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Mullum to Bruns Cycleway Investigation

Site Investigation and Route Options Analysis Report

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Executive Summary

This report provides a summary of the route options investigation and analysis completed for the proposed Mullumbimby to Brunswick Heads (Mullum to Bruns) Cycleway project for Byron Shire Council. Concept design documentation for a proposed cycleway route following Mullumbimby and Gulgan Roads has been completed by Council however significant constraints exist along this route and Council are seeking advice on potential improvements and alternative routes.

We have carried out detailed desktop and field investigations for alternative cycleway routes between the two villages and completed an assessment of the constraints and opportunities to enable Council to make an informed decision on the preferred route to take forward for design development.

Our investigations identified six (6) general route options for the cycleway as detailed in this report and summarised as follows:

- Option A – A route that follows the disused rail corridor north over the Brunswick River. This route considers two sub-options: Option A1 is a trail on the original rail formation while Option A2 is a trail off the original rail formation (i.e. adjacent to the rail corridor).
- Option B – A riverside route along the Brunswick River.
- Option C – Council's original concept design route.
- Option D – A variation to Option C with an alternative alignment through private properties from Hambly Road to The Saddle Road.
- Option E – A variation to Option C with an off-road route from Hambly Road to The Saddle Road then follows the same route as Option D from Henderson Lane.
- Option F – Similar to Option D but with a different route through private property from Hambly Road to The Saddle Road.

Each route achieves Council's overall objective for the project to provide a safe cycleway connection from Mullumbimby to Brunswick Heads. Some opportunities presented by the various route options include active transport, recreation, and regional tourism. The six (6) route options all have their own issues including land tenure, ecological impacts, construction costs, and approval and delivery timeframes. The final decision on the preferred route shall be made by the Council considering the balance of all the constraints and opportunities of each option.

A multi-criteria analysis (MCA) was completed for the route options considering a number of assessment criteria developed by the project team and weighted according to their relative importance. The MCA is a tool designed to assist Council with making an informed decision on the best route considering the full range of potential issues. It is highly subjective and it is recommended that the criteria and weightings are reviewed and adjusted as required to best reflect the values of the community and stakeholders.

The results of our MCA showed Option D scoring the highest with 3.60 followed by Option A1 (3.30), Option E (3.05), Option F (3.05), Option A2 (2.90), Option C (2.60), then Option B (2.30).

It should be noted that the MCA is a comparative analysis only and does not reflect the overall value of the development of each route. For example, Option B is probably the most attractive route in terms of user experience and tourism/recreation opportunities, however this was weighed down by

the likely issues around land tenure, construction costs, delivery timeframes, and regulatory approvals that may be extremely difficult to overcome. Conversely, Option D scored well due to the relative ease of delivery while Option A represents a good balance between the constraints and opportunities.

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1. Introduction

1.1 Background

The Mullum to Bruns Cycleway project is a proposed active transport and recreational trail linking the villages of Mullumbimby and Brunswick Heads using a combination of on road cycleways and off road shared pedestrian and cycle paths. The project is significant for the region and will provide a safe and accessible alternative transport route for the local community linking urban areas to schools and workplaces along the route helping achieve the goals of the Byron Shire Council's Community Strategic Plan and Bike Plan.

Council has previously prepared concept design documentation for a proposed route following Mullumbimby and Gulgan Roads however significant constraints exist along this route. Burchills have been engaged by Council to investigate whether any feasible alternative routes exist and to complete an assessment of all route options to assist Council with making a decision on the preferred route to take forward to design development.

1.2 Project Objectives

The objective of the project is to provide a safe cycleway connection from Mullumbimby to Brunswick Heads. The project is intended to deliver the following outcomes:

- Create a shared trail of regional significance that will attract cyclists and walkers to the area providing opportunities for tourism and some economic benefits.
- Provide a commuter and recreational pathway, separated from traffic that includes high standard safety features suitable for all confidence and skill levels.
- Provide integration with adjacent land uses including local parks, schools, workplaces, and links to the existing Council pathway network.
- Preserve any historical or culturally significance sites along the route and minimise environmental impacts through the design process.

1.3 Scope

The scope of this site investigation report includes the following tasks:

- Background information review to establish constraints, including the previous work on this project and other similar shared use pathways;
- Desktop investigation using GIS databases to determine potential alternative routes;
- Field investigations to identify opportunities and constraints for each route;
- High level cost estimates for each route for comparison purposes; and
- Route options analysis via a structured MCA to compare the outcomes from our technical assessment and field investigations.

2. Investigation of Route Options

2.1 Initial Desktop Assessment

Our initial desktop investigations were focussed on finding potential alternatives to Council's concept design route. Three (3) main corridors of investigation were identified as follows:

- Rail route – a trail following the disused rail corridor north from Mullumbimby and connecting to Brunswick Heads via a combination of road reserves, private property, and existing paths.
- River route – a riverside trail following the Brunswick River.
- Concept route – a route that generally follows Council's concept design route with alternative alignments through private property and road reserve to improve the route.

The potential cycleway routes and alternatives identified through our initial desktop investigation are presented in Figure 2.1.

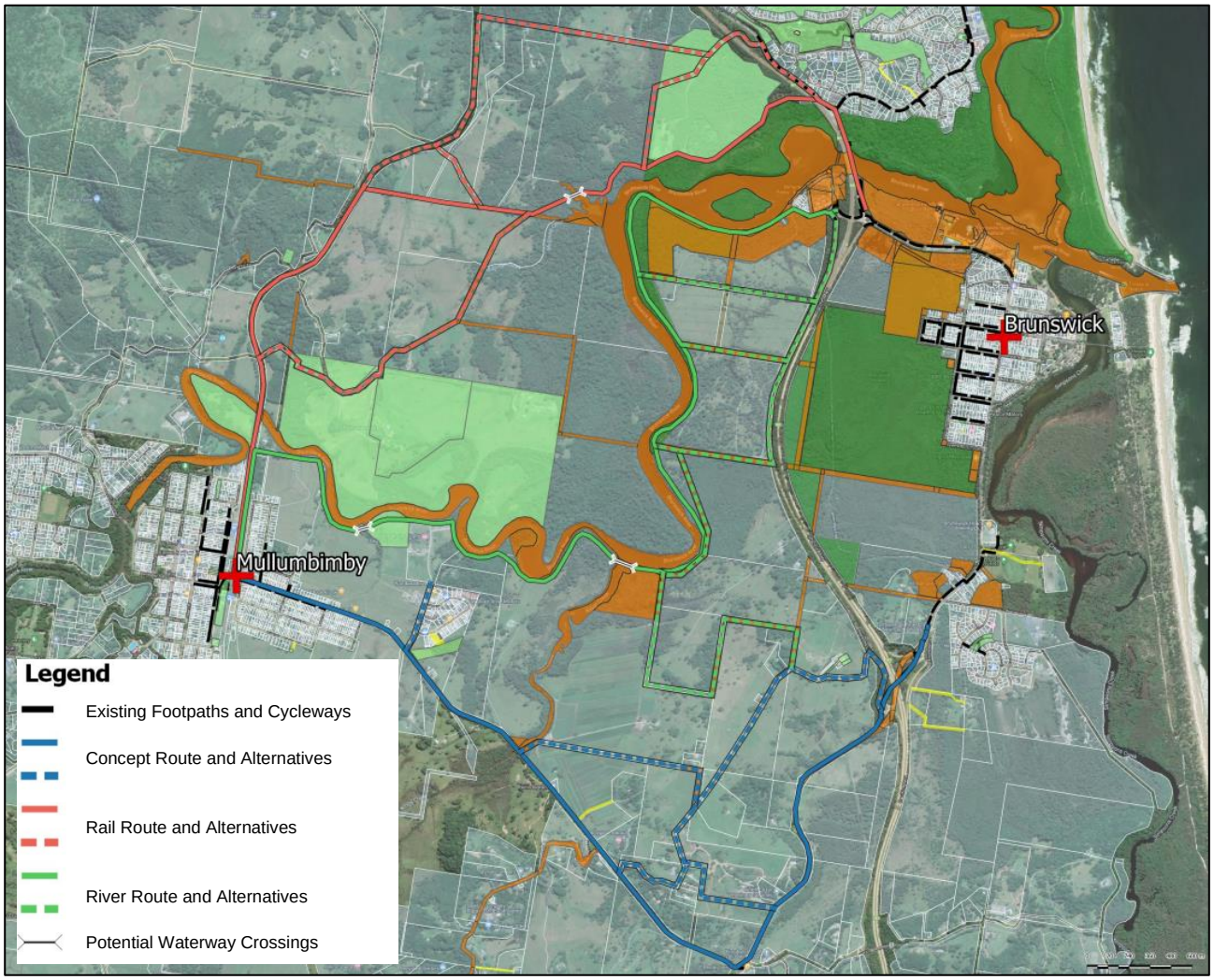


Figure 2.1 Potential Route Options

2.2 Site Investigations

A visual inspection of each route was then carried out where possible to observe the physical constraints on the ground and confirm the best routes to take forward for further assessment. Some of the key observations from our field investigations are outlined below.

User safety is a critical element in the consideration of options. The existing shoulder on Mullumbimby Road is very narrow for cyclists. There is also limited room to develop an off-road path.

The concept design alternative would require users to navigate a steep climb from Hambly Road to Hendersons Lane. Ideally, a switchback trail would be constructed but this will require land acquisition.

Byron Shire Council has expressed a desire to develop a cycle link between Mullumbimby and the Manns Road industrial area.

The rail route would take advantage of the magnificent bridge over the Brunswick River at Mullumbimby. Whilst very attractive to users, it will be a significant cost – particularly if Council wish to pursue a cycleway off the existing railway line

Another smaller creek crossing on the rail route would require the existing bridge to be refurbished or construction of a new low level bridge or culvert crossing

Image: David Michie

The rail route would make use of the 50 m long tunnel under Vallances Road. Bypassing the tunnel in pursuit of an off alignment route would be challenging and costly.

Image: David Michie

Using existing roads such as Synotts Lane would reduce costs. An off-road path or an upgrade to the existing road surface is an option.

The rail route would require the development of a trail through virgin bushland and river flats between the eastern end of Synotts Lane and Brunswick Valley Way, potentially passing through land occupied by the Ocean Shores Sewage Treatment Plant.[1]

Image: David Michie

Developing a trail along the Brunswick River will require good design to navigate through the caravan park at Mullumbimby.

[1] One option put forward by David Michie followed a route closer to the Brunswick River, staying south of the Ocean Shores Sewage Treatment Plant, travelling under the Pacific Motorway close to the northern shore of the Brunswick River, and onto the Brunswick Valley Way bridge to cross the Brunswick River.

A river trail can be constructed on existing trails in part (with upgrades) thus minimising environmental impacts.

The river route would use existing high quality infrastructure such as the boardwalk under the Pacific Motorway and Brunswick Valley Way.

The rail or river route would use existing infrastructure east of the Pacific Motorway to access Brunswick Heads. New construction and management decisions may be required to allow cyclists to use some sections.

2.3 Options Refinement

Based on our initial site investigations and subsequent review by Council, six (6) routes were identified as being potentially feasible for the development of the cycleway as follows:

- Option A – a trail using the existing rail corridor north from Mullumbimby to Synotts Lane, along Synotts Lane (constructed road) and Synotts Road (part of which is a privately owned former road reserve) to the sewage treatment plant and onto Brunswick Valley Way (via Smokey Valley Way). The trail would then continue to Brunswick Heads using Council's existing footpath network.
- Option B – a riverside trail using the roadside trail (Option C) from Mullumbimby to Manns Rd, along Manns Road to the Mullumbimby caravan park, and then following the Brunswick River to Riverside Crescent west of the Pacific Motorway and using existing roads and paths to access Brunswick Heads.
- Option C – the concept alignment as initially investigated by Byron Shire Council following Mullumbimby and Gulgan Roads.
- Option D – a variation to Option C which follows Mullumbimby Road from Mullumbimby to Hambly Road then follows a privately owned former road reserve to Henderson Lane, the Saddle Road and back to Gulgan Road.
- Option E – a variation to Option C which follows Mullumbimby Road from Mullumbimby to Hambly Road, then an off-road route to The Saddle Road then travels along The Saddle Road to its junction with Henderson Lane then follows the same route as Option D.
- Option F – a variation to Option C which follows Mullumbimby Road from Mullumbimby to Hambly Road, follows the same alignment as Option D very briefly then stays on Hambly Road (named and formed but privately owned) and a series of formed farm access tracks on private land heading north before turning east onto publicly owned road reserve, and turning south onto the more western end of the Bashforth Lane (a named road that appears to be constructed only for property access) before joining The Saddle Road (and then follows the same route as Options D and E).

Options B, D, E, and F vary from Option C at the Mullumbimby end of the route whereby they include a separated off-road cycleway between Manns Road and Mullumbimby to improve user safety.

The route options described above are general routes only and are not intended to described the final alignment of the cycleway. A more precise alignment for the preferred route would need to be determined during the concept design phase of the project and may vary considerably from these descriptions following detailed site investigations and community consultation.

The six (6) route options described above are present in Figure 2.2.

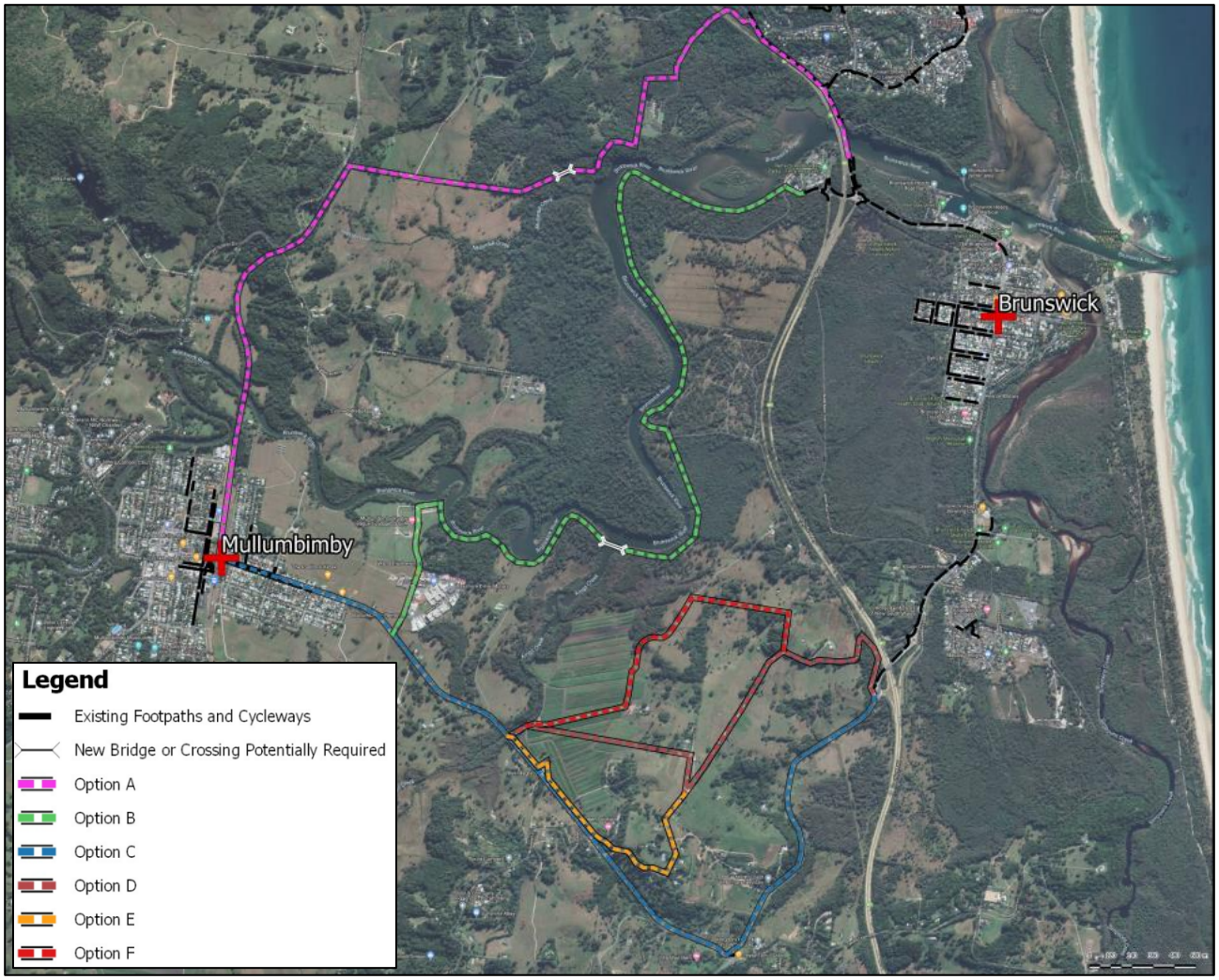


Figure 2.2 Refined Route Options

3. Development Constraints

3.1 Environmental and Coastal Management Overlays

The environmental constraints of Options C, D, E, and F are relatively limited. Roadside vegetation is likely to need clearing to create space for an off-road path particularly east of Hambly Road (affecting Options C and E) and a new separated bridge over Kings Creek (needed for Options C, D, E, and F) will pass through Coastal Wetland and Coastal Wetland Proximity Area. The north western section of Option F will pass through Coastal Wetland Proximity Area and may impinge upon Coastal Wetland. Some of the eastern portion of Option A passes through Coastal Wetland and Coastal Wetland Proximity Area. The Option A alternative route (put forward by David Michie) passes through more land classified as Coastal Wetland and Coastal Wetland Proximity Area and more land classified as Koala Habitat than Option A. It may also pass through the existing Brunswick Heads Nature Reserve. Most of Option B will be constructed in land classified as either Coastal Wetland, Coastal Wetland Proximity Area, or Koala Habitat.

Any routes requiring earthworks and/or vegetation clearing within these areas are likely to trigger the need for an environmental impact study which can have significant cost and time implications for the project. The mapped environmental constraints (High Environmental Value and Koala Habitat) are presented in Figure 3.1 while the Coastal Management SEPP mapping is presented in Figure 3.2.

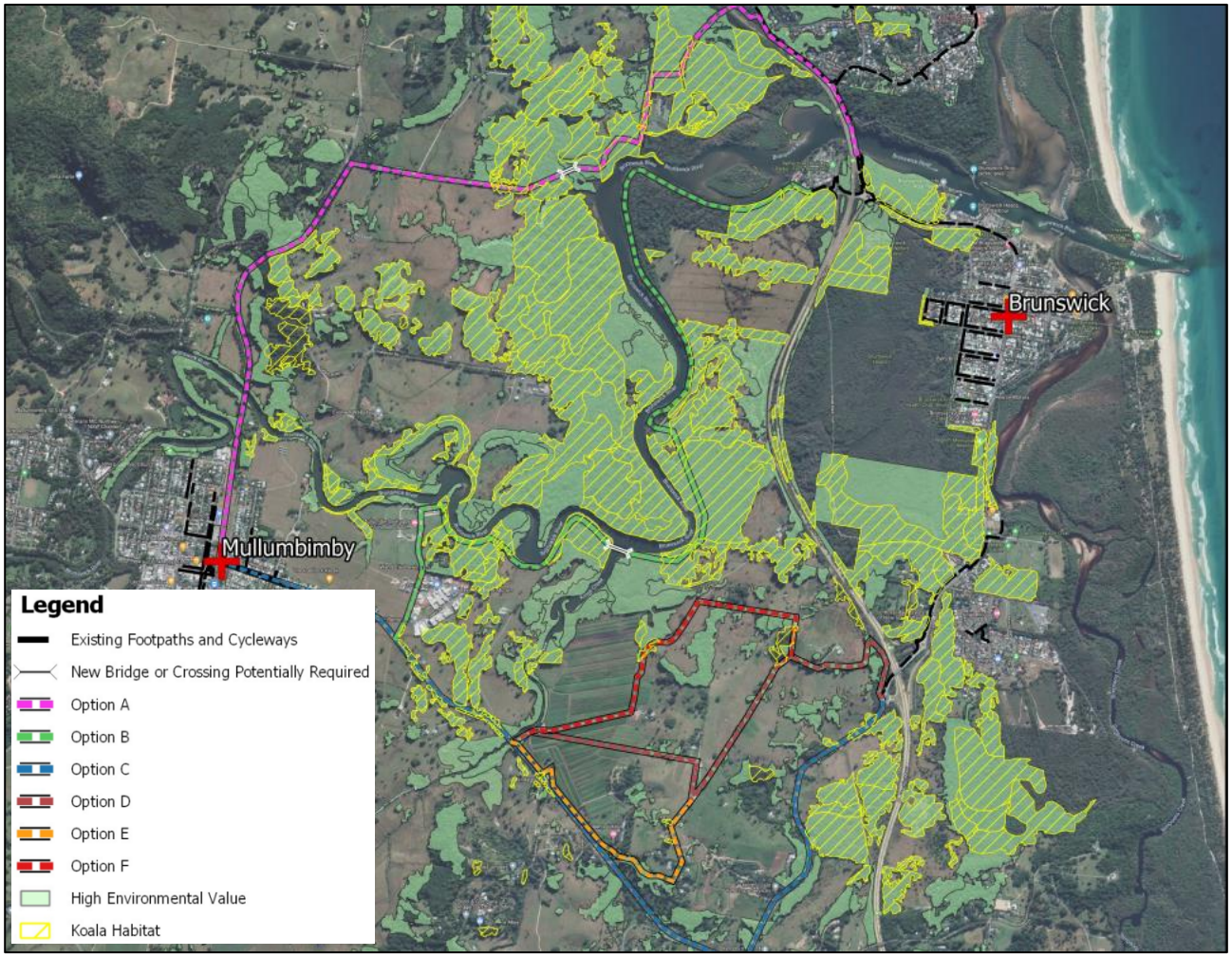


Figure 3.1 Environmental Constraints

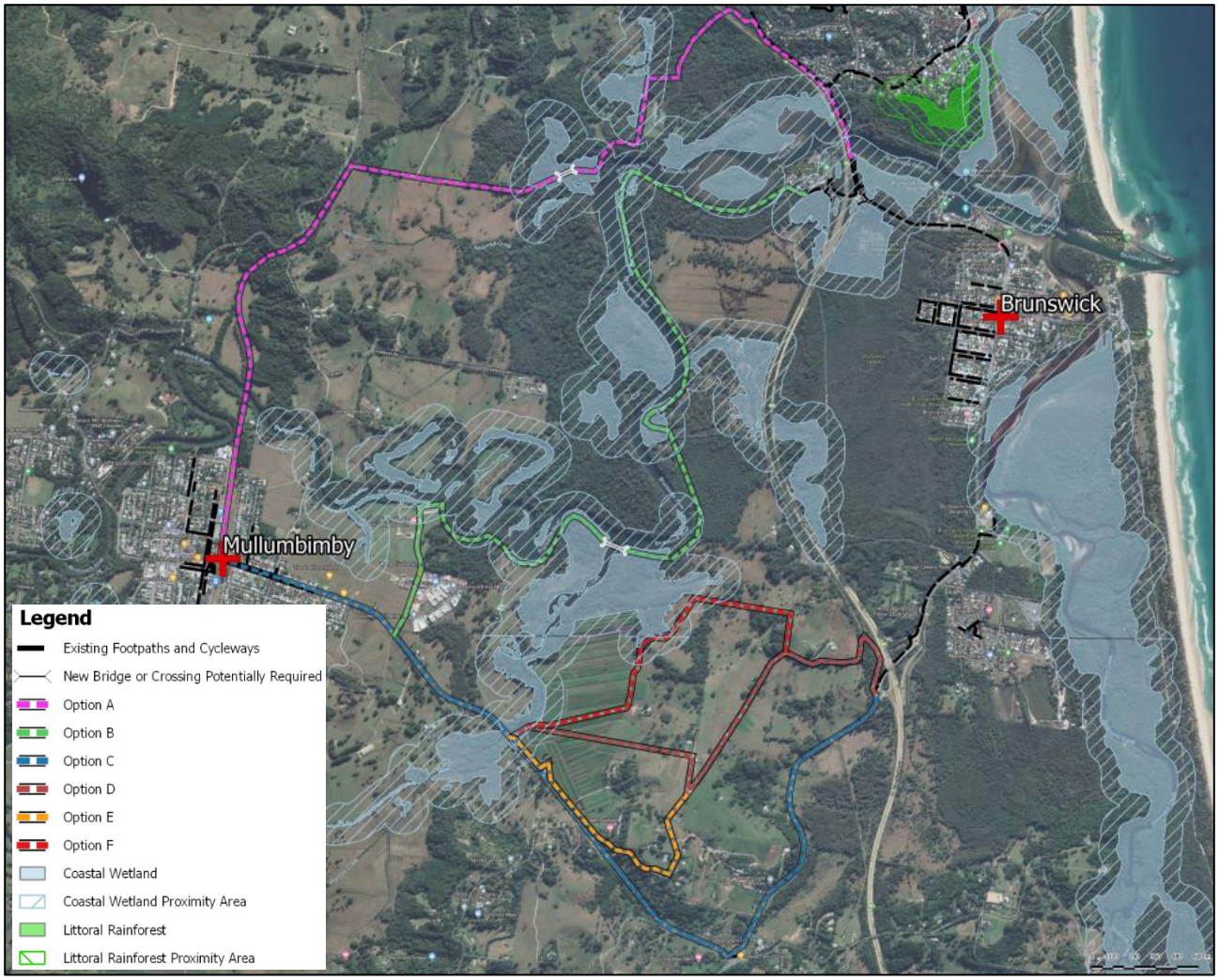


Figure 3.2 Coastal Management SEPP

3.2 Flood Inundation

All routes are affected by the 1 in 100 year flood extents and may be subject to flood impact assessment and/or be required to achieve some level of flood immunity. It is worth noting that Option F is subject to flooding for more of its route than comparative options in the same locality.

The 1 in 100 year flood inundation overlay mapping is present in Figure 3.3.

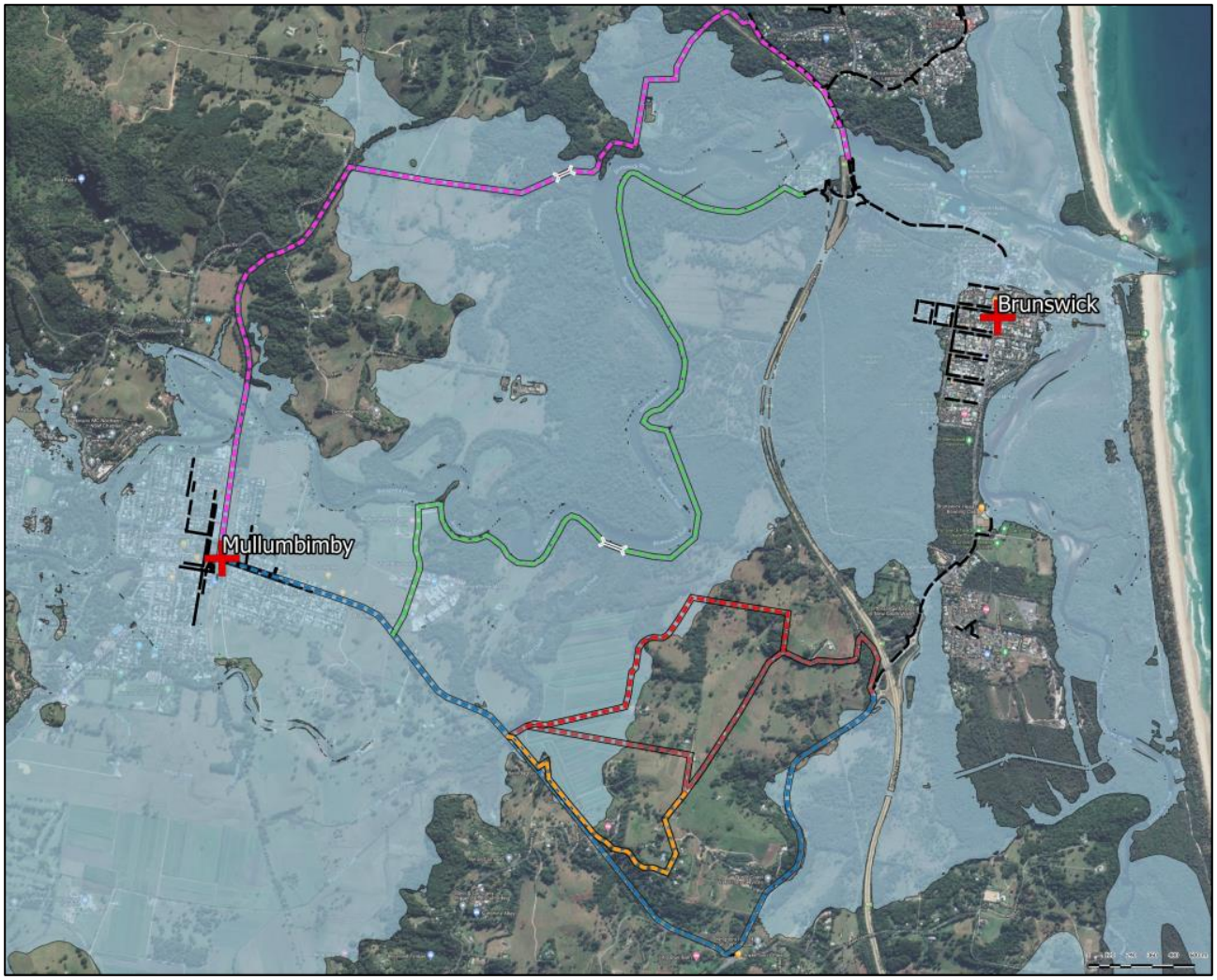


Figure 3.3 1 in 100 Year Flood Inundation

3.3 Topography

All routes except Option B encounter difficult terrain that may require significant earthworks to achieve suitable grades on the trail to accommodate a wide range of user groups. Suitable grades can be achieved by creating switchbacks along steeper sections otherwise some steeper sections of the trail may not be suitable for all users.

Option B being almost entirely flat would produce the most accessible trail.

A map showing the slope constraints along the routes is presented in Figure 3.4.

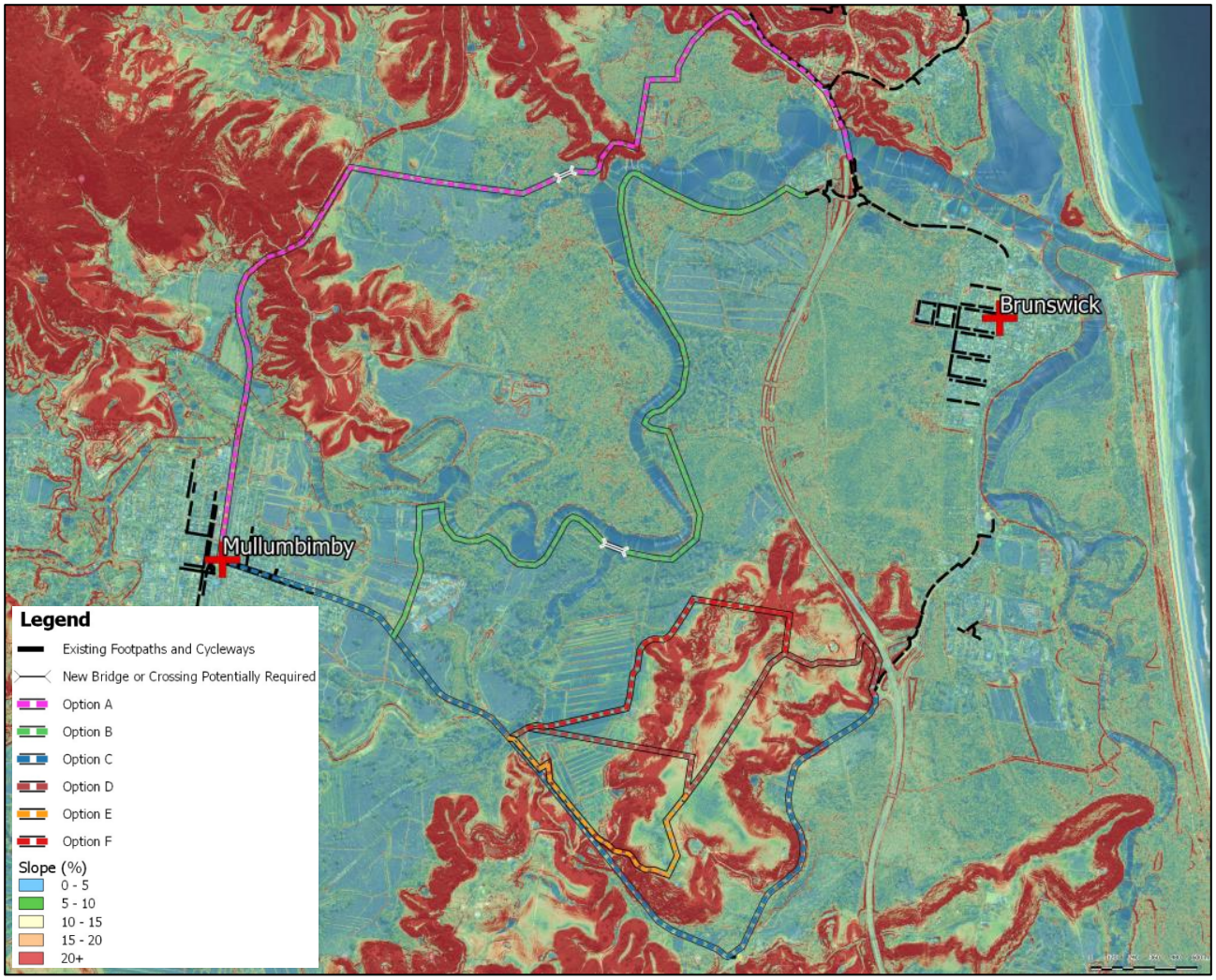


Figure 3.4 Topography

3.4 Impact on Route Options

The constraints mapping shows only a limited number of physical and legislative constraints and how they might impact upon the various options. These constraints are an element in choosing a preferred option and are considered as part of the Multi Criteria Analysis where they make a material difference between options.

A summary of the development constraints outlined above and their effects on the route options are presented in Table 3.1 below. Higher resolution constraints mapping is included in Appendix A.

Table 3.1 Impacts of Mapped Constraints on Route Options

	Environmental	Coastal Management SEPP	Flooding	Topography
Option A	Some impact – Eastern section (from end of constructed road on Synotts Lane) passes through Koala Habitat and Areas of High Environmental Value (mostly on fringe)	Proposed bridge crossing in Coastal Wetland, while the eastern section more generally passes through Coastal Wetland Proximity Area (less impact on wetlands than Option B)	Most of route subject to 1 in 100 year inundation	Shown as subject to steep slope but rail corridor is relatively flat (passing through steep slopes in cuttings). Short steep climb from the sewage treatment plant to Brunswick Valley Way
Option B	Some impact – Trail passes through Koala Habitat and Areas of High Environmental Value	It is likely that almost the entire route passes through areas classified either as Coastal Wetland or Coastal Wetland Proximity Area (the predominant classification). This will be significant in terms of environmental impact generally and approvals needed	All route subject to 1 in 100 year inundation	No impact – flat route
Option C	Low impact – clearing of roadside trees will be required along route (possibly impacting on land with High Environmental Value and Koala Habitat)	Low impact – on constructed roads	Mullumbimby end subject to 1 in 100 year inundation	Quite steep between Hambly Road and the highway
Option D	Some impact – clearing of roadside trees will be required along route (possibly impacting on land with High Environmental Value and Koala Habitat). New section off Hambly Road would pass through environmentally unconstrained farmland. Lower impact than Option C.	Low impact – generally on constructed roads	Mullumbimby end subject to 1 in 100 year inundation	Quite steep on the proposed new section between Hambly Road and Henderson Lane

Table 3.2 Impacts of Mapped Constraints on Route Options (cont.)

	Environmental	Coastal Management SEPP	Flooding	Topography
Option E	Some impact – clearing of roadside trees will be required along route (possibly impacting on land with High Environmental Value and Koala Habitat). In addition, more clearing may be required at the junction of Mullumbimby Road and The Saddle Road to provide better sightlines – though it is acknowledged that the path will likely be off-road so no more clearing would be required to establish sightlines than is otherwise required for an off-road path.	Low impact – on constructed roads	Mullumbimby end subject to 1 in 100 year inundation	Quite steep between Hambly Road and The Saddle Road though not as steep as the connections to The Saddle Rd in both Options D and F.
Option F	Some impact – clearing of roadside trees will be required along route (possibly impacting on land with High Environmental Value and Koala Habitat). New section off Hambly Road would pass through environmentally unconstrained farmland. Lower impact than Option C.	The north western section will pass through Coastal Wetland Proximity Area and may impinge upon Coastal Wetland depending on final location.	Mullumbimby end and north western segment of route through farmland subject to 1 in 100 year inundation	Quite steep on the proposed new section between Hambly Road and Bashforth Lane although slope may be slightly less than corresponding slope for Option D

4. Other Considerations

4.1 User Experience

User experience relates to the accessibility, utility, and enjoyability of the route for the intended users. The more enjoyable the experience for the user, the more likely they are to use it, representing a good return on investment for the trail owner. A high quality user experience, including the development of a “consistent” user experience and ease of user legibility delivers good outcomes in terms of maximising patronage.

In general trail planning, user experiences including tangible factors such as easy and functional trailheads and ease of access and intangible ones such as landscape values. In this particular case, the first two considerations are not particularly relevant due to the nature of the user groups. However, landscape values will be a factor as will accessibility of the route. Bicycle facilities can serve a wide range of existing and potential user groups.

The route (whichever one is chosen) will need to provide an improved cycling environment for a range of users: commuters cycling to work, cyclists using the route for utility purposes (accessing retail outlets in particular), general recreational cyclists, and cycle tourists and visitors to the region who may be attracted to riding to nearby attractions. Whilst commuter cyclists are likely to be somewhat less concerned with the attractiveness of a route, the other user groups will factor in attractiveness as part of their consideration. Commuter cyclists are likely to place a higher value on utility – which is still part of the user experience.

There also needs to be thought given to the possible use of the route by pedestrians (for all the same purposes as cyclists) – they are likely to give a high weight to route attractiveness.

4.2 Cyclist Safety

Bicycle facilities must be safe and convenient if they are to be well used and popular. Any cycle route should be planned with safety as well as convenience in mind, as this will be a critical factor in the route’s performance.

The key reason Byron Shire Council is looking at a cycle link is to encourage cycling in particular and to provide a safe environment in which to do so – regardless of the user groups. Commuter cyclists may be more confident riding on a busy road. Council’s desire to explore a range of route options indicates that cyclists (of all abilities) are not comfortable riding on the existing road network. Most other groups who may not cycle as often are less likely to be both competent and confident about riding on a busy road. Inexperienced cyclists (adults and children) should be kept well away from fast flowing traffic, especially when their primary purpose for cycling is leisurely sightseeing.

4.3 Land Tenure and Potential Acquisitions

All routes are likely to require some land acquisitions – it is not entirely clear at this stage until potential routes are examined more closely. Figure 4.1 shows the existing land tenure along each route with further details provided below.

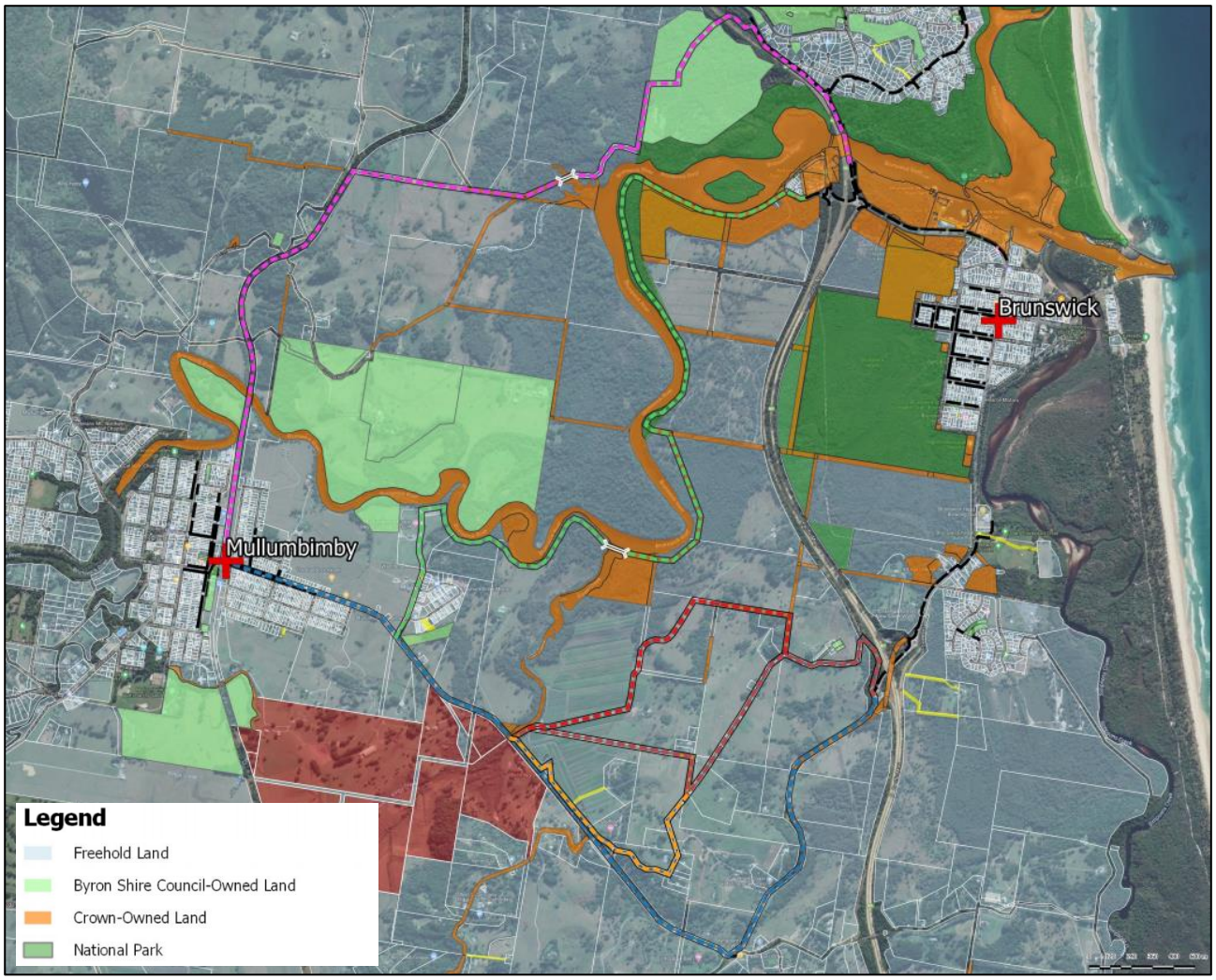


Figure 4.1 Land Tenure

4.3.1 Option A

The rail corridor and Synotts Lane are public land reserves. A former road reserve (now privately owned) runs from the eastern end of Synotts Lane partway along towards the western boundary of the sewage treatment plant. The sewage treatment plant is on Council-owned land while the adjoining land is national park.

4.3.2 Option B

The potential route along the river may be able to be kept within public land. There appears to be some road reserves which could be utilised as well as Crown land immediately adjoining the river although narrow bands of land may be required to supplement public land in places. This option runs through sensitive environmental areas along the river edge.

4.3.3 Option C

Minor land acquisitions may be required along road frontages where the current road reserve is not sufficient to construct a roadside trail.

4.3.4 Option D

The section from Hambly Road to Henderson Lane would require property acquisition and could follow the approximate alignment of an old road reserve. However, this original alignment represents a steep climb, and it would be a better option if a trail can be constructed using switchbacks to reduce the climb from Hambly Road to Henderson Lane. Land acquisition gives an opportunity – in the acquisition process – to seek a better "line of trail" rather than following the original road reserve. This has the potential to deliver a better trail outcome and possibly a better outcome for the landholder.

4.3.5 Option E

As with Option C, minor land acquisitions may be required along road frontages on Mullumbimby Road where the current road reserve is not sufficient to construct a roadside trail.

4.3.6 Option F

The section from Hambly Road to the western end of Bashforth Lane would require property acquisition and could follow in part the approximate alignment of Hambly Road and use existing farm access tracks. Whilst Hambly Road is a named constructed road, it is no longer in public ownership. The only publicly owned land for this route is at its eastern end where the named Bashforth Lane joins The Saddle Road (as noted above, Bashforth Lane in this location appears to be constructed only for property access).

4.4 Native Title

Much of the potential alignment of Option B (the river trail) is included in the recent native title determination for the Bundjalung People of Byron Bay (Arakwal). Mapping shows that, if the potential route is developed on Crown land, such land is included within the non-exclusive native title tenure. This means that while the native title holders have the right to use the land, they cannot do so to the exclusion of others. Advice from BSC is that this has financial implications for the Council. The alternative is to locate the river trail outside the land subject to this determination (i.e. away from Crown land) but this would mean it would need to be developed on private freehold land with some possible development on road reserves.

4.5 Impacts on Existing Land Uses

All options will have some impacts on existing land uses and adjoining landholders – these can be satisfactorily dealt with using a number of mitigation measures. Option A may mean using land which currently houses the Ocean Shores Sewage Treatment Plant. Byron Shire Council needs to ensure it is satisfied that a trail can be built on this land and any management concerns (notably but not only around secure access) can be addressed through the design process.

4.6 Bicycle Travel Times

A cycling travel time assessment was completed for each route considering distance, grades and intersection delays. The estimated travel time was based on:

- the total distance cycled at a speed of 20 km/h.[2]
- for sections of the route where the average gradient was 5%-10% the speed was slowed to 10 km/h.
- any sections with an average gradient of over 10% had a speed of 5km/h.
- a penalty of 20 seconds per intersection was applied based on the assumption that cyclists would slow down when approaching an intersection before speeding up again.

Table 4.1 shows the six route options with the maximum average gradient over the hill distance, the number of intersections crossed and the final estimated travel time. Detailed calculations and gradient profiles are included in Appendix C.

Table 4.1 Bicycle Travel Time Assessment

Option	Distance (km)	Max Avg Grade	Intersections	Estimated Travel Time
Option A	7.9	6.1% over 1.03 km	8	32 min
Option B	8.9	Entire route <5%	11	27 min
Option C	8.0	10% over 1.15 km	23	35 min
Option D	7.6	14% over 400 m	24	39 min
Option E	8.1	7.4% over 700 m	23	38 min
Option F	7.6	10% over 400 m	23	37 min

4.7 Strategic Planning Considerations (Connectivity)

An assessment of the strategic planning considerations for each route has been completed including existing and future/emerging populations/land uses, demographic information such as economic disadvantage of communities, and passive surveillance opportunities.

Note that future land use changes are proposed through several BSC planning documents including:

- Residential Strategy (BSC, 2020)
- Business and Industrial Lands Strategy (BSC, 2020)
- Brunswick Valley Sustainability Centre Management Plan (BSC, 2017)

Extracts of these BSC documents are included in Appendix D.

Option A has the highest population within a 500 m buffer, primarily due to it serving Ocean Shores. It also has the potential to serve the proposed Brunswick Valley Sustainability Centre (including future community and housing project). It passes close to currently unused Council land bounded by the rail corridor and Brunswick River ('leaf land'). The route is relatively isolated as it predominately

[2] We based the 20 km/h on Austroads guidance 'Cyclists typically travel at speeds between 20 km/h and 30 km/h'. We then made some educated assumptions on how much a rider may slow down based on gradient and then applied these consistently across the routes.

traverses a rural area along the disused rail corridor, however, passive surveillance would likely increase if further sections of the rail trail are delivered to the north and south.

Option B has the lowest population within its 500 m buffer but has potential to serve the existing and future Mullumbimby Industrial Estate and large residential investigation areas to the south of Mullumbimby. This option will also serve areas of relative economic disadvantage, providing a cheap travel choice for these residents. This route along the river has limited surveillance from surrounding areas.

Option C serves the second highest existing population (over 2,600 people) within 500 m of the route, but also has the potential to serve future residential populations in southern Mullumbimby, a 40 lot subdivision at McAuley's Lane and future residential areas at southern Brunswick Heads. It is also close to two potential industrial expansion areas at Mullumbimby Industrial Estate and Gulgan West. This route follows the existing major road network so has the greatest level of passive surveillance.

Options D, E and F are similar in terms of existing and future population catchments, but these areas are also the least disadvantaged communities in the area at present. Surveillance levels would be relatively low as the routes are away from the main roads, however, Option E would probably have greater surveillance as it follows an existing, formed road (The Saddle Road).

A summary of the population analysis is provided in Table 4.2, with supporting mapping found in Appendix E.

Table 4.2 Summary of Strategic Considerations

Route	Pop. Within 500m	Future Land Use Changes	SEIFA[3]	Passive Surveillance
Option A	2884 Highest due to proximity to Ocean Shores	Council owned "leaf land" (no plans on future use of this site). Brunswick Valley Sustainability Centre includes proposed 20 Ha Community and housing project area	Some disadvantaged communities	Low-Med Rail corridor and rural area, additional surveillance likely if rail trail developed further
Option B	2229 Lowest due to river/rural location	Mullumbimby industrial estate expansion (potential) Potential future road connection and residential expansion in southern Mullumbimby	Most disadvantaged communities	Lowest Along river/rural areas with limited escape routes
Option C	2634	Future large lot residential (approx. 40 dwellings) 256 infill and pipeline dwellings (Brunswick Heads south)	Least disadvantaged communities	Highest Follows existing major road network
Option D	2568	256 infill and pipeline dwellings (Brunswick Heads south)	Some disadvantaged communities	Low Rural land and existing/unformed roads
Option E	2595	256 infill and pipeline dwellings (Brunswick Heads south)	Least disadvantaged communities	Med Follows existing formed road
Option F	2569	256 infill and pipeline dwellings (Brunswick Heads south)	Least disadvantaged communities	Low Rural land and existing/unformed roads

[3] There are various Socio-Economic Indexes for Areas (SEIFA) from the 2016 Census. We used the Index of Relative Socio-economic Disadvantage (IRSD) in our analysis, which is a general socio-economic index that summarises a range of information about the economic and social conditions of people and households within an area. Unlike the other indexes, this index only measures relative disadvantage.

The numbers are Australia-wide, ranging from 188 (most disadvantaged) to 1186 (least disadvantaged). As you can see from the Byron numbers (scores), they are all fairly high numbers i.e. the residents are not very disadvantaged. The lowest score in the study area was Mullumbimby (871) and the highest was Ocean Shores (1013).

IRSD/SEIFA scores have had minimal impact on the connectivity criteria assessment score.

4.8 Timeframes For Delivery

The process for developing any of these route options will vary depending on the complexity of the issues that need to be considered. Key issues on delivery timeframes are likely to include:

- Regulatory approvals;
- Acquisition of land for the trail corridor including private lands, rail corridor, and crown land;
- Cost and availability of funding;
- Requirement for Environmental Impact Studies; and
- Difficulty of construction.

In summary, Options C, D, E and F can be delivered relatively quickly though the necessary works for Option C and to a lesser extent Option E may slow construction down. Options D and F have relatively limited major engineering works but require negotiations and possible resumptions, while Option C and E require very limited negotiations but significantly more major construction works. Option A will take more time (with the length of time primarily dependent on the timeline for closing the relevant section of the railway line) while Option B is likely to take the longest time given the complex approvals and negotiations needed to deliver the option.

Potential issues with delivery timeframes for each route are discussed in detail below.

4.8.1 Option A

The Coastal Management SEPP will trigger the need for environmental approvals for the eastern section of this corridor as the proposed bridge crossing falls within a designated Coastal Wetland and the potential trail route (eastern section) more generally passes through a Coastal Wetland Proximity Area.

There is one parcel of private land along the trail route and an easement or similar will need to be secured through this parcel. This may take time to negotiate. In addition, the rail corridor between Argyle Street and Synotts Lane will need to be closed by an act of Parliament and use rights conveyed to Byron Shire Council. Given the timeframes for other railway closures to facilitate trail development (Tumbarumba Rosewood and parts of the Northern Rivers line), this may cause a significant time delay.

There are no native title considerations so this is not an impediment to development to this route.

Construction of the trail presents some difficulties at the eastern end in particular as well as renovation work likely to be required on the railway bridge at Mullumbimby. This may contribute to a slower than desirable development of this trail.

4.8.2 Option B

It is likely that almost the entire route passes through areas classified either as Coastal Wetland or Coastal Wetland Proximity Area (the predominant classification). The route is likely to require significant clearing and approvals under Coastal SEPP and most likely require an EIS. This will contribute to a long approvals time for this option.

If the trail is developed on Crown land, there will be no need to secure additional private land for the trail (noting native title issues below).

If this trail option were to be developed on Crown land (the preferred option to securing a significant length of privately owned land), much of the potential alignment is included in the recent native title determination for the Bundjalung People of Byron Bay (Arakwal). Whilst it is included within the non-exclusive native title tenure, there will be the need to negotiate its use with the successful native title claimants (despite the fact that the determination does not allow them to enjoy the land to the exclusion of others). Council has advised that this determination will have financial implications to the use of the land; it is not known what these implications are likely to be but it is likely to involve significant time in negotiations.

Construction of the trail presents difficulties along much of its length including a new bridge over Kings Creek and likely significant clearing as well as challenges associated with building so close to a river. This will contribute to a slower than desirable development of this trail.

In summary, given the need for environmental approvals and native title associated negotiations, delivering on this route is likely to take the longest period of time of all options.

4.8.3 Option C

This option will be relatively easy to deliver in terms of approvals and construction timeframes. The upgrading of the intersection of Mullumbimby Road and Gulgan Road is likely to have some impact on the delivery timeframe. There are some difficult construction elements but no significant approval issues – other than for a separated bridge over Kings Creek. It is understood that Council has had some initial discussions with one of the adjoining landholders about securing some land to allow an alternative alignment near the intersection of Mullumbimby Road and Gulgan Road, so if this route was to proceed, this initial discussion would improve the timeframe for delivery.

4.8.4 Option D

This option is likely to be relatively simple to deliver, though negotiations with landholders between Hambly Road and Henderson Lane will take time as there has been no discussions to date and it is likely that land resumptions will be required though easements could be negotiated.

4.8.5 Option E

This option will be the easiest to deliver in terms of approvals and construction timeframes. There are some difficult construction elements but no significant approval issues – other than for a separated bridge over Kings Creek.

4.8.6 Option F

This option is likely to be relatively simple to deliver, though – as with Option D - negotiations with landholders between Hambly Road and Bashforth Lane will take time as there has been no discussions to date and it is likely that land resumptions will be required though easements could be negotiated. Given the greater length of private land to be utilised, it will take longer to deliver than Option D.

4.9 Costs of Construction

Undertaking a high level assessment at this early stage of the process means that costs cannot be anticipated with any sense of certainty. What is known in terms of major expenditure items is that:

- Option A will require the redecking and inclusion of handrails on the railway bridge over the Brunswick River (as a minimum treatment assuming the bridge is structurally sound) and the construction of a new bridge in the vicinity of the junction of the Brunswick River and Midjimbal Creek. The use of existing infrastructure such as Synotts Lane will reduce the need for new trail construction – although an upgrade of the road or construction of an off-road path may be appropriate.
- Option B will require the construction of a new bridge over Kings Creek. It is also not clear how much existing trail could be used as "base material" for the trail. There is currently a cleared envelope from Riverside Crescent in Brunswick Heads heading west along the river. This option will also have some significant challenges gaining the required approvals given it would run through a very sensitive environmental area. We have significant concerns about the possibility of securing these approvals and are likely to have significant time and cost implications including an Environmental Impact Study.
- Option C is expected to require some large retaining walls and earthworks along much of the route which will be a significant expense.
- Option D may be cheaper than Option C given that the more expensive sections of the existing road corridor are avoided though the need for a new bridge to cross Kings Creek will add to the cost of this option.
- Option E is expected to require some large retaining walls and earthworks along some of the route (though less than Option C) which will be quite expensive.
- Option F is similar to Option D, in that the more expensive sections of the existing road corridor are avoided though the need for a new bridge to cross Kings Creek will add to the cost of this option.

The capital costs for each option have been estimated using Council's concept design estimate as a baseline for comparative purposes only – these values should not be used for project budget estimates. The total project development costs include a 30% contingency and a 15% allowance for design, approvals, and other project costs.

Table 4.3 Comparative Cost Estimate

	Major Cost Items	Estimated Capital Cost (for comparison only)
Option A	Earthworks Pavement and Surfacing Bridges and Treatments Embellishments	$7.31m
Option B	Earthworks Pavement and Surfacing Acquisitions / Compensation Approvals / EIS Bridges / Trail on Structure Embellishments	$13.58m
Option C	Earthworks Pavement and Surfacing Retaining Walls Bridges and Treatments Roadworks Embellishments	$9.33m
Option D	Pavement and Surfacing Property Acquisitions Bridges and Treatments Embellishments	$8.50m
Option E	Pavement and Surfacing Property Acquisitions Bridges and Treatments Embellishments	$8.34m
Option F	Property Acquisitions Pavement and Surfacing Bridges and Treatments Embellishments	$12.32m

Note the above costs are based on preliminary investigations completed to date and are subject to potential variability as more detailed investigations are carried out. The estimate also includes assumptions about the final surfacing and bridge treatments which are the most significant components of the project.

4.10 Legal Access to Rail Corridor

In addition to the issue of using road reserves and other public land for each option, there is the issue of using the existing railway corridor land which will impact on Option A. Railway lines in NSW must be closed by an Act of Parliament before they can be used for any other purpose such as a trail or pathway. This has been a significant impediment until recently in progressing the development of trails on disused railway corridors. The process in NSW is progressing based on the experience of the pilot project – the Tumbarumba-Rosewood Rail Trail. The *Transport Administration Amendment (Closures of Railway Lines in Northern Rivers) Bill 2020* was passed by both Houses of Parliament in October 2020.

This is a critical step toward trail construction.

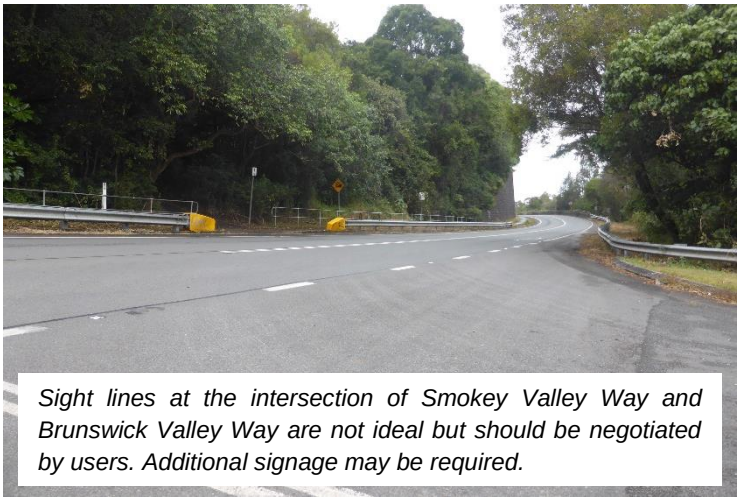
The bill is a simple bill with four (4) clauses as follows:

- specify the geographic extent of the closure;
- allows the rail infrastructure owner to sell or otherwise dispose of the land and remove the railway tracks and other works;
- specifies that the land remains in public ownership (by prescribing what entities the land can be sold or given to); and
- specifies that the land may be leased for recreation, tourism or community and related purposes only.

The Bill closely resembles the *Transport Administration Amendment (Closure of Railway Line Between Rosewood and Tumbarumba) Act 2017.* Any legislative attempt to close this section of railway line (from Mullumbimby to Synotts Lane) should be relatively easy to draft once a decision is made to proceed – but such a decision is needed to progress this option.

4.11 Existing Intersection Configurations

Option A brings users through the Ocean Shores sewage treatment plant onto the Smokey Valley Way. It is a short steep climb to the intersection of the Smokey Valley Way and the Brunswick Valley Way. Users would then cross over to the existing path which runs down the eastern side of the Brunswick Valley Way. The intersection provides limited sight lines; however, it is at the top of a climb and users are likely to be travelling quite slowly. Consequently sightlines are considered sufficient for safety.



Sight lines at the intersection of Smokey Valley Way and Brunswick Valley Way are not ideal but should be negotiated by users. Additional signage may be required.

Option C is affected by the proposed upgrade of the intersection of Mullumbimby Road and Gulgan Road that may include the installation of a roundabout. Whilst not critical in determining the desirability or otherwise of this route, allowances will need to be made in the design.

4.12 Aboriginal Cultural Heritage Sites

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) was completed for the project area to check whether any of the routes might be affected. The search returned a total of 35 different sites and objects which may affect Options C, D, E, and F as shown in Figure 4.2.

The details of the items returned through the extensive search are included in Appendix B.

Further investigation is required to confirm the details of these site/objects however there may be an opportunity for the project to help preserve and protect these important sites.

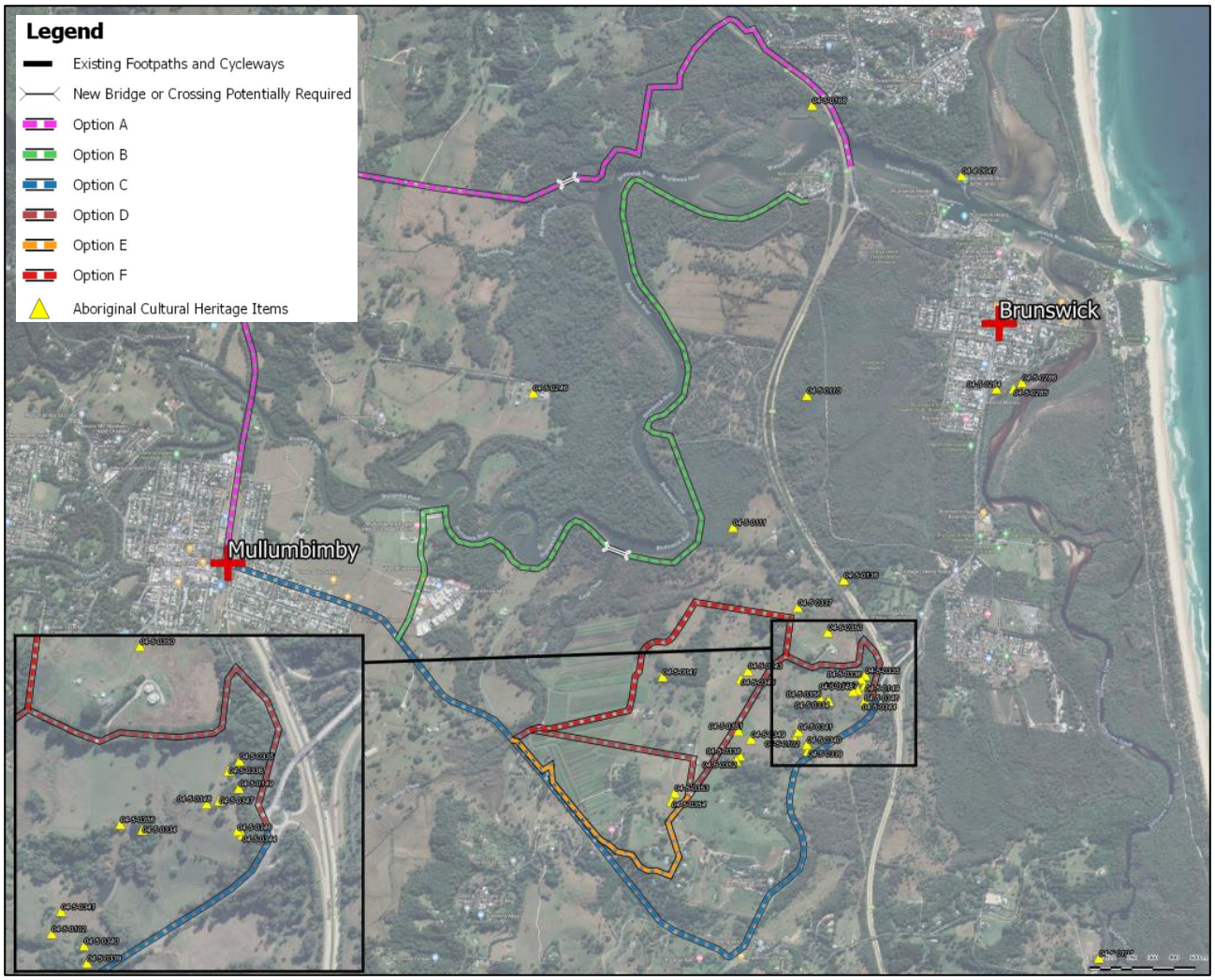


Figure 4.2 Aboriginal Heritage Locations

5. Route Options Analysis

5.1 Multi Criteria Analysis

A high level Multi Criteria Analysis (MCA) has been prepared which includes consideration of the key constraints and opportunities outlined above. The framework of the MCA includes the following:

- Six (6) route options as described above;
- A set of social, environmental and economic evaluation criteria selected for the project;
- A series of weightings that represent the relative importance of each of the assessment categories and criteria; and
- A score from 1 (low score) to 5 (high score) for each criterion.

The MCA process is not intended to be definitive but is a useful tool to differentiate between the options. The selected criteria and weightings have been developed by the project team in conjunction with Council officers however these are all highly subjective and may be altered to achieve an entirely different outcome.

5.2 Criteria Categories

Weighting against each category of social, environmental and economic considerations was determined based on their importance. It was decided to allocate even weighting against each of the nominated criteria (33% each). Following this, a “long list” of evaluation criteria was developed in each category before shortlisting to the preferred criteria below.

5.3 Evaluation Criteria

The initial “long list” of criteria considered in the MCA is presented in Table 5.1.

Table 5.1 Criteria Considerations – Long List

Long List of Criteria Considered	
Capital Cost	Impact on local residents
Road Safety	Constructability
Flooding	Difficulty of environmental approvals
Environment Impact	Visual amenity
Land Tenure and Native Title	Property Acquisition
Construction Impacts	Pedestrian / cyclist safety
Bridges and Waterway Crossings	Cultural Heritage
Usability / Usefulness to Community	Directness (length) of Route

5.4 Selected Key Criteria

The selected key criteria, categories, descriptions, and weightings are presented in Table 5.2.

Table 5.2 MCA Criteria and Weightings

Criteria	Category	Description	Weighting
1. User Experience	Social	The accessibility, utility, enjoyability, and attractiveness of the route for the intended users	5%
2. Cyclist Safety	Social	The extent to which the route is free from major safety issues (e.g. interaction with road users)	20%
3. Approvals Risk	Economic	Potential time and cost of approvals	15%
4. Ecological Impacts	Environmental	Extent of vegetation clearing required and potential conflicts with ecological values	20%
5. Construction Costs	Economic	Cost of delivering the route	20%
6. Delivery Timeframe	Social	Desirable length and travel speed	10%
7. Connectivity	Social	Population within 500 m and travel time	10%

5.5 Criteria Weightings and Scores

Each route was then given a score against each criteria from 1 (low or poor score) to 5 (high or positive score) and given a final ranking based on the weighted score as shown in Table 5.3.

Table 5.3 MCA Scoring and Results

Criteria	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Weighted Score**	**Rank**
Weighting	**5%**	**20%**	**15%**	**20%**	**20%**	**10%**	**10%**		
	Score								
Option A1	5	4	3	2	3	3	5	3.30	2
Option A2	5	4	3	2	2	3	3	2.90	5
Option B	5	5	1	1	1	1	4	2.30	7
Option C	1	1	5	3	2	3	3	2.60	6
Option D	3	3	5	4	3	4	3	3.60	1
Option E	2	2	5	3	3	5	3	3.25	3
Option F	4	3	3	4	2	4	2	3.05	4

The outcome of the MCA has Option D scoring the highest with 3.60 followed by Option A1 (3.30), Option E (3.05), Option F (3.05), Option A2 (2.90), Option C (2.60), then Option B (2.30). Note this is a comparative analysis only and does not reflect the overall value of the development of each route.

6. Summary

This report has explored the possible route options for the proposed Mullum to Bruns Cycleway based on desktop and site investigations by the project team. We have reviewed Council's constraints mapping, conducted a walkthrough of accessible sections, reviewed public submissions, and prepared a multi criteria analysis of six (6) potential route options to assist Council with making a decision on a preferred alignment for the route.

A summary of our investigations and assessment of each option is provided below.

6.1 Option A – The Rail Trail

Option A uses the rail corridor leaving Mullumbimby and heading north across the Brunswick River until it intersects with Synotts Lane. The trail would then head east requiring the use of road reserves and one parcel of private property, a new water crossing near the Ocean Shores Sewage Treatment Plant and utilisation of existing roadside paths into Brunswick Heads from the north.

Whilst requiring a new bridge, renovation of the existing railway bridge and legislated closure of a portion of the railway line, it represents a good compromise between the user experience and challenges of delivery. It will have some environmental impact as clearing will be required along the old railway corridor and to create a link between the eastern end of Synotts Lane and the Sewage Treatment Plant.

The timing for development of this option depends on three key factors – approvals for construction at the eastern end between Synotts Lane, the Smokey Valley Way (required under the Coastal Management SEPP), and legislative closure of the railway corridor from Mullumbimby to Synotts Lane and negotiations over the use of private land on what was formerly Synotts Road.

It is worth noting that the rail corridor north from Brunswick Heads to Billinudgel is identified as a priority route in the Council's 10 year Bike Plan. The railway line north of Byron Shire – from Crabbes Creek to Murwillumbah – is now formally closed and construction on a rail trail will begin shortly. Using the rail corridor for part of the Mullum Bruns Cycle Way will possibly create some further momentum and open possible funding opportunities to further develop a rail trail north to the Shire boundary.

Construction of a trail adjacent to the railway formation (Option A2) would be difficult and costly given the route includes a bridge over Brunswick River and the 50 m long tunnel under Vallances Road. These issues are detailed in the report *Multi Use of Byron Shire Rail Corridor* (Arcadis, 2019).

6.2 Option B – The River Route

This route follows the Brunswick River. From the Mullumbimby Caravan Park to Riverside Crescent and then into Brunswick Heads on existing boardwalks and paths.

This is the most attractive option but has the lowest score in the MCA. The low score is due primarily to conflicts with native title, overall ecological impacts and permit approvals. The route will either require traversing land that has been subject to native title determination (or private land that would

need to be acquired) and will require significant clearing and approvals under Coastal SEPP and most likely require an EIS.

It is the most difficult option to deliver in terms of time, approvals and will most likely cost the most.

6.3 Option C – The Concept Option

This is the original route selected by Council travelling a alongside Mullumbimby Road and Gulgan Road into Brunswick Heads.

This scored the second lowest in the MCA. This will be the easiest to deliver in terms of approvals and construction timeframes but represents the least desirable outcomes from a user quality and safety perspective. There is also the need to consider the upgrading of the intersection of Mullumbimby Road and Gulgan Road.

6.4 Option D – The Concept Option Alternative

This is a variation of Option C using Hambly Road and The Saddle Road rather than much of Mullumbimby Road. This option scored the highest in the MCA. It offers improved user experience and safety over Option C but will require some land acquisition. Timeframes and approvals are similar to Option C.

6.5 Option E – The Saddle Road

This is a variation of Option C using The Saddle Road rather than much of Mullumbimby Road. It offers improved user experience and safety over Option C but will require some land acquisition. Timeframes and approvals are similar to Option C.

6.6 Option F – The Farm Road Route

This is a variation of Option C using Hambly Road and private property before returning to the Saddle Road. It offers improved user experience and safety over Option C but will require significant land acquisition. Timeframes and approvals are similar to Option C.

Appendix A – Route Options Constraint Mapping

Mullumbimby to Brunswick Cycleway Investigation

Alignment Options
Byron Shire Council
Environmental Constraints

Area of Interest within the Byron Shire

Legend

- Existing Footpaths and Cycleways
- New Bridge or Crossing Potentially Required
- Option A
- Option B
- Option C
- Option D
- Option E
- Option F
- High Environmental Value
- Koala Habitat

Project:	BE210132
Date:	21-09-2021
Scale:	1:20,000 at A3
Projection:	GDA 94/MGA Zone 56
Data Sources:	Byron Shire Council (2021), Google Earth Imagery (2021)

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Mullumbimby to Brunswick Cycleway Investigation

Alignment Options
Coastal Management SEPP

Area of Interest within the Byron Shire

Legend

- Existing Footpaths and Cycleways
- New Bridge or Crossing Potentially Required
- Option A
- Option B
- Option C
- Option D
- Option E
- Option F
- Coastal Wetland
- Coastal Wetland Proximity Area
- Littoral Rainforest
- Littoral Rainforest Proximity Area

Project: BE210132
Date: 21-09-2021
Scale: 1:20,000 at A3
Projection: GDA 94/MGA Zone 56
Data Sources: Byron Shire Council (2021), Google Earth Imagery (2021)

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Mullumbimby to Brunswick Cycleway Investigation

Alignment Options
Flood Inundation

Area of Interest within the Byron Shire

Legend

- Existing Footpaths and Cycleways
- New Bridge or Crossing Potentially Required
- Option A
- Option B
- Option C
- Option D
- Option E
- Option F
- Flood Inundation - 1 in 100 year

Project:	BE210132
Date:	21-09-2021
Scale:	1:20,000 at A3
Projection:	GDA 94/MGA Zone 56
Data Sources:	Byron Shire Council (2021), Google Earth Imagery (2021)

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Mullumbimby to Brunswick Cycleway Investigation

Alignment Options
Slope

Area of Interest within the Byron Shire

Legend

- Existing Footpaths and Cycleways
- New Bridge or Crossing Potentially Required
- Option A
- Option B
- Option C
- Option D
- Option E
- Option F

Slope (%)
- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20+

Project: BE210132

Date: 21-09-2021

Scale: 1:20,000 at A3

Projection: GDA 94/MGA Zone 56

Data Sources: Byron Shire Council (2021), Google Earth Imagery (2021)

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Mullumbimby to Brunswick Cycleway Investigation

Alignment Options
Tenure

Area of Interest within the Byron Shire

Legend

- Existing Footpaths and Cycleways
- New Bridge or Crossing Potentially Required
- Option A
- Option B
- Option C
- Option D
- Option E
- Option F
- Freehold Land
- National Park
- Byron Shire Council-Owned Land
- Crown Land
- Easement
- Unknown Tenure

Project:	BE210132
Date:	21-09-2021
Scale:	1:20,000 at A3
Projection:	GDA 94/MGA Zone 56
Data Sources:	Byron Shire Council (2021), Google Earth Imagery (2021)

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Mullumbimby to Brunswick Cycleway Investigation

Alignment Options
Aboriginal Heritage

Area of Interest within the Byron Shire

Legend

- Existing Footpaths and Cycleways
- New Bridge or Crossing Potentially Required
- Option A
- Option B
- Option C
- Option D
- Option E
- Option F
- Aboriginal Cultural Heritage Items

Notes: This plan is to be read in conjunction with the AHIMS Web Services Extensive Search undertaken for the site (PO Number BE210132; appended to the report).

Project:	BE210132
Date:	21-09-2021
Scale:	1:20,000 at A3
Projection:	GDA 94/MGA Zone 56
Data Sources:	Byron Shire Council (2021), Google Earth Imagery (2021), New South Wales Government AHIMS Web Services (2021)

BURCHILLS ENGINEERING SOLUTIONS

Appendix B – AHIMS Extensive Search Report

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : BE210132

Client Service ID : 611431

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
04-5-0149	TL 1	AGD	56	552750	6840550	Open site	Valid	Shell : -, Artefact : -	Midden	102407
	Contact	**Recorders**	Phil Hughes					**Permits**		
04-4-0047	Brunswick 1	AGD	56	553300	6843450	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	Ms.Jacqueline Collins					**Permits**		
04-4-0081	RTA Ridge 1	AGD	56	552630	6841150	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Kim Lomax					**Permits**	687	
04-5-0102	Byron Urban Areas 1;Mullumbimby;	AGD	56	552351	6840240	Open site	Valid	Artefact : -	Open Camp Site	97692,102407
	Contact	**Recorders**	Ms.Jacqueline Collins					**Permits**		
04-5-0110	Midden;	AGD	56	552420	6842200	Open site	Valid	Shell : -, Artefact : -	Midden	102407
	Contact	**Recorders**	M Wheeler					**Permits**		
04-5-0136	RTA Ridge 1;	AGD	56	552630	6841150	Open site	Valid	Artefact : -	Open Camp Site	102407
	Contact	**Recorders**	Kim Lomax					**Permits**		
04-5-0041	Mullumbimby;	AGD	56	551600	6840600	Open site	Valid	Stone Arrangement : -	Stone Arrangement	102407
	Contact	**Recorders**	Department of Lands - South Region - Wollongong					**Permits**		
04-5-0111	Mound;	AGD	56	552000	6841450	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	
	Contact	**Recorders**	M Wheeler					**Permits**		
04-5-0168	Brunswick River: Brunswick Heads Bypass	AGD	56	552450	6843850	Open site	Valid	Hearth : -, Shell : -, Artefact : -		102407,104473
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA),Allan Goodwin,Mr.Ron Heron					**Permits**		
04-5-0101	Byron Urban Areas 2;Brunswick Heads;	AGD	56	554080	6839000	Open site	Valid	Shell : -, Artefact : -	Midden	2229,97692,102407
	Contact	**Recorders**	Ms.Jacqueline Collins					**Permits**		
04-5-0246	Brunswick Valley STP Site	GDA	56	550970	6842404	Open site	Valid	Potential Archaeological Deposit (PAD) : -		102407
	Contact Arakwal Elders Corporation	**Recorders**	Department oF Environment & Climate Change (Coffs Harbour)					**Permits**	3102	
04-5-0284	Terrace Holiday Park Midden Site.1	GDA	56	553603	6842426	Open site	Valid	Shell : -, Aboriginal Resource and Gathering : -		
	Contact Mr.Des Williams	**Recorders**	Mr.Ashley Moran					**Permits**		
04-5-0285	Terrace Holiday Park Midden Site.2	GDA	56	553700	6842426	Open site	Valid	Aboriginal Resource and Gathering : -		
	Contact Mr.Des Williams	**Recorders**	Mr.Ashley Moran					**Permits**		
04-5-0286	Terrace Holiday Park Midden Site.3	GDA	56	553748	6842462	Open site	Valid	Aboriginal Resource and Gathering : -		
	Contact	**Recorders**	Mr.Ashley Moran					**Permits**		
04-5-0334	Saddle Road 19	GDA	56	552650	6840650	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Everick Heritage Pty Ltd,Miss.Pauline Fowler					**Permits**		

Report generated by AHIMS Web Service on 06/08/2021 for Caroline Kelly for the following area at Search using shape-file BE210132_Extent with a buffer of 0 meters. Additional Info : Due Diligence. Number of Aboriginal sites and Aboriginal objects found is 35

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : BE210132

Client Service ID : 611431

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
04-5-0335	Saddle Road 17	GDA	56	552857	6840797	Open site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Miss.Pauline Fowler						Permits		
04-5-0336	Saddle Road 18	GDA	56	552834	6840776	Open site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Miss.Pauline Fowler						Permits		
04-5-0337	Saddle Road 16	GDA	56	552474	6841183	Open site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Miss.Pauline Fowler						Permits		
04-5-0338	Saddle Road 15	GDA	56	552146	6840339	Open site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Miss.Pauline Fowler						Permits		
04-5-0339	Saddle Road 14	GDA	56	552532	6840366	Open site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Miss.Pauline Fowler						Permits		
04-5-0340	Saddle Road 13	GDA	56	552526	6840403	Open site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Miss.Pauline Fowler						Permits		
04-5-0341	Saddle Road 12	GDA	56	552477	6840476	Open site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Miss.Pauline Fowler						Permits		
04-5-0343	Saddle Road 11	GDA	56	552191	6840823	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0344	Saddle Road 8	GDA	56	552863	6840639	Closed site	Valid	Shell : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0345	Saddle Road 10	GDA	56	552150	6840773	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0346	Saddle Road 9	GDA	56	552853	6840648	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0347	Saddle Road 7	GDA	56	552814	6840712	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0348	Saddle Road 6	GDA	56	552787	6840706	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0349	Saddle Road 4	GDA	56	552208	6840434	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0350	Saddle Road 5	GDA	56	552645	6841042	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0351	Saddle Road 3	GDA	56	552137	6840481	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0352	Saddle Road 2	GDA	56	552124	6840310	Open site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		
04-5-0353	Saddle Road 01B	GDA	56	551774	6840129	Closed site	Valid	Artefact : -		
Contact	Recorders	Everick Heritage Pty Ltd,Mr.Tim Hill						Permits		

Report generated by AHIMS Web Service on 06/08/2021 for Caroline Kelly for the following area at Search using shape-file BE210132_Extent with a buffer of 0 meters. Additional Info : Due Diligence. Number of Aboriginal sites and Aboriginal objects found is 35

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : BE210132

Client Service ID : 611431

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
04-5-0354	Saddle Road 01A	GDA	56	551757	6840079	Closed site	Valid	Artefact : -		
	Contact	**Recorders**	Everick Heritage Pty Ltd,Mr.Tim Hill					**Permits**		
04-5-0356	Saddle Road 20	GDA	56	552603	6840662	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Everick Heritage Pty Ltd,Miss.Pauline Fowler					**Permits**		

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

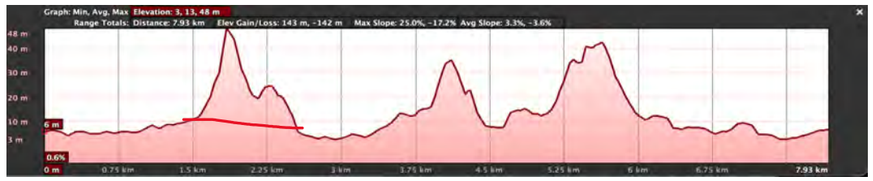
Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 06/08/2021 for Caroline Kelly for the following area at Search using shape-file BE210132_Extent with a buffer of 0 meters. Additional Info : Due Diligence. Number of Aboriginal sites and Aboriginal objects found is 35

Appendix C – Cycle Travel Time Calculations (ZTP)

Route A

Start	Finish	Avg Grad	Speed	Distance	Time		
0	3.6	0	20	3.6	10.8	mins	
3.6	4.5	5.5	10	0.9	5.4	mins	Hill 1
4.5	5.03	0	20	0.53	1.59	mins	
5.03	6.06	6.1	10	1.03	6.18	mins	Hill 2
6.06	7.92	0	20	1.86	5.58	mins	
				7.92	29.55		
					2.664	+ time penalty	
					32.214		

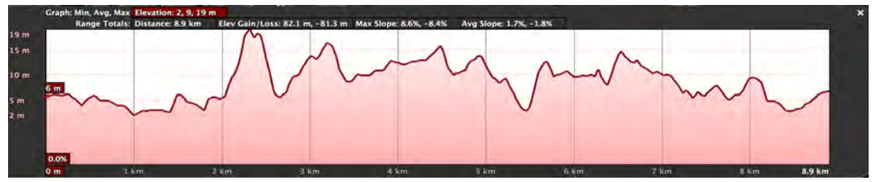


* Red line above indicates existing rail tunnel

** If an alternative route was to avoid the rail tunnel an average slope of 12% (max at 25%) would need to be considered at Vallances Road.

Route B

Start	Finish	Avg Grad	Speed	Distance	Time		
0	8.9	0	20	8.9	26.7	mins	
				8.9	0		
					3.6663	+ time penalty	
					26.7		



Route C

Start	Finish	Avg Grad	Speed	Distance	Time		
0	2.53	0	20	2.53	7.59	mins	
2.53	3.68	5 (max 10)	10	1.15	6.9	mins	Hill 1
3.68	8.07	0	20	4.39	13.17	mins	
				8.07	27.66		
					7.59	+ time penalty	
					35.25		

Route D

Start	Finish	Avg Grad	Speed	Distance	Time		
0	2.6	0	20	2.6	7.8	mins	
2.6	3.01	14	5	0.41	4.92	mins	Hill 1
3.01	4.45	0	20	1.44	4.32	mins	
4.45	5	-11	5	0.55	6.6	mins	Hill 2
5	7.55	0	20	2.55	7.65	mins	
				7.55	31.29		
					7.92	+ time penalty	
					39.21		

Route E

Start	Finish	Avg Grad	Speed	Distance	Time		
0	2.63	0	20	2.63	7.89	mins	
2.63	3.33	7.4	10	0.7	4.2	mins	Hill 1
3.33	4.98	0	20	1.65	4.95	mins	
4.98	6.31	-5	10	1.33	7.98	mins	Hill 2
6.31	8.09	0	20	1.78	5.34	mins	
				8.09	30.36		
					7.59	+ time penalty	
					37.95		

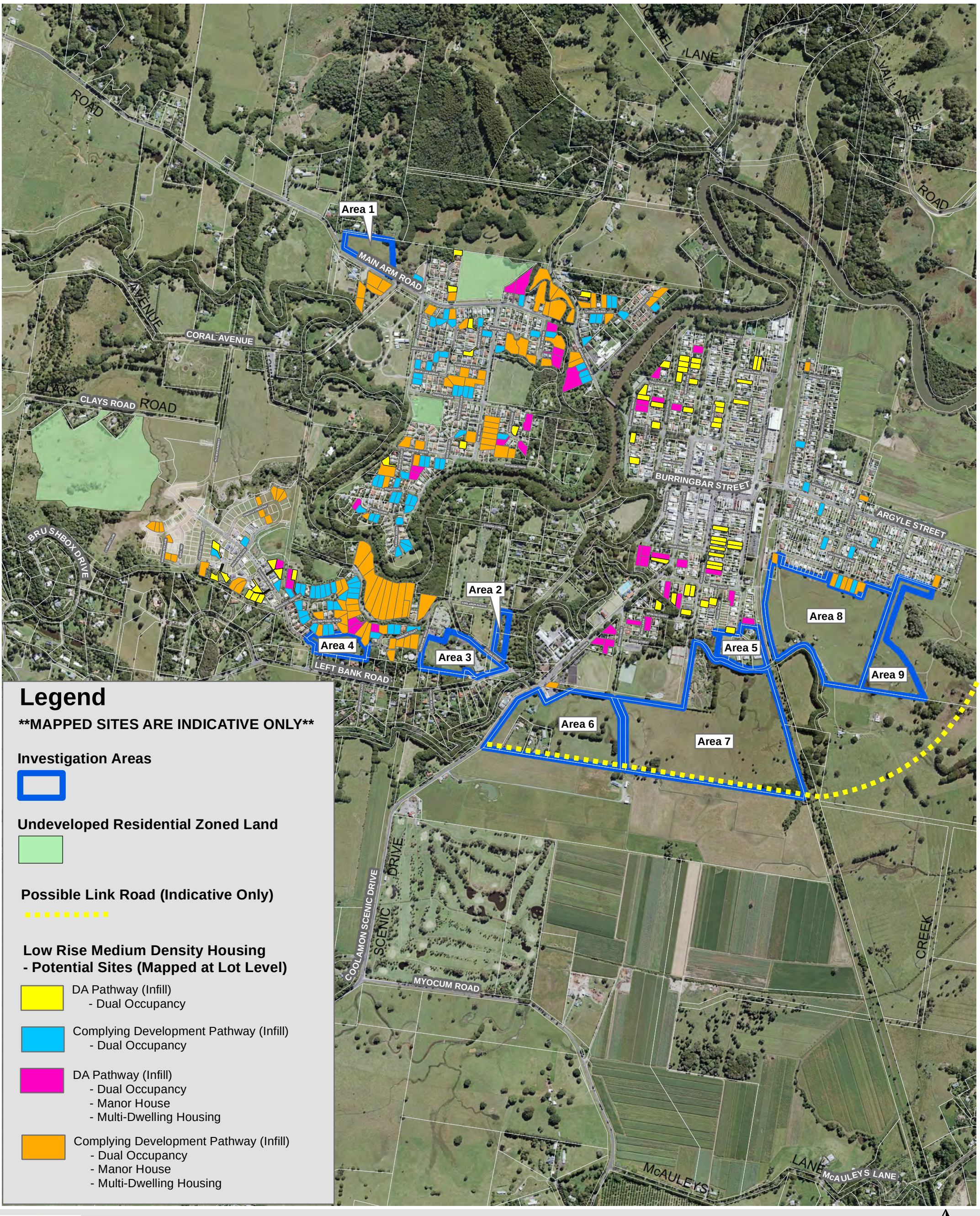
Route F

Start	Finish	Avg Grad	Speed	Distance	Time		
0	3.47	0	20	3.47	10.41	mins	
3.47	3.94	10	5	0.47	5.64	mins	Hill 1
3.94	4.45	0	20	0.51	1.53	mins	
4.45	5.34	-5	10	0.89	5.34	mins	Hill 2
5.34	7.55	0	20	2.21	6.63	mins	
				7.55	29.55		
					7.59	+ time penalty	
					37.14		

Appendix D – Extracts from BSC Planning Documents

Map 1: Mullumbimby Potential Housing Supply

NOTE:
The information provided on this map is indicative only and should not be used as a basis for investment or other private decision making purposes about land purchase or land use.



Legend

****MAPPED SITES ARE INDICATIVE ONLY****

Investigation Areas

Undeveloped Residential Zoned Land

Possible Link Road (Indicative Only)

Low Rise Medium Density Housing - Potential Sites (Mapped at Lot Level)

- DA Pathway (Infill)
  - Dual Occupancy
- Complying Development Pathway (Infill)
  - Dual Occupancy
- DA Pathway (Infill)
  - Dual Occupancy
  - Manor House
  - Multi-Dwelling Housing
- Complying Development Pathway (Infill)
  - Dual Occupancy
  - Manor House
  - Multi-Dwelling Housing

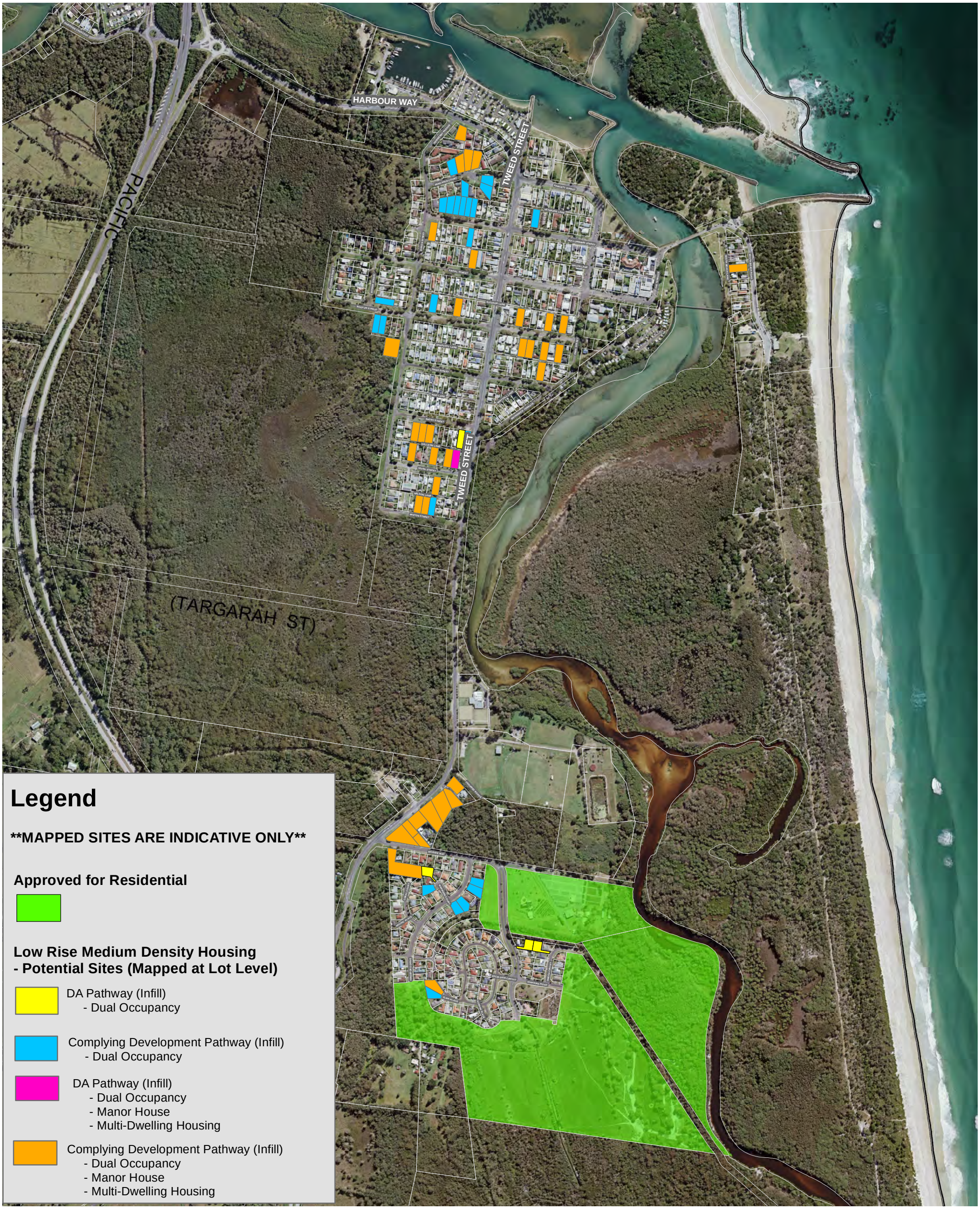
0 650 1,300 Metres

1:13,318 @ A3 size

Date: 16/11/2020

Map 3: Brunswick Heads Potential Housing Supply

NOTE:
The information provided on this map is indicative only and should not be used as a basis for investment or other private decision making purposes about land purchase or land use.



Legend

****MAPPED SITES ARE INDICATIVE ONLY****

Approved for Residential

Low Rise Medium Density Housing
- Potential Sites (Mapped at Lot Level)

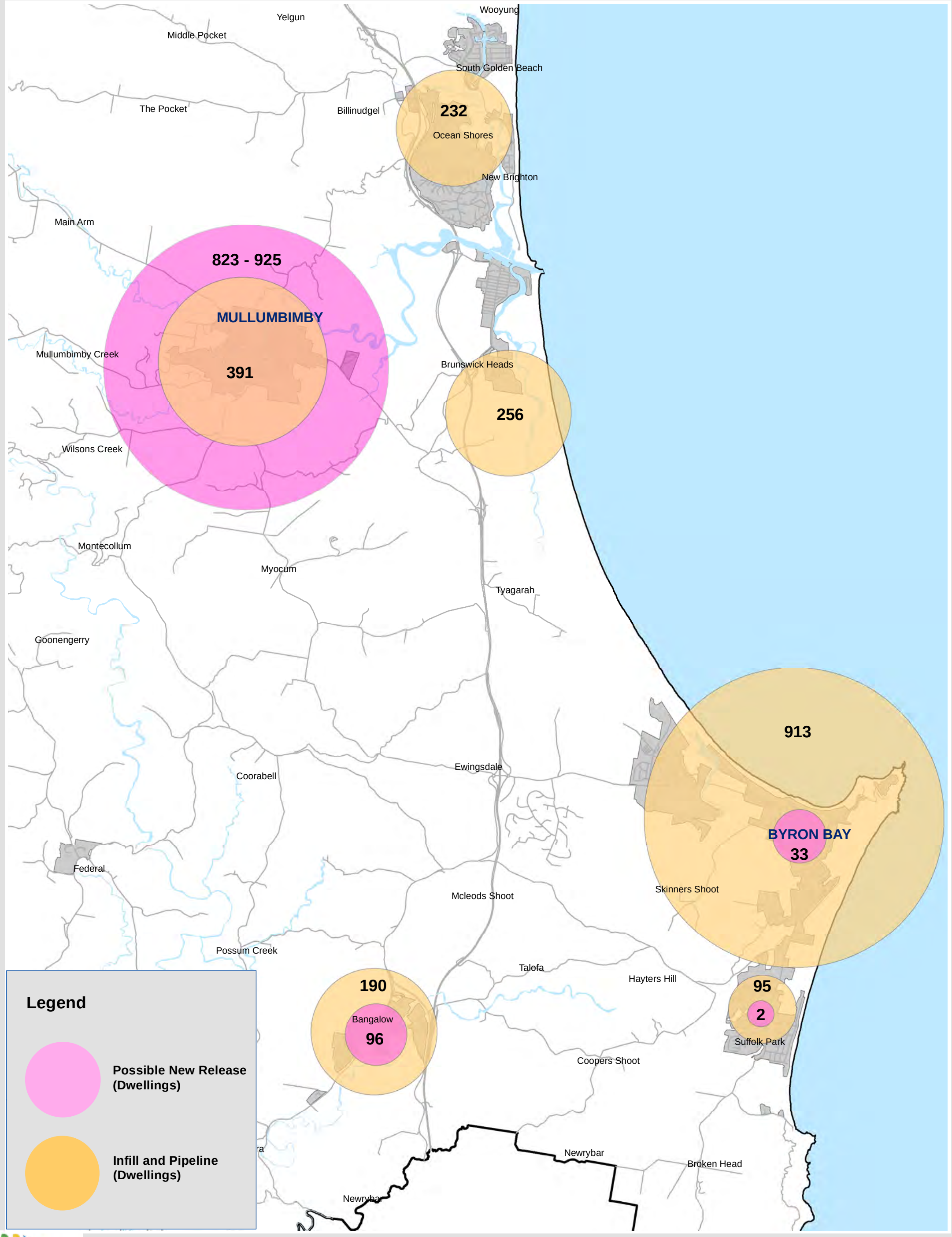
- DA Pathway (Infill)
  - Dual Occupancy
- Complying Development Pathway (Infill)
  - Dual Occupancy
- DA Pathway (Infill)
  - Dual Occupancy
  - Manor House
  - Multi-Dwelling Housing
- Complying Development Pathway (Infill)
  - Dual Occupancy
  - Manor House
  - Multi-Dwelling Housing

0 475 950 Metres

1:9,448 @ A3 size

Date: 12/11/2020

Map 6: Urban Housing Supply Distribution



0 2,150 4,300 Metres

1:71,911 @ A3 size

Date: 21/12/2020

COMMUNITY & HOUSING PROJECT AREA
(Including an Education & Interpretation Centre, Community Gardens; pedestrian connections to Mullumbimby Town Centre; and Future Affordable Housing Initiatives)

BIOMASS PROJECT AREAS
(Including planiting of coppice crops, the land application of digested bio-solids for fertiliser, and use of recycled water for irrigation)

BRUNSWICK VALLEY STP PROJECT AREA
(Including Effluent Storage Ponds and constructed Wetland polishing)

LEGEND

- PROJECT BOUNDARIES
- BRUNSWICK VALLEY SUSTAINABILITY CENTRE MANAGEMENT PLAN BOUNDARY

20.0ha

23.8ha

14.1ha

3.6ha

49.8ha

SOLAR PROJECT AREAS
(Including renewable solar energy farms, both Council and Community-funded)

ENVIRONMENTAL LAND USE PROJECT AREAS
(Including wildlife corridors, revegetation, bank stabilisation & Boardwalks/walkways)

5A
1B1
4A
7B
1AH
2A

STREET
AVENUE
MORRISON
PRINCE
CROWN
ROAD

MAP 1 - PROJECT AREAS

BRUNSWICK VALLEY SUSTAINABILITY CENTRE

PLANIT CONSULTING

PROJECT TITLE
VALLANCES ROAD, MULLUMBIMBY

DRAWING TITLE
PROJECT AREAS

BASE ISSUED BY
GOV MAPS

SCALE
NTS

DESIGN
ZP

DRAWN
ZACP

DATE
26/07/2017

CHECKED
CT

DRAW NO
A102

SHEET NO
02

NO	DATE	REVISION	BY
-	-	-	-

NORTH POINT
N

Level 1 2247 Gold Coast Hwy
Nobby Beach
PO Box 206 QLD 4218

Telephone: 07 5526 1500
Fax: 07 5526 1502
Email: admin@planitconsulting.com.au

Area 2: Mullumbimby Industrial Estate expansion

Area Number	**2.**
Description	Part of Lot 67 DP 1226493
Image of investigation area	
Potential developable land[1] (ha)	2.4 ha
Preferred role	Industrial urban service land (IN1)
Strengths/ advantages	• adjacent existing industrial area • good proximity to existing workforce • on existing public transport route • flat cleared site links with the proposed new on-road cycle lane on Mullumbimby Road between Manns Road and Gulgan North Pacific Highway interchange
Key issues and further investigations	• flooding • important farmland classification - requiring detailed assessment of agricultural capability and impact on surrounding land as part of any planning proposal consistent with *Environmental Planning and Assessment Act 1979* Section 9.1 Direction 5.3: Farmland of State & Regional Significance on the NSW Far North Coast • traffic flow implications for Manns Road and Mullumbimby Road and relationship to possible southern local connector • gateway to Mullumbimby town landscaping to enhance visual amenity • investigations to ensure that any proposed development is consistent with relevant State and regional planning provisions this may include the management of areas of high environmental value, flooding and heritage/cultural significance.
Anticipated delivery timeframe	Short term

Area 4: Gulgan West

Area Number	**4.**
Description	Part of Lot 26 DP830652 Located to the west of the Pacific Highway off the southern Gulgan Road interchange
Image of investigation area	
Potential developable land[1.] (ha)	10 ha
Preferred role	Industrial land (IN1) with agricultural ancillary development (i.e. food packaging, food production etc.)
Strengths/ advantages	• direct north and south-bound ingress and egress to Pacific Highway • on existing public transport route • disused rail corridor to the west that links to areas with an existing workforce • relatively flat and cleared area
Key issues and further investigations	• flooding and stormwater drainage • important farmland classification - requiring detailed assessment of agricultural capability and impact on surrounding land as part of any planning proposal consistent with *Environmental Planning and Assessment Act 1979* Section 9.1 Direction 5.3: Farmland of State & Regional Significance on the NSW Far North Coast • Aboriginal cultural heritage sensitivities • biodiversity and ecological sensitivities including prime koala habitat (verification by qualified and experienced ecologist) • land containing HEV vegetation to be excluded and designated as

	Environmental Zone • distance from existing water and sewerage infrastructure and connection to existing infrastructure • bushfire prone • traffic impacts and safe access point to Gulgan Road • long term capacity to link with the proposed new on-road cycle lane on Mullumbimby Road between Manns Road and Gulgan North Pacific Highway interchange • landscaping to enhance visual amenity as it pertains to view lines from Gulgan Road and Pacific Highway
Anticipated delivery timeframe	Medium to long term

Area 5: Gulgan North

Area Number	**5.**
Description	Part of Lot 2 DP 1159910 66 The Saddle Road, Brunswick Heads
Image of investigation area	

Appendix E – Population Analysis Mapping (ZTP)

Figure 1: Existing population counts

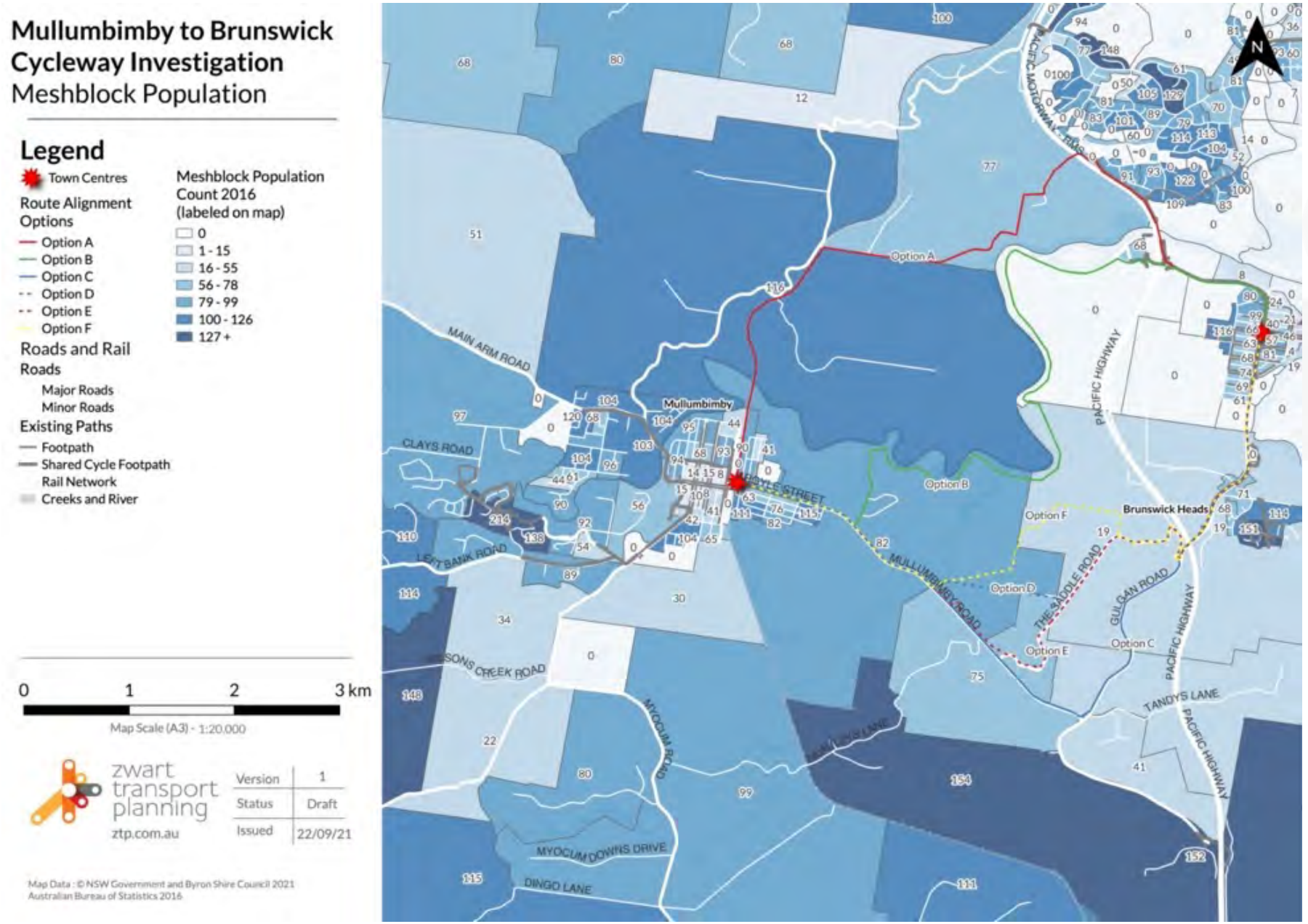


Figure 2: Population density

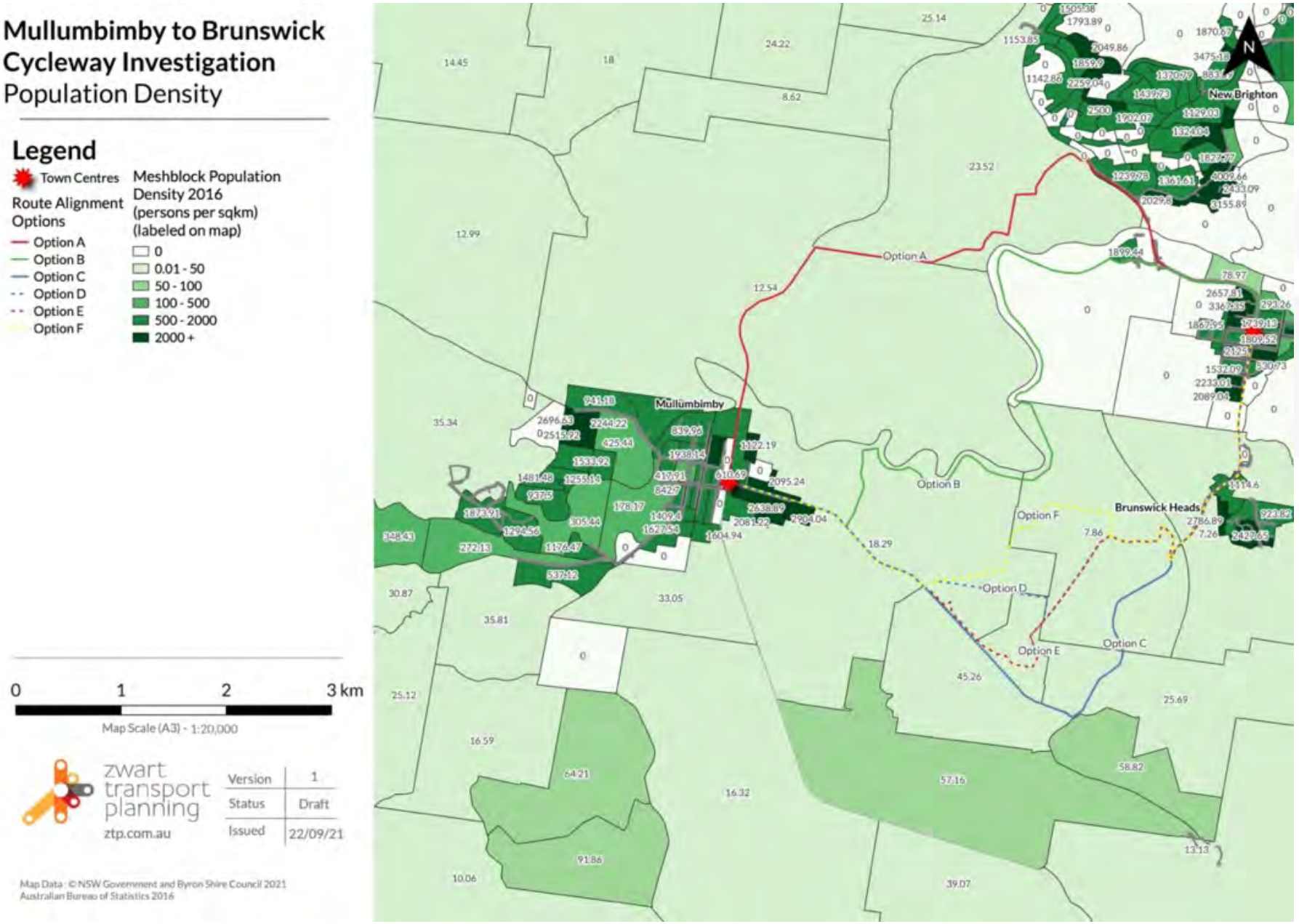


Figure 3: Future land use changes

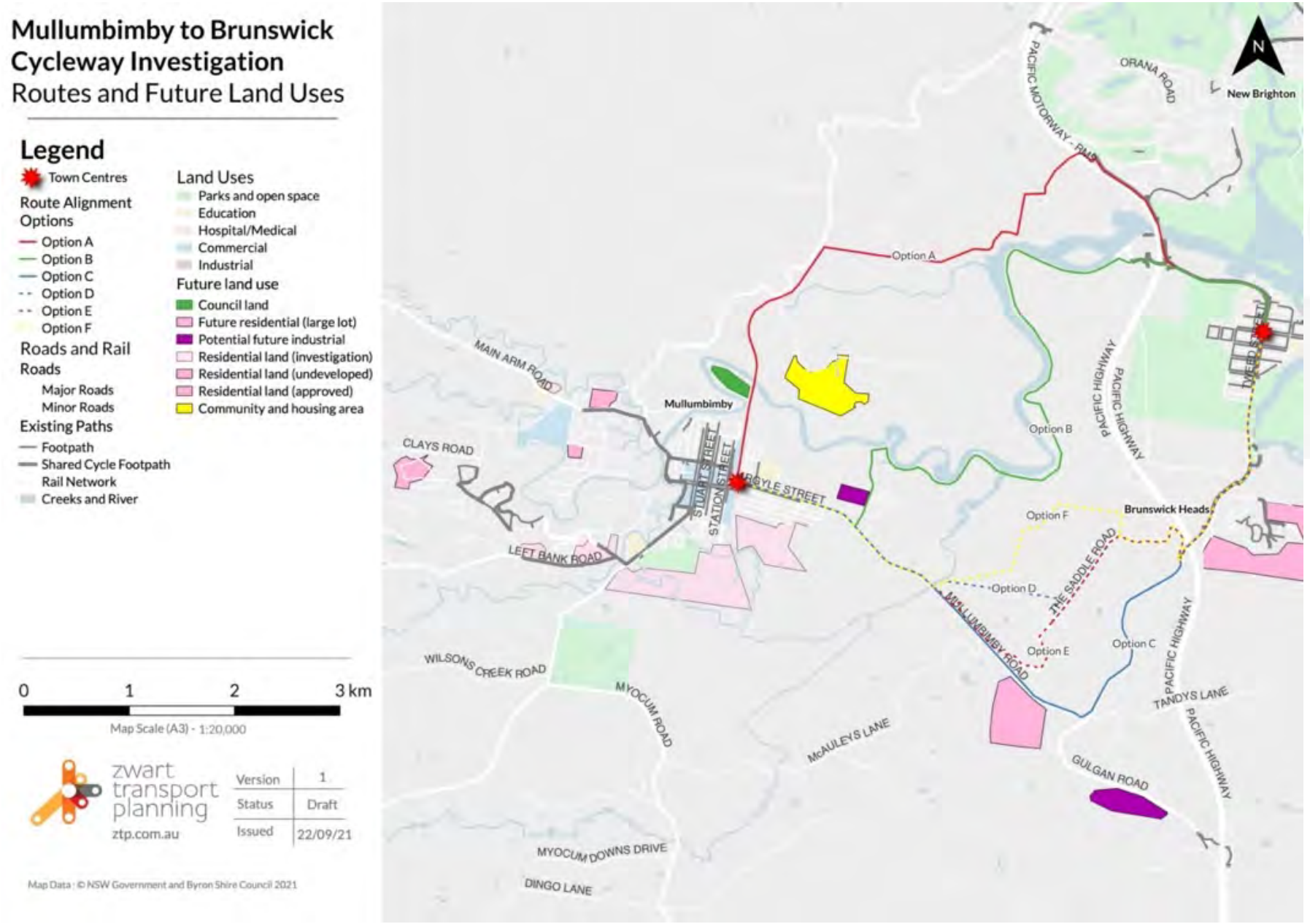
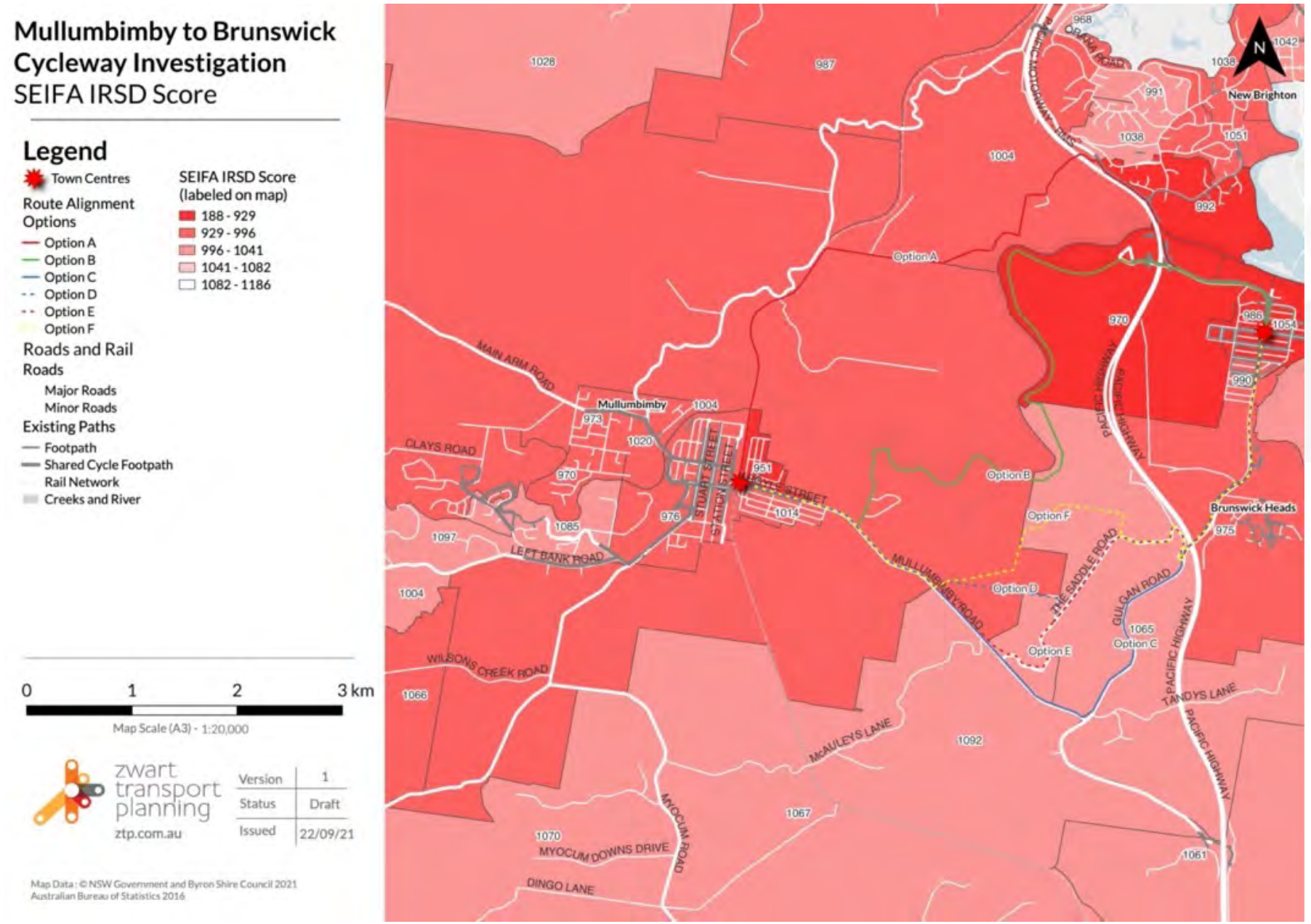


Figure 4: Socio-economic disadvantage



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