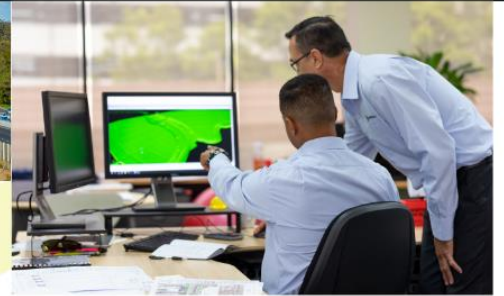




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## Mullum to Bruns Cycleway

### Preferred Route Proof of Concept Report

Client: Byron Shire Council

Project No: BE210132

Document No: BE210132-RP-FSR-00

July 2023

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# Executive Summary

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- Appendix A – Cycleway Alignment Drawings
- Appendix B – Preliminary Construction Cost Estimate
- Appendix C – Brunswick River Bridge Condition Report



## 1. Introduction

### 1.1 Background

Burchills Engineering Solutions was engaged by Byron Shire Council to prepare a proof of concept assessment for the preferred option of the proposed Mullum to Bruns Cycleway connecting the villages of Mullumbimby and Brunswick Heads.

Following investigations into a number of different route options, two potential outcomes were put to the public for feedback via a “Tell us what you think” survey as shown in Figure 1.1 and described below.



Figure 1.1 Cycleway Route Options

#### Option 1 - the north option

- Starts in Mullumbimby at corner of Prince Street and Argyle Street, heads north off-road and uses the rail corridor north over the Brunswick River to Synotts Lane and then east towards Smokey Valley Way, connecting to Brunswick Valley Way (at a spot between Orana Road and Rajah Road, Ocean Shores).
- Connects to the north of Brunswick Heads via existing shared path on Brunswick Valley Way that extends all the way to Tweed Street.

#### Option 2 - the south option

- Starts in Mullumbimby at corner of Prince Street and Argyle Street, heads out of town on-road via Mullumbimby Road (past the industrial estate and across Kings Creek) then takes a turn inland towards Hambly Road, through sugar cane fields directly to Henderson Lane, Saddle Road.



- Connects to the south of Brunswick Heads via Gulgan Road to Tweed Street.

Based on the preliminary investigations and the 803 survey responses, Council identified Option 1 as the preferred route for the cycleway. More detailed investigations are now required to determine whether the cycleway can be constructed along the preferred route.

Following more detailed desktop investigations and ground truthing of the preferred route where possible, some refinement of the alignment was made between Synotts Lane and Smokey Valley Way as shown in Figure 1.2.

There is no doubt this section of the preferred route is heavily constrained by private property, environmental overlays, and topography generally unsuitable for a cycleway. These constraints are explored in detail in this report.

Given these obvious constraints, two other potential options that make use of part of the disused railway corridor have been considered as part of this proof of concept investigation as shown in Figure 1.2.

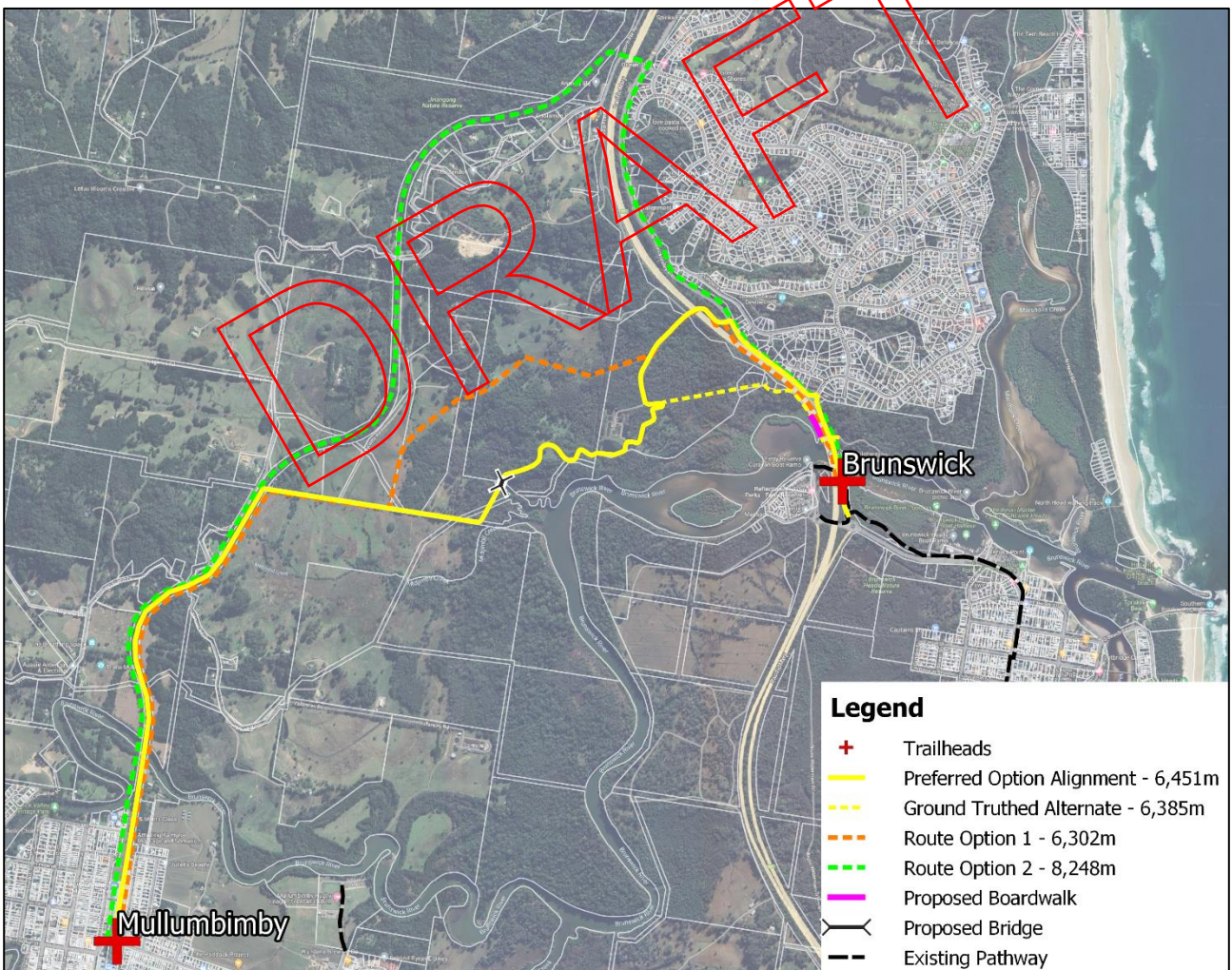


Figure 1.2 Cycleway Preferred Alignment and Possible Alternative Routes

## 1.2 Scope

The brief issued by Byron Shire Council sets out the requirements for this assessment and includes the following tasks:

- A condition assessment of the existing railway infrastructure based on a visual inspection;
- An assessment of engineering and environmental constraints;
- A review of other constraints including land tenure and native title;
- A review of required permits and approvals; and
- A high level budget civil construction cost estimate.

## 1.3 History of the Project

Council previously prepared concept design documentation for a proposed route following Mullumbimby and Gulgan Roads, however, significant constraints exist along this route. Burchills was engaged by Council in 2021 to identify any possible alternative routes exist and to complete a high level constraints assessment of all route options to assist Council with making a decision on the best route to take forward to design development. Two potential cycleway routes were identified in the resulting options assessment report which were taken through a community consultation process to determine the level of community support. The cycleway route that is the subject of this report had the greatest support from the local community.

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.

## 1.4 NSW Rail Trail Legislation

Legislation to make it easier to approve new active transport on disused railway lines in NSW has been passed by both houses of the NSW Parliament, with the NSW Legislative Assembly voting in favour on 10 August 2022.

The legislation enables the Minister for Transport to grant 30-year leases to local governments on disused government-owned NSW rail corridors for tourism purposes. Abandoned rail lines on ex-government corridors in NSW are currently regarded as non-operational but not closed. Previously, each rail trail proposal in NSW required a separate act of Parliament to "close" and re-purpose the corridor, resulting in political blockages to progress. This has now been addressed in the new legislation, with a much simpler process.

Rail trail proposals will still need to have demonstrated local community support and a positive business case.





## 2. Existing Railway Infrastructure

### 2.1 Brunswick River Bridge (Bridge 1)

The existing railway bridge over the Brunswick River is a composite structure consisting of a 26 m long, four (4) span timber structure on the southern bank and an 84 m long, four (4) span steel plate girder structure over the river channel. The bridge is supported by reinforced concrete abutments at both ends with the timber section supported by timber trestle piers on concrete footings or timber corbels sitting directly on concrete piers, and the steel section supported by concrete filled steel caisson piers.



**Figure 2.1 Brunswick River Railway Bridge, Mullumbimby (Bridge 1)**

A visual inspection of all major structural components was completed in June 2023 to gain an initial understanding of the structural condition. The level of inspection was similar to the requirements of a Level 2 inspection as specified in TMR Structures Inspection Manual 2016. Detail of the condition state of the main components has been recorded and is included in Appendix C.

The inspection found that the existing timber components are generally in very poor condition and would not be able to be made economically serviceable for the cycleway. One of the timber trestle piers was found to be missing one of the outside timber members with the central pier also almost completely rotted out. The two adjacent timber spans are being supported by the one remaining pier and the structure is at risk of imminent failure. The structure should be fenced off immediately with warning signs installed to prevent public access. The timber structure would need to be demolished and replaced with a new structure for use as part of the cycleway.



The existing concrete abutments and piers/footings were found to be in fair condition and are likely to be able to be reused as part of the substructure for the new bridge subject to detailed Level 3 condition inspections.

The main steel plate girders were found to be in fair condition with no visible signs of distress other than surface level corrosion particularly along the top and bottom flanges. The stiffeners along both faces of the girder web are in poor condition and need to be repaired or replaced. The transverse girders or cross beams were all in fair condition as were the beams that support the transoms. There is evidence of advanced corrosion on many of the nuts, bolts, and rivets which will also need to be replaced. The protective coating (gal or paint) has completely broken down on all components and needs to be restored.

The steel caisson piers do not have any visible defects however the bracing between each pair of piers is in very poor condition. The bottom member of the bracing is of steel reinforced concrete construction and severe corrosion and spalling has occurred due to contact with salt water.

## 2.2 Timber Rail Bridge (Bridge 2)

Another existing 28m long railway bridge of full timber construction is located on the railway corridor between the Brunswick River and Vallances Road. The visual inspection completed in March 2023 found that the existing timber components are generally in very poor condition. The existing concrete abutments and piers are also in poor condition with visible cracking and spalling.



Figure 2.2 Timber Railway Bridge (Bridge 2)

Our recommendation for Bridge 2 would be to allow for a full replacement with a new timber or steel structure with a minimum 50 year design life. An entirely new substructure is likely to be required including new reinforced concrete abutments.

### 2.3 Vallances Road Tunnel

A visual inspection of the Vallances Road Tunnel was completed in March 2023. The tunnel is assumed to be original construction from 1894. There is moderate cracking throughout the tunnel but mostly near the portals and on both headwalls where the concrete is exposed to weather. There is no evidence of spalling or more serious structural defects. There is graffiti covering much of the sunlit section of the tunnel near the portals which may be covering up more severe cracks.

It is anticipated that the tunnel will be able to be used as part of the proposed cycleway subject to a detailed Level 3 condition inspection and repair recommendations. The Burringabr Range and Hulls Road tunnels were recently repurposed for the Tweed section of the Northern Rivers Rail Trail with minimal restoration works required. It is understood that these tunnels are of the same vintage and construction with similar structural conditions.



Figure 2.3 Vallances Road Tunnel

### 3. Constraints Assessment

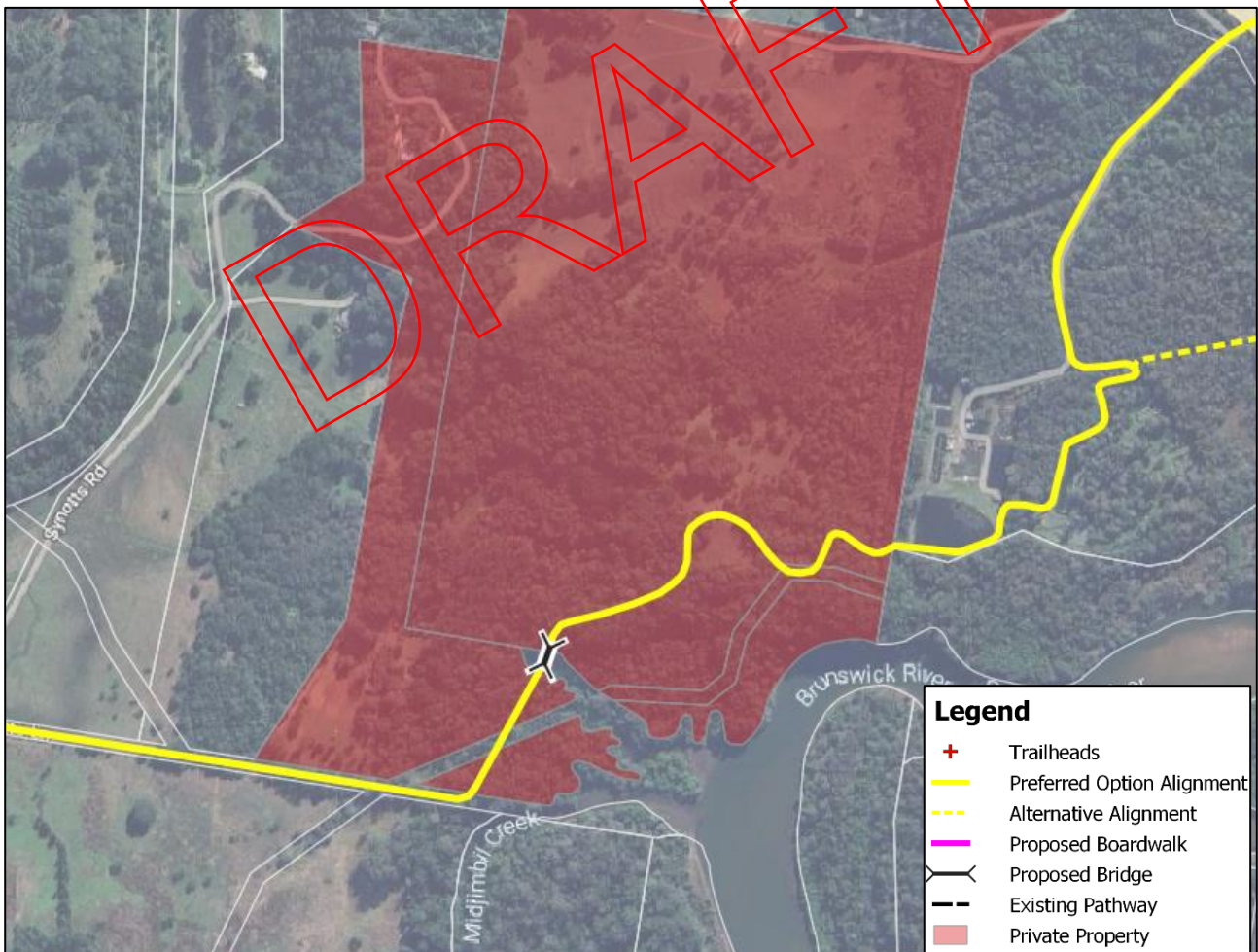
#### 3.1 Land Ownership and Tenure

It is understood that the existing railway corridor is owned by the State of New South Wales through Transport for New South Wales (TfNSW). The railway is considered non-operational but not closed, despite the fact that the no trains have operated on the line since 2004 and the railway is generally in a state of disrepair. Byron Shire Council would need to enter into a lease agreement with TfNSW for use of the corridor as a cycleway and a NSW State parliamentary regulation must be created to govern the terms of the lease. Refer to Section 1.4 for further details.

Development of the cycleway along the sections within Council road reserve (Synotts Lane and Smokey Valley Way to Brunswick Heads) is understood to be acceptable development.

The Ocean Shores Sewage Treatment Plant (STP) is also understood to be Council owned land. An agreement with the STP operator may be required to facilitate the cycleway through this parcel.

The section between the eastern end of Synotts Lane and the Ocean Shores STP is wholly encumbered by privately owned freehold lands as shown in Figure 3.1 below.



**Figure 3.1 Privately Held Land in Proximity of the Proposed Cycleway**



The real property descriptions for the affected lots are Lot 3 on DP710680, Lot 1 on DP1052705, and Lot 1 on DP1177790. It is understood that there are two separate land owners affected by the proposed cycleway alignment.

The total estimated land area required for the cycleway within these affected lots is 4,000 m<sup>2</sup> based on an approximate length of 800 m and average width of 5 m.

Based on correspondence Byron Shire Council received in March 2023, one of the affected landowners is not supportive of the proposal, based on the following issues:

- Disturbance of peaceful enjoyment of the natural environment within the property;
- Members of the public trespassing on private land;
- Destruction of sensitive environmental areas including riparian zones;
- Separation of the riparian land from the rest of the land parcel;
- Loss of value of the property;
- Loss of visual appeal of the riverside area.

Lack of support from the landowners is likely to be a key barrier to the proposal proceeding.

In their correspondence with Council, the landowner suggested an alternative route north via Coolamon Scenic Drive to Brunswick Valley Way. This route is discussed in further detail in Section 5.3.

### 3.2 Topography

The section along the existing railway corridor has a consistent and gentle gradient generally less than 5%. The longitudinal gradient of sections off the rail corridor are largely determined by the local topography however a longitudinal gradient greater than 10% is undesirable from an accessibility perspective.

There are two sections of the proposed cycleway route that exceed maximum desirable grades: a section near the Brunswick River (within the aforementioned private property), and a section along Smokey Valley Way, as shown in Figure 3.2.

The preferred alignment for the cycleway has been adjusted within Lot 1 on DP1052705 and Lot 1 on DP1177790 (private property) to achieve a maximum grade of 12.5%.

In order to avoid the steep grades near the intersection of Smokey Valley Way and Brunswick Valley Way, an alternative route was considered that connects under the Pacific Motorway bridge over the Brunswick River, as indicated by the broken yellow line in Figure 3.2. Whilst this alternative route achieves a better grade for the cycleway and a more attractive route, there are significant environmental constraints including the need for a substantial viaduct (boardwalk) over marine vegetation.

Longitudinal grades have been assessed based on Aerial Laser Survey data and shall be confirmed with detailed survey and detailed design.



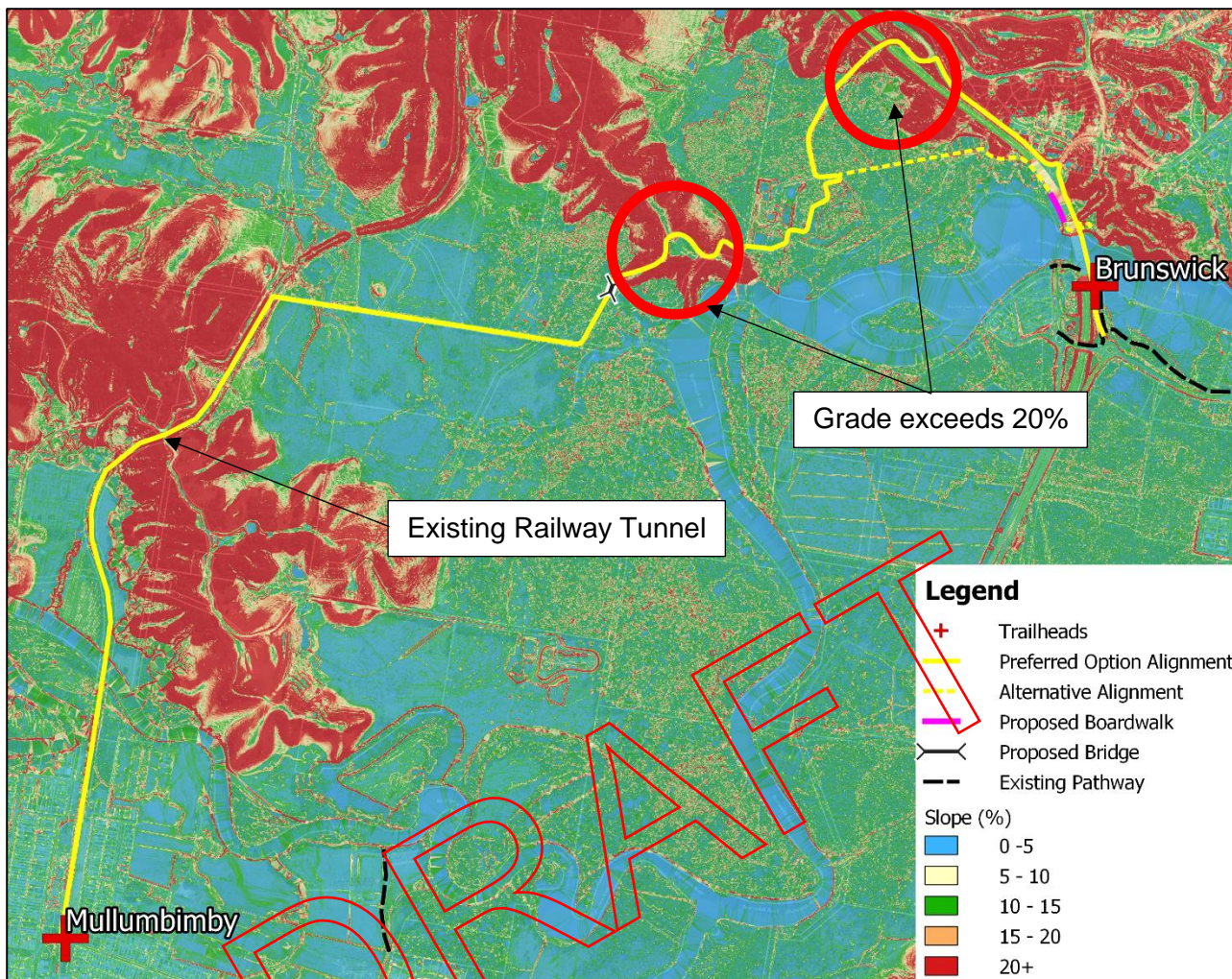


Figure 3.2 Topography in Proximity to the Proposed Cycleway

### 3.3 Environmental Constraints

#### 3.3.1 Koala Habitat

The Koala Planning Area of the *Byron Coast Comprehensive Koala Plan of Management 2016* (CKPoM) is mapped within areas of the route east of Coolamon Scenic Drive. The proposed alignment bisects approximately 1.03 km of mapped Koala Habitat (Figure 3.3) and is wholly outside of a Koala Management Precinct. It is likely that the Koala Habitat will be impacted by the works, particularly in areas that have not been previously cleared for road / transport infrastructure, and in areas where earthworks and built structures are required (e.g. around the proposed bridge). A Koala Habitat Assessment Report should be undertaken as part of the next design phase in accordance with the CKPoM to identify the on-ground extent of koala habitat and assess koala activity in the area in order to determine impacts on koala habitat. If this assessment finds that the works will significantly impact on koala habitat, a Biodiversity Conservation Management Plan (BCMP) should be prepared to provide advice on how to avoid and mitigate impacts.



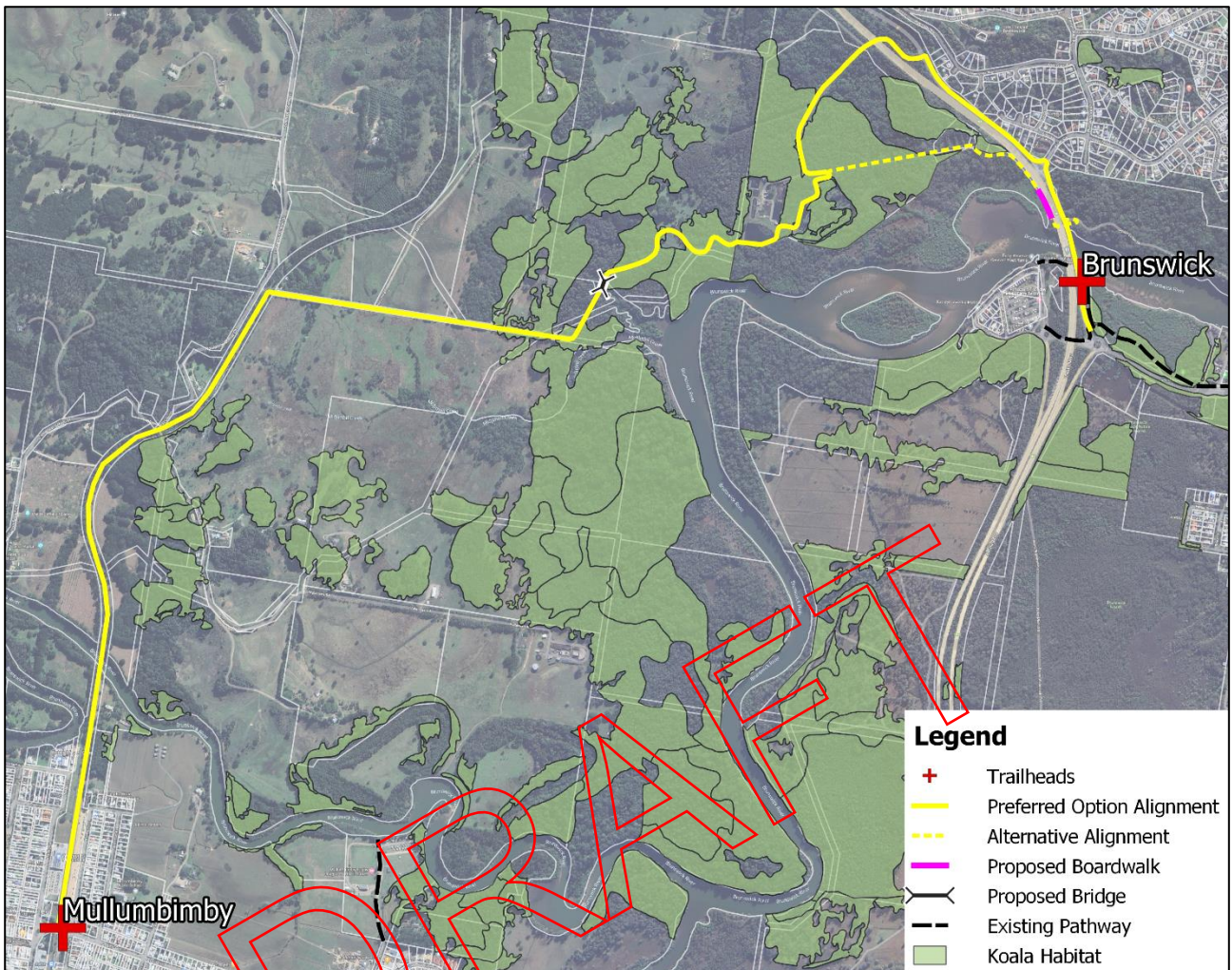


Figure 3.3 Koala Habitat Mapping

### 3.3.2 High Environmental Value Vegetation

Areas of High Environmental Value (HEV) are mapped under the *Byron Shire Council Development Control Plan 2014* throughout the proposed route alignment (Figure 3.3). HEV areas are vegetation that comprise Threatened Ecological Communities (TEC), over-cleared vegetation types and landscapes, old growth, wetlands, bushland on slopes greater than 18% and pre-existing protected habitat (e.g. protected areas by way of covenants or conservation agreements). The proposed works will likely require vegetation clearing in areas mapped as HEV, particularly around the proposed bridge. An Ecological Assessment and a BCMP should be prepared to provide advice on how to avoid and mitigate impacts.

There is a risk that this may potentially prevent the project from proceeding, if approval is not granted to undertake works within the HEV areas.

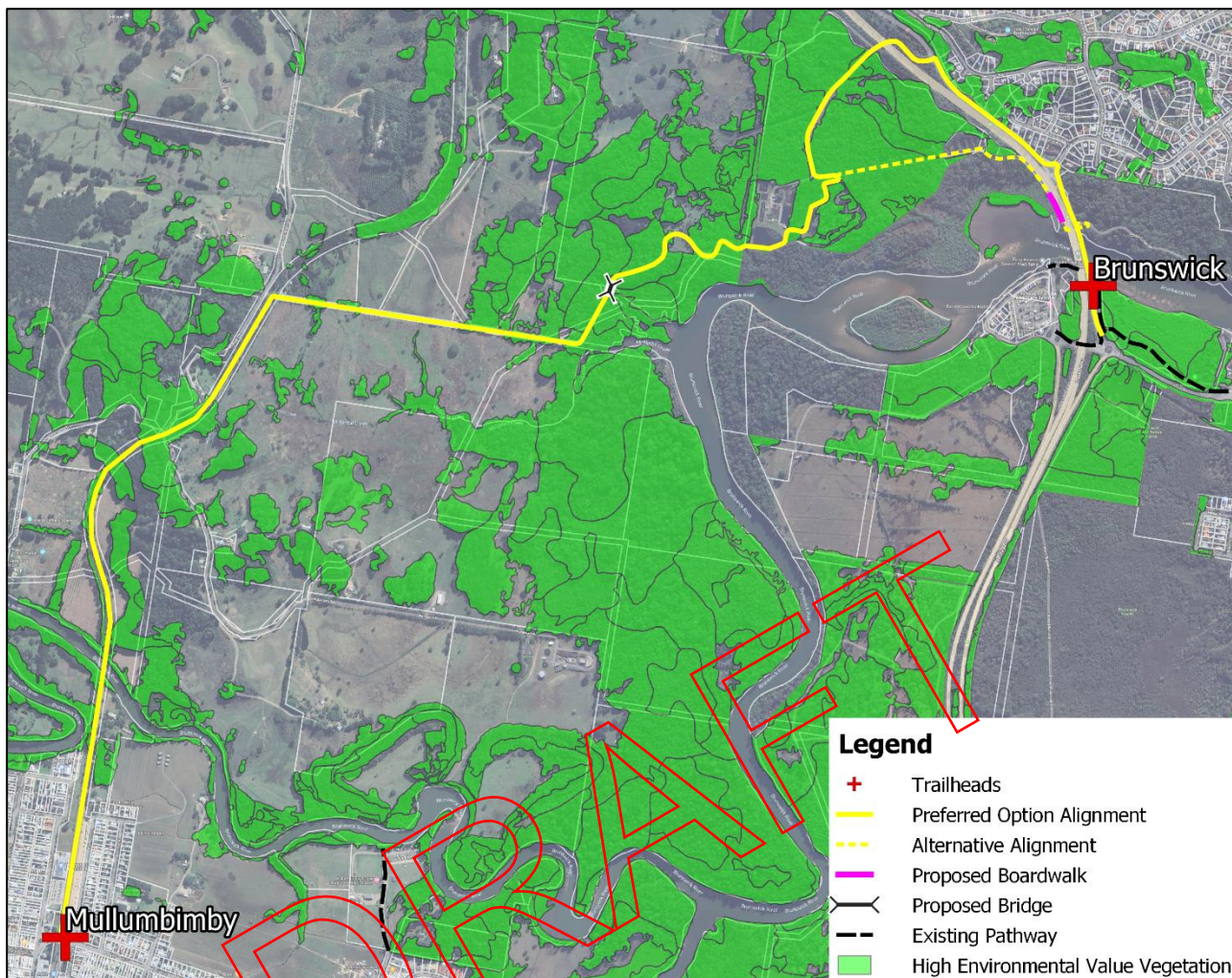


Figure 3.4 High Environmental Value Vegetation Mapping

### 3.3.3 SEPP Resilience and Hazards 2021

The *State Environmental Planning Policy (SEPP) Resilience and Hazards 2021* mapping indicates that the proposed route crosses mapped Coastal Wetlands in areas proximate to the Brunswick River, including in the location of the proposed bridge (Figure 3.5). The proposed works are likely to require the clearing of native vegetation, harm of marine vegetation and earthworks within the mapped Coastal Wetland and therefore it is anticipated that the works (and particularly the proposed bridge) will require a development consent, as per Section 2.7 of SEPP Resilience and Hazards 2021.

It is also anticipated that marine vegetation, including mangroves, is present within the proposed bridge location and impacts on this vegetation may require a permit under the *NSW Fisheries Management Act 1994*. This is discussed further in Section 3.3.4.



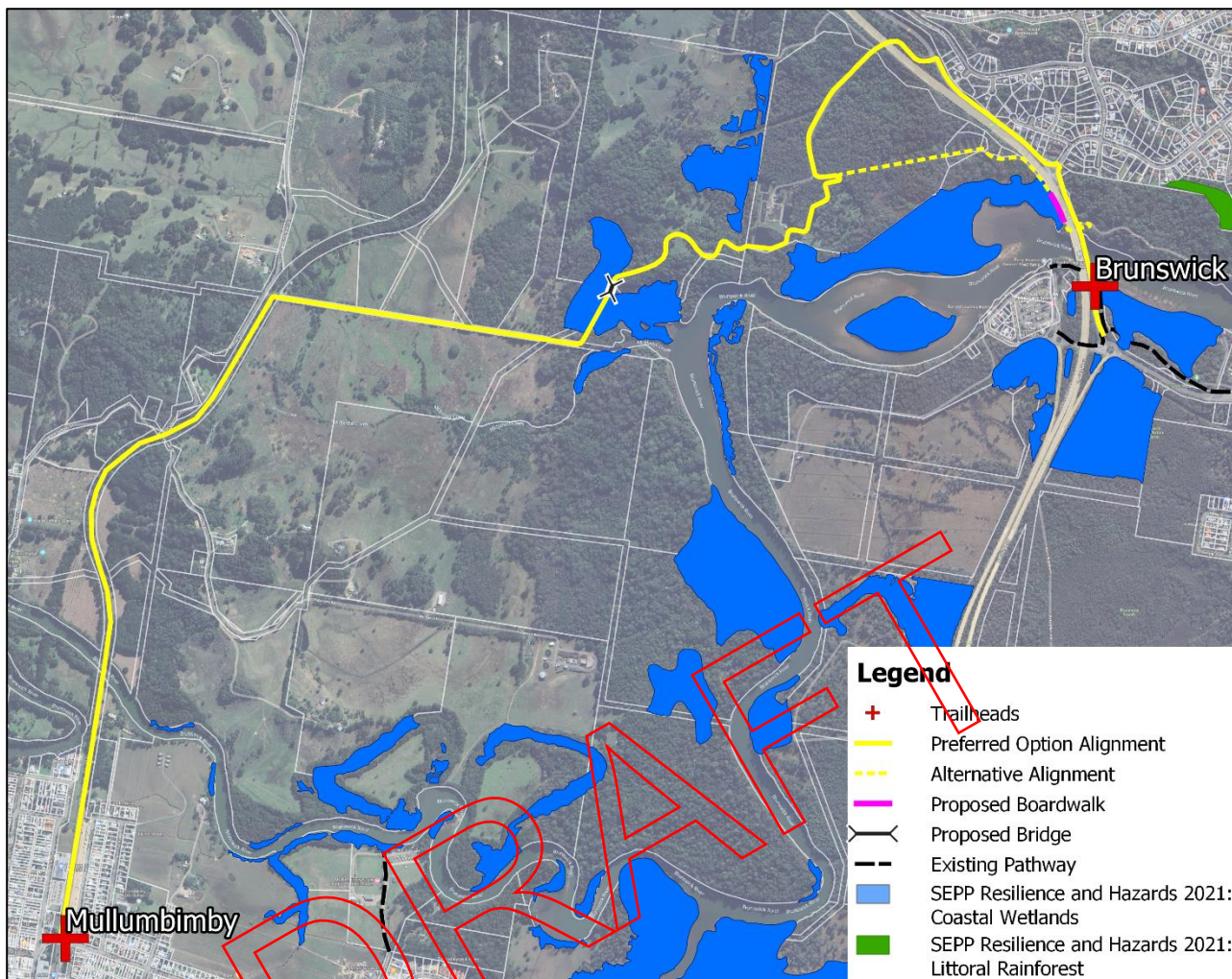


Figure 3.5 Coastal Wetlands Mapping

### 3.3.4 Marine Vegetation

Marine Vegetation communities (particularly mangroves) are mapped in the areas of the proposed bridge and the proposed mangrove boardwalk on the alternative route alignment. Under Section 7 of the NSW *Fisheries Management Act 1994*, impacts on marine vegetation require a permit from the NSW Department of Primary Industries (DPI). It is noted that these marine vegetation communities are also within SEPP 14 Coastal Wetland areas which may further complicate assessment and permit process.

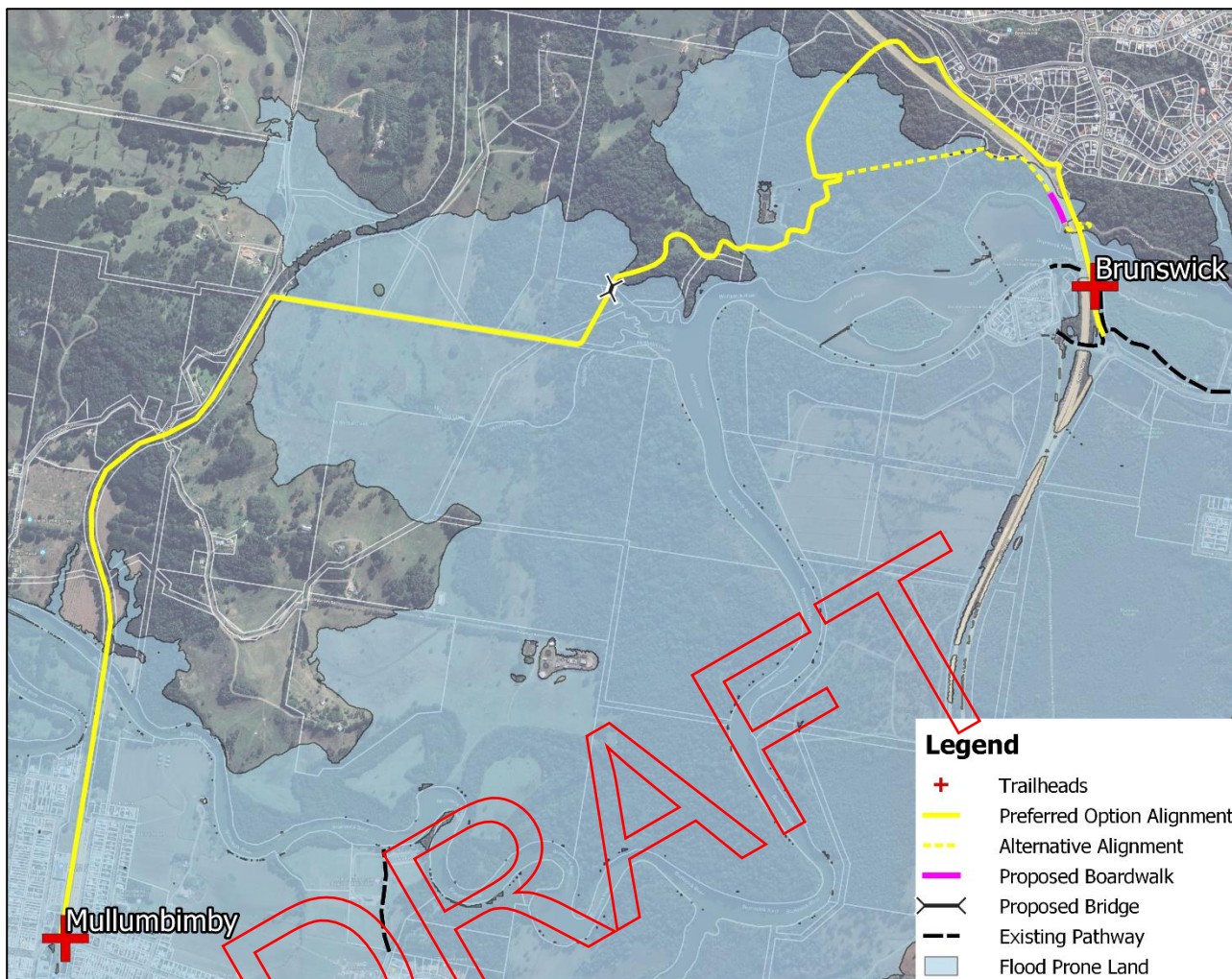
It is highly recommended that advice is sought from DPI on this matter.

## 3.4 Flooding

Much of the proposed cycleway alignment lies within flood prone land, as shown in Figure 3.6 below.

Where any part of the cycleway does not achieve the minimum desired flood immunity, the flood hazards and risks will be mitigated through the installation of flood warning signs and flood depth indicators to warn trail users of the potential hazards.





**Figure 3.6 Flood Prone Land in Proximity to Proposed Cycleway**

There is also a desire to ensure the cycleway does not cause any regional flood impacts in all regional events up to the 1% AEP. Where any significant changes to ground level are proposed, or a new structure is to be constructed, it is possible that a regional flood hydraulic impact assessment will be required.

### 3.5 Cultural Heritage and Native Title

A Search of the Aboriginal Heritage Information Management System (AHIMS) was completed for the proposed route. This search identified one (1) Aboriginal Heritage item (04-5-0168) adjacent to the alignment of the proposed route in its northeast extent, on the opposite side of the M1 (Figure 3.7). Consultation should be undertaken with the Tweed Byron Local Aboriginal Council (LALC) to confirm the exact location of this item, as well as any other cultural heritage items along the route alignment.

The proposed alignment is not known to be affected by native title.

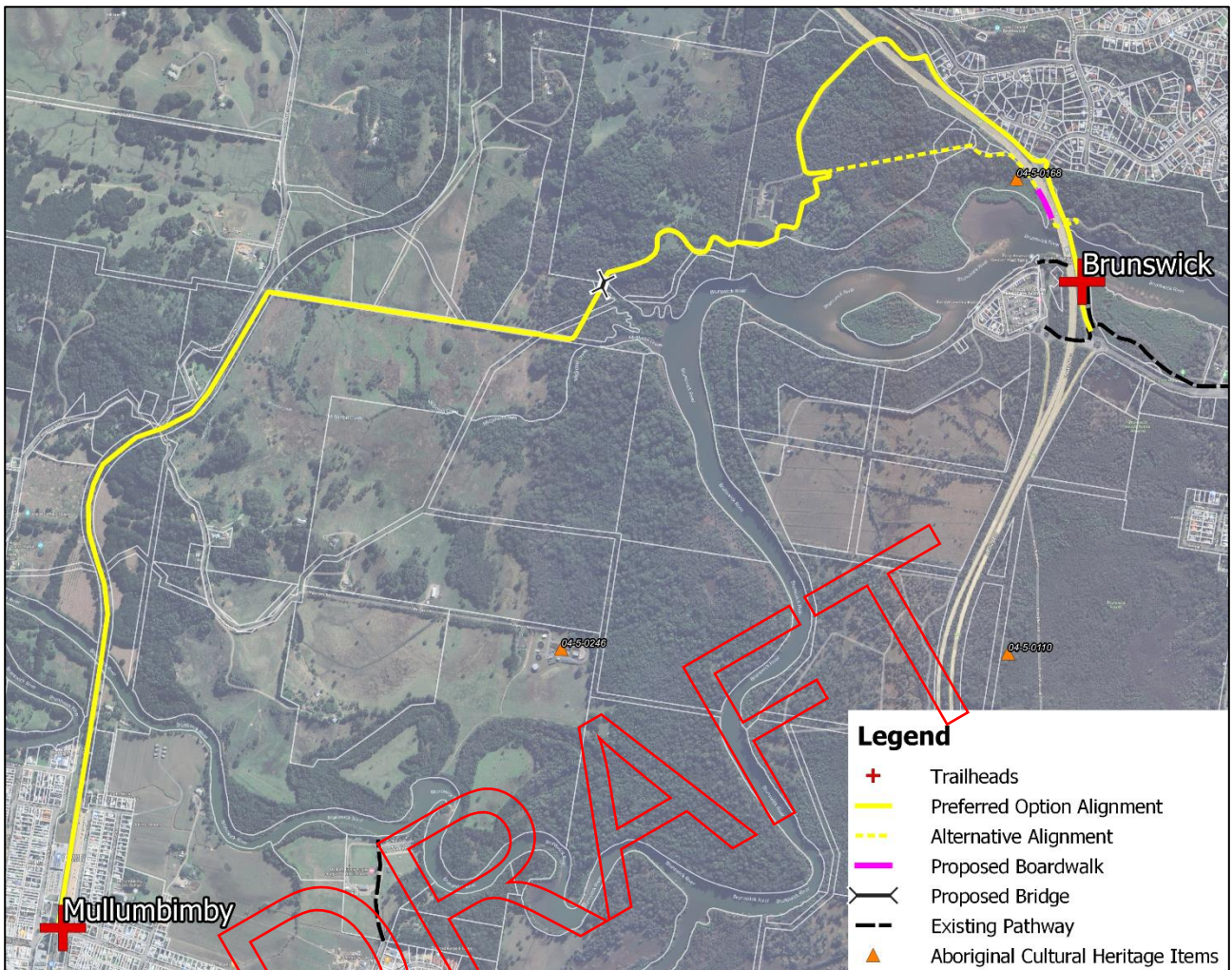


Figure 3.7 Aboriginal Heritage Information Management System (AHIMS) Search Results

### 3.6 Local Environment Plan Heritage

The Heritage mapping under the *Byron Shire Council Local Environment Plan 2014* identifies a number of Heritage places present along the route alignment (Figure 3.8). Of particular interest to the proposed works is the Railway Tunnel proximate to Coolamon Scenic Drive / Vallances Road intersection, and the Wharf Remains proximate to the proposed bridge. It is also noted that the Mullumbimby Railway Station is within the General Conservation Area under this mapping. Heritage assessments should be undertaken during the next design stage to determine how these heritage areas can be retained, protected and, where appropriate, promoted by the proposed works.

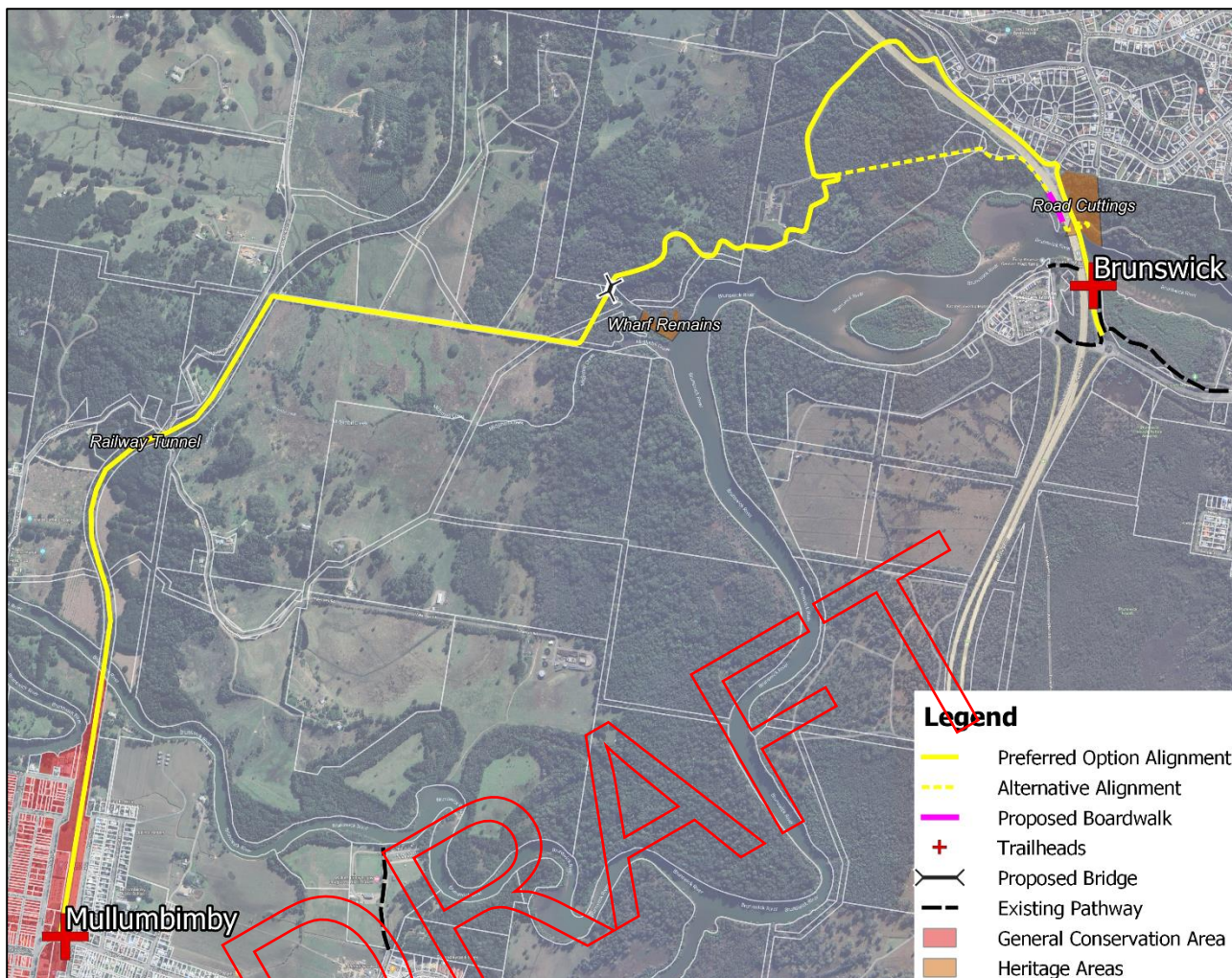


Figure 3.8 Byron Shire Council Local Environment Plan 2014 Heritage Mapping

### 3.7 Required Permits and Approvals

Key permits and approvals likely to be required for the proposed rail trail are outlined below.

- The rail corridor must be closed by parliamentary regulation and a lease must be granted by TfNSW before it can be used for the cycleway.
- Coastal Management SEPP will trigger the need for environmental approvals for the eastern section of the corridor – proposed bridge crossing falls within a designated Coastal Wetland
- Impacts on marine vegetation (including mangroves and saltmarsh) will require approval under Part 7 of the *Fisheries Management Act 1994*.
- TfNSW coordination for any works within Brunswick Valley Way (classified regional road, i.e. intermediate between state and local road)

## 4. Design Considerations

### 4.1 Alignment and Trailheads

The proposed alignment follows the disused rail corridor from Argyle Street, Mullumbimby to Synotts Lane, where it leaves the rail corridor and continues east along the Synotts Lane road reserve. At the eastern end of Synotts Lane, the proposed alignment heads north east through private properties towards the Council owned Ocean Shores Sewage Treatment Plant then along Smokey Valley Way to Brunswick Valley Way where it connects to an existing off road cycleway.

Trailhead facilities could be developed at the site of the historic Mullumbimby Railway Station in Mullumbimby. A trailhead should also be developed in Brunswick Heads however no specific location has been identified as part of this assessment.

### 4.2 Surfacing

An asphalt or concrete surface is proposed for the length of the cycleway as shown on the alignment drawings included in Appendix A.

### 4.3 Road Crossings

There are several road crossings along the route which will feature appropriate treatment and signage providing a safe crossing point for users. Construction will ensure the visibility for both cyclists and motorists is unobstructed. Generally, the cycleway should interface with the existing roadway with bollards and suitable signage identifying to both path and road users of the road crossing.

The options assessment report (BE210132-RP-SIR-02) identifies that the Smokey Valley Way / Brunswick Valley Way intersection has limited sight lines; however, it has also been noted that cyclists will be travelling slowly due to the uphill climb at this section of the trail. As Brunswick Valley Way is not a low speed environment, cyclists should stop and give way to vehicular traffic at this location. Signage and appropriate treatments should be included in the detailed design to make traffic priorities clear and mitigate safety risks.

### 4.4 Drainage

Longitudinal drainage is generally not required where the trail is constructed on the original railway embankment. It is generally limited to the areas where the railway is in cut.

Detailed survey of the ground surface is required before further design and confirmation of the drainage measures required to ensure that drainage is free flowing.

### 4.5 Geotechnical

Under the *Soil Landscapes of the Lismore-Ballina 1:100,000 map sheet*, a variety of aeolian, alluvial, erosion and estuarine soils are mapped along the rail trail alignment (Table 4.1, Figure 4.1). Geotechnical advice should be sought during detailed design to confirm constraints and opportunities associated with these soil types.

These soils generally have potential acid sulfate soil risk (refer to Section 3.8.1).



**Table 4.1 Classifications per the Soil Landscapes of the Lismore-Ballina 1:100,000 Map Sheet**

Class	Code	Name	Description
Aeolian	ty	Tyagarah	Sediment basins of mixed estuarine and aeolian origina forming level to gently undulating plains. Relief is <3m, elevation <5m and slopes <1%. Extensively cleared open and closed forest. Very strongly acid, permeable, often waterlogged soils of low fertility and low water-holding capacity with localized salinity. Permanently high watertables and moderate wind erosion hazard.
Alluvial	mu	Mullumbimby	Level to gently undulating alluvial plains and terraces of the Brunswick River and its tributaries. Predominantly metamorphic and rhyolitic derived sediments. Extensively cleared closed-forest. Flood hazard, localized seasonal waterlogging and moderately erodible soil materials with high shrink-swell.
Erosional	bi	Billinudgel	Low rolling hills on metamorphics of the Neranleigh-Fernvale Group. Relief is 10-100m, slopes 10-20% and locally >33%. Slopes are generally moderately long (100-300m). Ridges and crests are narrow (100-150m). Partly cleared open eucalypt forest. Littoral closed-forest at Brunswick and Broken Heads. Hardsetting, shallow, stony and erodible soils of low fertility. Steep slopes and localized mass movement.
	bu	Burringbar	High rolling hills on metamorphics of the Neranleigh-Fernvale group. Relief 100-200m, slopes 15->33%. Slopes are generally long (400-750m) and waning or simple. Ridges and crests are narrow to moderately broad (<100-200m). Streams are erosional. Open-forest with partial to extensive clearing. Very steep slopes, mass movement hazard, erodible soils.
Estuarine	bp	Burns Point	Extremely low, level tidal flats (mudflats, mangroves and saltmarsh) on Quaternary marine and fluvial sediments. Relief <1%, slopes <2%. Regularly inundated by tidal waterways. Mangrove open scrub, salt-marsh, herbland and sedgeland and low closed Casuarina forest. Regular tidal flooding and waterlogging, high acid sulfate potential, saline soils, very low soil fertility, low wet-bearing strength soils.
	mua	Mullumbimby	Mixed alluvial and estuarine soil materials. Level to gently undulating alluvial plains and terraces of the Brunswick River and its tributaries. Predominantly metamorphic and rhyolitic derived sediments. Extensively cleared closed-forest. Flood hazard, localized seasonal waterlogging and moderately erodible soil materials with high shrink-swell.

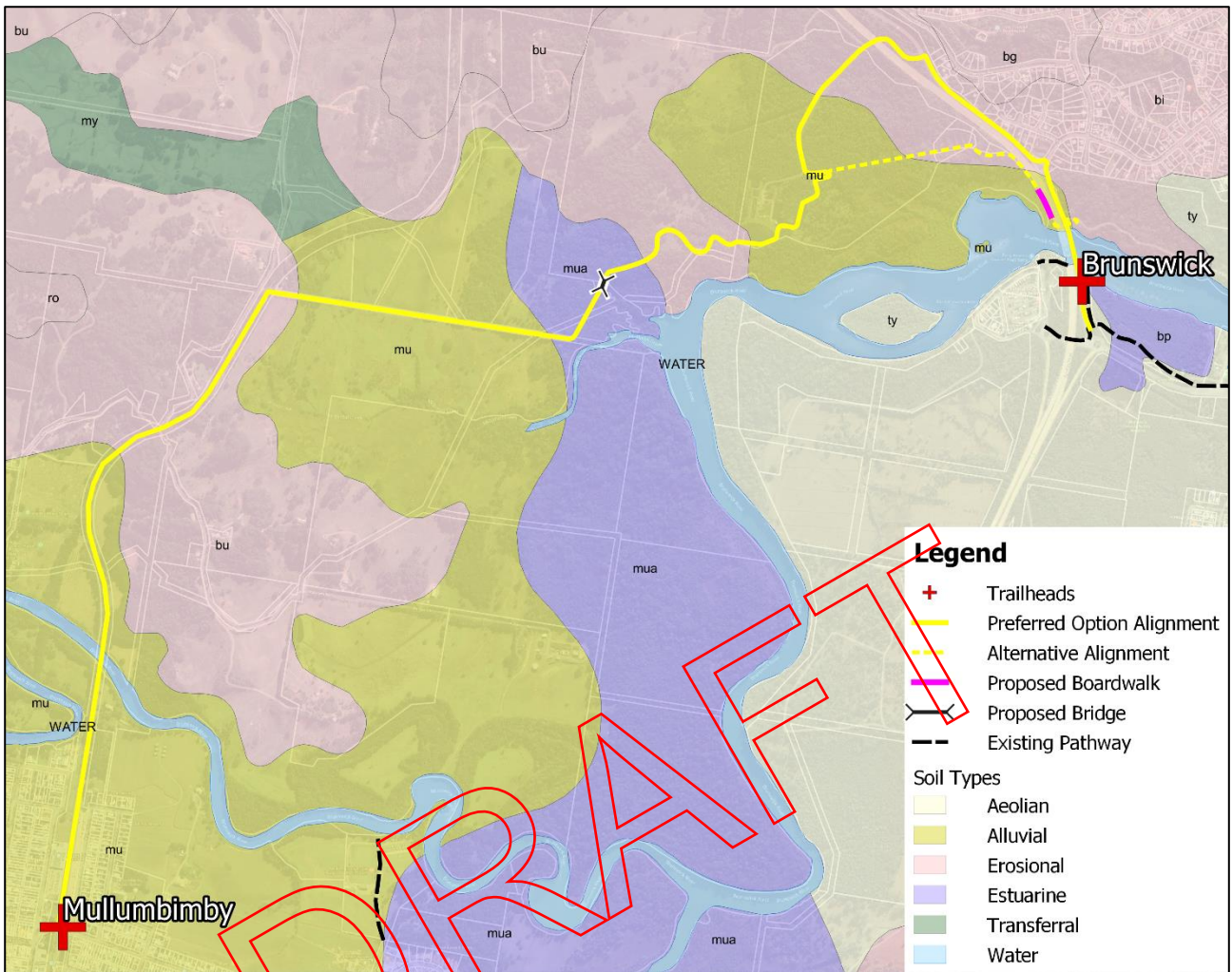


Figure 4.1 Soil Landscapes of the Lismore-Ballina 1:100,000 Mapping

#### 4.5.1 Acid Sulfate Soils

The *Byron Shire Local Environment Plan 2014* Acid Sulfate Soils overlay indicates that potential Class 1, Class 2, Class 3 and Class 4 acid sulfate soils are mapped throughout the alignment (Figure 4.2). Where construction of the rail trail has the potential to disturb acid sulfate soils, suitable management measures will have to be employed.

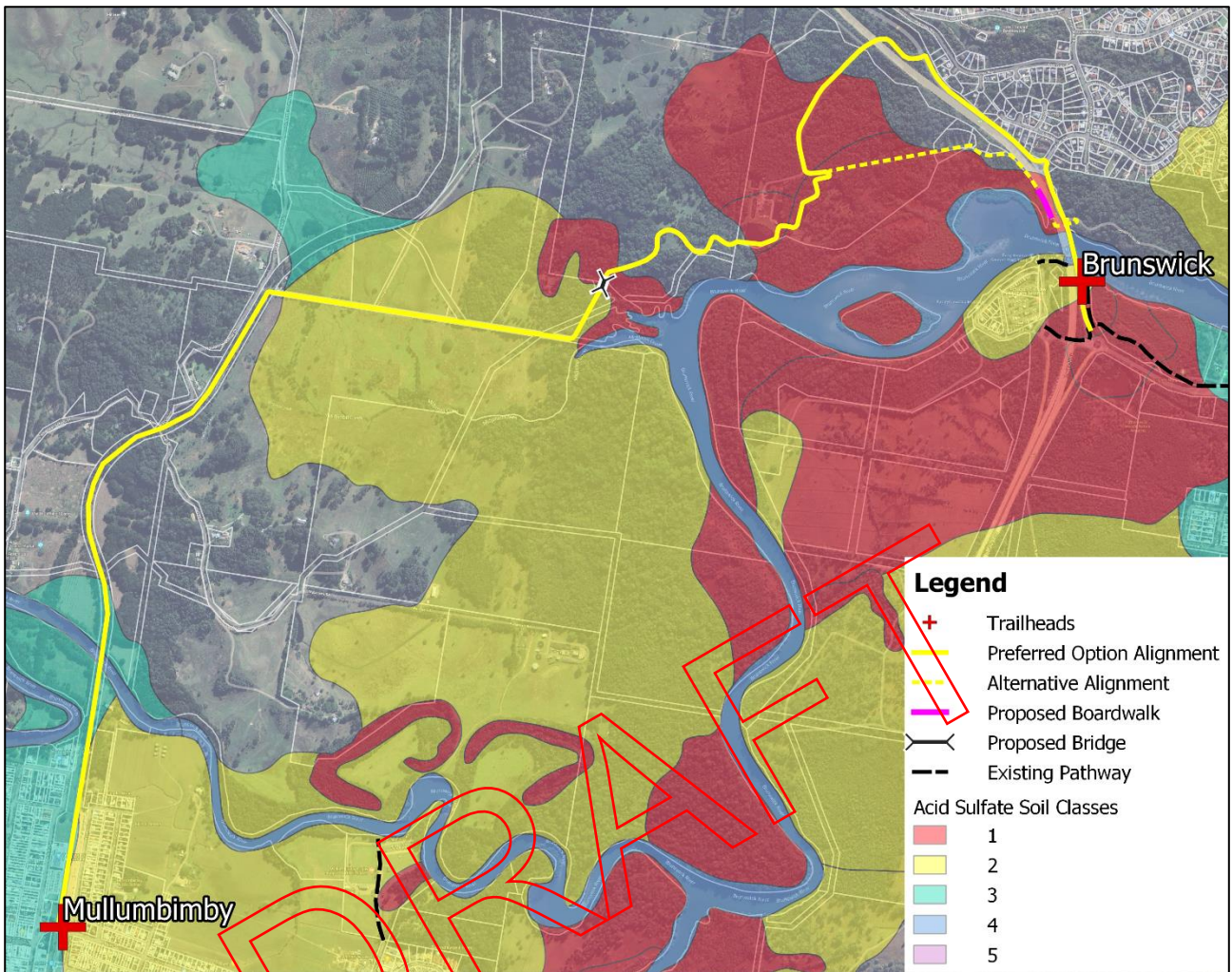


Figure 4.2 Byron Shire Local Environment Plan 2014 Acid Sulfate Soils Mapping

#### 4.6 Public Utility Plant

A review of existing Public Utility Plant (PUP) has been completed along the proposed route using Before You Dig Australia (BYDA) data to identify any potential conflicts between existing PUP and the proposed cycleway:

The following table details PUP which has been identified in the vicinity of the route and potential conflicts with the concept design. It is noted that no surface design has been undertaken to determine where cut/fill will occur. For the telecommunications conduits that cross the trail, it has been assumed that the earthworks will maintain suitable cover over the existing asset. All PUP conflicts will be confirmed during the detailed design phase.

Table 4.2 Potential PUP Conflicts

Asset Description	Asset Owner	Location	Potential for Conflict	Source of Data	Proposed Action
High voltage electrical cables	APA Group	Along existing rail corridor	Low	DBYD	No action, review at detailed design





Asset Description	Asset Owner	Location	Potential for Conflict	Source of Data	Proposed Action
Overhead electrical cables / power poles	Essential Energy	At the Synotts Lane / rail corridor intersection; at various locations along the rail corridor	Low	DBYD	No action, review at detailed design
Telecommunications	Telstra	Along and underneath Synotts Lane	Low	DBYD	No action, review at detailed design
Wastewater main	Byron Shire	Crossing rail corridor between Prince St and Station St, Mullumbimby	Low	DBYD	No action, review at detailed design
Stormwater pit	Byron Shire	Near Poinciana Street within Mullumbimby Station land parcel	Low	DBYD	No action, review at detailed design
Water main (recycled)	Byron Shire	Alongside and crossing Brunswick River near the rail crossing bridge	Low	DBYD	No action, review at detailed design

Further investigations will need to be undertaken as part of the detailed design stage to determine the impacts on the existing services.

#### 4.7 Indicative Cost Estimates

A high-level indicative civil construction cost estimate has been completed for the Mullum to Bruns Cycleway based on our desktop and site investigations, our proposed alignment plans, and from indicative and actual costs on other comparable trails completed by Burchills. The alignment plans completed as part of this proof-of-concept report are included in Appendix A.

A summary of the estimated civil construction costs and associated development costs is presented in Table 4.3, with the full breakdown of quantities and rates provided in Appendix B. The recommended budget for the project at this time is \$11.5m.

**Table 4.3 Indicative Project Cost Estimate**

Item	Description	Indicative Cost
1	Preliminaries	\$380,000
2	Bulk earthworks	\$727,000
3	Civil works (including bridges)	\$4,897,000
4	Other items (detailed design, project management, embellishments, etc.)	\$2,835,000
	<b>Sub Total</b>	<b>\$8,839,000</b>
6	Contingency (30%)	\$2,652,000
	<b>Total Indicative Project Budget</b>	<b>\$11,491,000</b>



Note the above costs are based on preliminary investigations completed to date and are subject to significant 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.

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## 5. Alternative Cycleway Routes

### 5.1 Routes Considered

Given the difficulty of overcoming the land ownership and environmental constraints affecting the proposed route between Synotts Lane and the Ocean Shores STP, two (2) alternative solutions for the northern section of the cycleway alignment have been considered:

- Option 1 – a route following the proposed sewage transfer pipeline from Synotts Lane to Smokey Valley Way; and
- Option 2 – a route following the railway line to Ocean Shores near the Coolamon Scenic Drive M1 underpass continuing on road to Brunswick Heads via Brunswick Valley Way.

The alternative routes considered are shown in Figure 5.1 below.

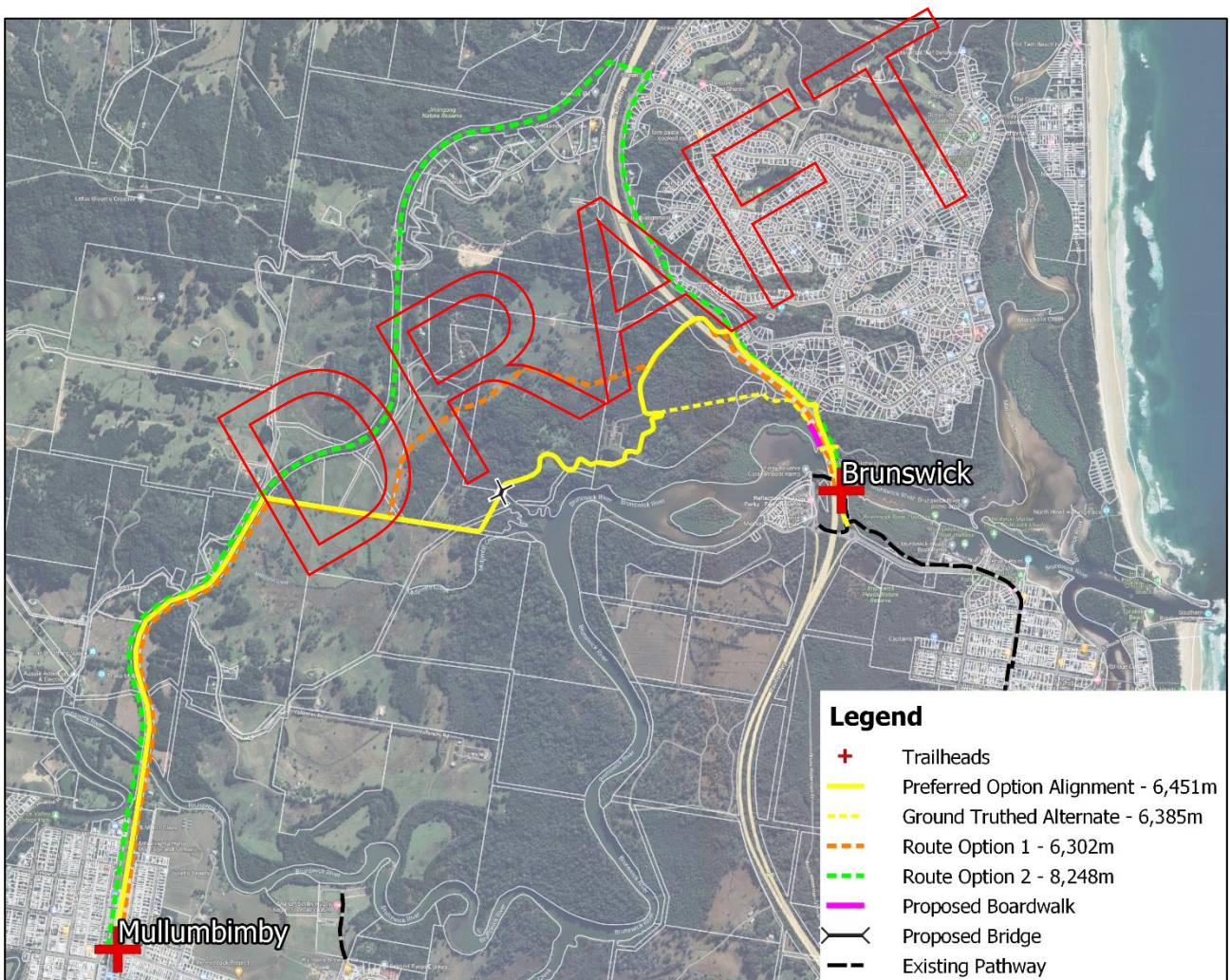


Figure 5.1 Alternate Alignments

## 5.2 Option 1 – Sewage Transfer Pipeline

This option follows the proposed Ocean Shores – Brunswick Valley sewage transfer pipeline from Synotts Lane to Smokey Valley Way. A summary of the pros and cons of this options is provided below.

Pros	Cons
<ul style="list-style-type: none"> <li>• Efficiency of land use as Council will need to acquire the land for the sewer easement.</li> <li>• Efficiencies in design and construction as the Cycleway design and construction could be combined with the sewer.</li> <li>• The route is the most similar to the Preferred Option, as it only diverts in the middle where the private property is located.</li> <li>• The route has fewer environmental constraints compared to the Preferred Option.</li> </ul>	<ul style="list-style-type: none"> <li>• The route still traverses private properties including the same properties affected by the Preferred Option.</li> <li>• The route affects more private properties than the Preferred Option.</li> <li>• Significant earthworks would be required to achieve a suitable longitudinal grade.</li> <li>• It is unlikely the timing of the sewage transfer pipeline and cycleway will coincide.</li> </ul>

It is unclear how the route for the proposed sewage transfer pipeline was selected as the route is still significantly constrained by privately owned lands (the same lands), environmental overlays, and difficult topography. The feasibility of Option 1 is entirely dependent on the proposed pipeline proceeding so there is little value in investigating this option further until that proposal has been approved. Our view is that there is little value in proceeding with a cycleway along this route.

## 5.3 Option 2 – Rail Corridor to Ocean Shores

This option follows the rail corridor farther north before connecting with Orana Road / Brunswick Valley Way at the Pacific Motorway underpass. A summary of the pros and cons of this options is provided below.

Pros	Cons
<ul style="list-style-type: none"> <li>• Completely avoids any private property.</li> <li>• Provides connectivity to the population at Ocean Shores as well as Brunswick Heads.</li> <li>• Advances the Northern Rivers Rail Trail within Byron Shire and the associated benefits.</li> <li>• Connects to existing on road cycling facilities on Brunswick Valley Way.</li> <li>• Relatively unconstrained route with respect to environmental overlays.</li> <li>• A relatively attractive route between Mullumbimby and Ocean Shores including the 390 m long tunnel under Coolamon Scenic Drive.</li> <li>• Likely to be significantly cheaper to construct than the Preferred Option.</li> <li>• Could be developed relatively quickly (say within 2 years) subject to approval and design.</li> </ul>	<ul style="list-style-type: none"> <li>• The route is approximately 1.3 km longer than the Preferred Option for travel between Mullumbimby and Brunswick Heads (increased travel time).</li> <li>• The on road section on Brunswick Valley Way south of Orana Road has a grade of 7-10% for a distance of approximately 800 m which is beyond the ability of some cyclists.</li> </ul>

Option 2 is a longer and more physically challenging route for cyclists however it presents many other potential benefits that should be explored further. Development of the Northern Rivers Rail



Trail from Mullumbimby to the Tweed Shire border at Wooyung Road would essentially complete this route with only a short section of works needed to connect the rail trail to Brunswick Valley Way.

Given the possibility of the rail trail proposal proceeding in the short to medium term, it is worth investigating whether this route could meet the needs of the local community in Mullumbimby and Brunswick Heads, despite the challenging terrain. This route is unlikely to meet the needs of all user groups but may be suited to some commuters and more advanced recreational cyclists.

The need for an additional, more direct, and more accessible route between Mullumbimby and Brunswick Heads via the preferred route could be considered after the rail trail and the connection to Brunswick Valley Way have been constructed.

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## 6. Summary and Conclusions

The development of a cycleway between Mullumbimby and Brunswick Heads along the preferred route is technically feasible subject to available funding which is unknown at this stage. The most difficult issues to overcome are the land ownership and environmental constraints on the section between Synotts Lane and the Ocean Shores STP. Whilst these issues are not insurmountable, they are likely to cause significant delays to the progress of the project.

This proof-of-concept investigation sought to answer several key questions on the feasibility of the project as set out in Table 6.1.

**Table 6.1 Feasibility Assessment**

Key Question	Answer
Is there a viable cycleway route?	Yes. The route is viable from a technical perspective but is subject to environmental impact studies and agreements with affected landowners.
Are there any environmental risks, i.e. protected land, flora and fauna that might become a barrier to the project?	The route passes through HEV areas and SEPP containing high value and protected vegetation (including mangroves). Disturbance of these areas is subject to a detailed ecological assessment and BCMP as well as being subject to Council approval. There is a risk that these protected areas may prevent the project from proceeding.
Will the cycleway provide a quality user experience (terrain/landscape/history)?	Yes. The trail provides an attractive off road route following the disused railway corridor, historic railway bridges and tunnels, and scenic bushland and marine environments. The longitudinal profile of the route exceeds maximum desired grades in two locations however this topography would be encountered on any viable route between Mullumbimby and Brunswick Heads.
Will the cycleway create any unmanageable or unmitigated impacts on landholder's peaceful enjoyment of their property?	To be confirmed. The proposed cycleway route does not pass within close proximity to any dwellings except at some locations along the railway corridor near Mullumbimby. Any adjacent landholders would be consulted as part of the design development process to address any potential impacts.
Is the local government and key stakeholders supportive of the project?	Yes. The project has the support of Byron Shire Council, the NSW State Government.
Is there a supportive community?	The community generally support the preferred option, as per the community consultation undertaken by Byron Shire Council. One of the affected landholders has expressed their objection to the project.
Would the cycleway be value for money?	Yes, with some limitations. The cost per km is relatively high for comparable cycleways / shared paths in SEQ and NNSW however it was found to be cheaper than the original concept design route.
Are there alternative routes that that provide a similar outcome that should be explored further?	Yes. Alternative Route Option 2 should be considered in more detail since this route will potentially be constructed in the short to medium term. If this routes meets the needs of the community then there may no longer be a need for a dedicated cycleway between Mullumbimby and Brunswick Heads.



## Appendix A – Cycleway Alignment Drawings

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## Appendix B – Preliminary Construction Cost Estimate

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## Appendix C – Brunswick River Bridge Condition Report

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