4	1
LAmx Exceedences (Existing: 84)	57	47	46	46	20
Technical/ Engineering					
Number of road crossings	2	2	2	3	2
Number of existing rail crossings.	The proposed alignment runs with the existing rail corridor for approximately 3.5km, therefore creating constructability issues, particularly at Blackall Range Road.	There could be constructability issues with the proposed alignment at Blackall Range Road. The alignment runs within the existing rail for approximately 650m. In addition there are two rail crossings.	There could be constructability issues with the proposed alignment at Blackall Range Road. The alignment runs within the existing rail for approximately 650m. In addition there are two rail crossings. The alignment also runs within the existing rail corridor for approximately 500m on the approach to Nambour.	The alignment crosses the existing railway at Blackall Range Road, therefore creating constructability issues. There are three rail crossings in total.	The alignment should minimise the impact on the construction of a road bridge at Blackall Ridge Road. There are two rail crossings in total.
Number of river crossings	1	There are no rivers crossings, however the alignment runs with 30m of Petrie Creek at two locations	There are two rivers crossings, and this may need be one structure up to 200m in length	0	1
Chainages	99+160 – 102+795	99+235 – 102+860	99+023 – 103+000	99+630 – 103+260	98+785 – 102+415
Average Speed (Km/h)	E1 1 No curves 130km/hr 4 No curves 120km/hr 1 No curves 80km/hr Total Length of Straight = 1228m	E2 (Approx 86m of 1 No. 160km/hr curve) 1 no curve 140 km/hr 1 no curve 150 km/hr 1 no curve 60 km/hr Total Length of Straight =1830m	E3 1 no curve 140 km/hr 2 no curve 100 km/hr (Approx 100m of 1 No. 160km/hr curve) Total Length of Straight =2038m	E4 1 no curve 140 km/hr 1 no curve 160 km/hr 1 no curve 60 km/hr Total Length of Straight =2277m	E5 1 no curve 150 km/hr 1 no curve 160 km/hr 1 no curve 60 km/hr Total Length of Straight =1918m

SEGMENT E	E1	E2	E3	E4	E5
Length of structures required across Flood Plain	305m	295m	720m	415m	441m
Access to stations/ Development of station access opportunities	The alignment ties into the existing railway before Nambour	The alignment ties into the existing railway before Nambour	The alignment ties into the existing railway before Nambour	The alignment ties into the existing railway before Nambour	The alignment ties into the existing railway before Nambour
Utilities	Telstra Metropolitan main Cable runs parallel in rail corridor for approximately 1500m. Large optical fibre and copper cable. Cables to be relocated. Major influence on corridor option.	Telstra Metropolitan main Cable. Cable runs across corridor. Large optical fibre and copper cable. Cables to be relocated or other measures put in place.	Telstra 2 Metropolitan main Cable Cables run length of corridor for approximately 600m. Large optical fibre and copper cable. 1200m of cable to be relocated. Major Influence on corridor option.	Telstra Metropolitan main Cable runs across corridor. Large optical fibre and copper cable. Cables to be relocated or other measures put in place. Not an influence on corridor option	Telstra 2x Metropolitan main Cable runs along corridor for 2x 300m. Large optical fibre and copper cable. Cables to be relocated or other measures put in place. Not an influence on corridor option. Telstra Metropolitan main Cable runs along corridor for 200m. Large optical fibre and copper cable. Cable to be relocated or other measures put in place. Not an influence on corridor option
Transport and Road Network					
Overall effect on the surrounding road network (including ped access)	Negligible – secures existing accesses	Negligible – secures existing accesses	Negligible – secures existing accesses	Negligible – secures existing accesses	Negligible – secures existing accesses
Number of low road bridges or road crossings eliminated	1 narrow road bridge upgraded 2 rail bridges upgraded	1 narrow road bridge upgraded 2 rail bridges upgraded	1 narrow road bridge upgraded 2 rail bridges upgraded	1 narrow road bridge upgraded 2 rail bridges upgraded	1 narrow road bridge upgraded 2 rail bridges upgraded
Access to stations	Access unchanged	Access unchanged	Access unchanged	Access unchanged	Access unchanged
Walk up catchments/ walkability	Unchanged	Unchanged	Unchanged	Unchanged	Unchanged
Cost Ratio					
Comparative cost ratio (1 being the lowest cost option)	1	1.35	1.80	1.64	1.52

8 Route Options

8.6 Stabling Options at Nambour

During the route identification process, it was determined that a rail stabling yard (500 m x 40 m) would be required to support planned passenger service improvements on the North Coast Line. The purpose of the stabling is to house trains overnight and conduct cleaning. The general assumption was that it should be constructed close to Nambour Station, as this is where CityTrain services commence their run in the morning peak. The following criteria have been used to establish preferred areas and options for the stabling yard:

- The stable is to be located within 1 km of the station to minimise 'dead' travel time and fuel costs
- The stable should be located on a straight alignment of the track
- The stable can not be adjacent to the existing station to enable trains to travel directly onto the track from the stable – if stable is located adjacent to the station, trains will have to travel down/up track and then travel back to the station which impacts on track capacity.

The potential stabling options identified during the route identification process are discussed below, and shown in drawings SK013 to SK015 in Appendix E. These include one approximately 500 m to the south of the station, one directly south of the station, and one approximately 500 m to the north.

The selection of a preferred stabling location will be subject to further consideration and consultation with Queensland Rail, TransLink, Council and other stakeholders to determine the most appropriate location for stabling. This will occur during the EIS and preliminary design process.

As there is the potential for additional private property to be affected depending on which option is selected as the preferred stabling location, landowners will be given the opportunity to meet with the study team to discuss the potential implications for their land.

8.6.1 Stabling to South of Nambour Station (close to station)

The following issues have been considered in the identification of this potential stabling location, shown on drawing SK014 of Appendix E:

- Curve easing and platform lengthening at the "Dock Road" for rail safety reasons
- Tie-in to existing single track sections as existing layout
- Three new carriage sidings on the west side - for three 6-car trains
- New platform on west side to remove existing conflict between CityTrain and Sunlander services and remove other operational difficulties
- No new turnouts on main line curves.

Evaluation of options may find that time taken for the train to travel up/down track and then back to the station may be less than a stable situated further away. Constraints for this option include:

- Nambour Station is adjacent to the area, generating the potential to impact track capacity due to the need to manoeuvre into the stations
- The northern and southern limits of the proposed option are in close proximity to Petrie Creek. The creek requires a 50 m buffer
- The northern end of the stabling yard will be subject to flooding
- There is a potential for contamination of the waterway from activities associated with the stabling yard
- Vegetation along Petrie Creek at the southern end of the area is 'State significant'
- The northern end of the site is within an environmental management zone within the Maroochy Planning Scheme
- The area will cut across the northern end of Price Street
- Commercial buildings and a large car park between the rail track and Price Street will be affected
- The soil is mostly alluvial, which may impact on construction. Some sedimentary soils are present.

8.6.2 Stabling to North of Nambour Station

Possible layouts for stabling in this location are shown in drawing SK015, in Appendix E.

The following issues have been considered in the identification of this potential stabling location:

- Creating two sidings approximately 250 m to the south of National Park Road, to the east of the existing railway and to the north of Nambour Station
- Involves using existing single track, therefore reducing the need for two new rail bridges
- Would potentially affect an industrial area to the east of the existing track (direct property impacts)
- Stabling could be up to a maximum 300 m in length on each siding
- The area is approximately 600 m north of Nambour Station
- Options to the north will need to consider any future alterations to the alignment.

8.6.3 Stabling to South of Nambour Station

Possible layouts for stabling in this location are shown in drawing SK013, in Appendix E.

The following issues have been considered in the identification of this potential stabling location:

- The area is approximately 500 m south of Nambour Station and on the western side of the railway line. Land use of the area includes 'Town Centre Frame', 'Industry' and 'Neighbourhood Residential'. Petrie Creek is adjacent to the area
- Petrie Creek flows in close proximity to the southern end of the area, approximately 45 m from the centre of the rail line. The Maroochy Planning scheme defines a 50 m buffer for developments to the creek
- The area is subject to flooding
- There is a potential for contamination of the waterway from activities associated with the stabling yard
- Vegetation along Petrie Creek is 'State significant' and intermingled with areas of 'Of Concern' Regional Ecosystems south of Arundell Avenue
- The site is within an environmental management zone within the Maroochy Planning Scheme
- Petrie Creek is potential habitat for threatened flora and fauna

- Some commercial buildings along Colless Lane may be impacted (though it is understood that these are already affected by the preferred route)
- The area cuts across the western end of Arundell Avenue and would require consideration of the road network impacts
- The soil is mostly alluvial, which may impact on construction
- Acid sulphate soils are present in most of the area, which may impact on construction
- The area has a large area of high level valued scenic amenity
- A location to the south of the station would use up track capacity, due to the need to manoeuvre to the station.

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