

# Twin Coast Discovery Route and Northland Journeys

## Northland Integrated Cycling Implementation Plan

### Preliminary Design and Delivery

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WSP Opus

5 June 2019

VERSION Final



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## Contents

1	Executive Summary .....	1
2	Introduction.....	2
3	Overall Northland Cycling Plan.....	4
3.1	Overall Route and Project.....	4
3.2	The Network Effect.....	6
3.3	Networked assumptions.....	7
3.4	Networked effects.....	7
4	Design Philosophy Statement .....	9
4.1	Introduction.....	9
4.2	An Evolving Narrative .....	9
5	Trail Descriptions.....	11
5.1	Waoku Old Coach Road - (Hokianga Connection).....	13
5.2	Kaihu Valley Rail Trail.....	16
5.3	Langs Beach to Ruakaka.....	18
5.4	Opuā to Paihia.....	20
5.5	Waitangi to Kerikeri.....	24
6	Overall Programme .....	26
6.1	Next Steps for Councils to Progress Priority Projects.....	27
6.2	Heartland Rides.....	28
7	Overall Project Risk Register.....	29
8	Alignment to Provincial Growth Fund.....	31
	Supporting information: Preliminary Design Drawings.....	32

### List of Figures

Figure 1: Overall Map of Routes .....	5
Figure 2: National and Regional Cycleway Benefits.....	8

### List of Tables

Table 1: Routes Prioritised for First Stage of Delivery.....	3
Table 2: Project Timeline.....	26
Table 3: Provincial Growth Fund Outcomes, Objectives and Criteria.....	31

### Document History and Status

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### Revision Details

Revision	Details
1	28/05/2019 Revised BCRs and Programming. Additional background information from the NICIP – Problem Statements & Evaluation Framework (January 2019).

## 1 Executive Summary

The Northland Walking and Cycling Strategy was developed in 2017 by Northland's various councils and Northland Inc. Its aim is to contribute to the region's economy through improved infrastructure that would attract visitor's region wide and all year round. The strategy prioritised 13 routes as meeting the vision for *'Northland as one of the world's best coastal walking and cycling destinations where the journeys and stories are as impressive and memorable as the scenery'*.

The Northland Integrated Cycling Implementation Plan now demonstrates a programme for building these trails to deliver a network that could be installed in prescribed stages, prioritising appropriate trails for early delivery.

The project seeks the early development of approximately 140km of off-road cycling and walking tracks with an investment total of \$19M and a benefit cost ratio (BCR) of 5.22. Through multi-criteria analysis these trails have been assessed as ready for the first stage of delivery:

- Waitangi to Kerikeri (13.7km);
- Te Araroa Trail - Opua to Paihia Walkway (6.8km);
- Opua to Paihia on-road cycle route via Aucks Road (8km);
- Waoku Old Coach Road (53km);
- Kaihu Valley Rail Trail (41km);
- Langs Beach to Ruakaka (25km).

The first stage seeks to develop the above projects and add a total of approximately 140km of off road trail to the existing 80km Pou Herenga Tai Cycle Trail. This creates a total of over 200km off road trail, or 30% of the Twin Coast Discovery Route. An investment of \$103M is required to achieve the full 700km cycling network loop of Northland, which would roughly follow the Twin Coast Discovery Route, an existing on-road loop.

Preliminary design and costings have been developed for each of these routes. The overall project has been assessed against geotechnical requirements, implementation risks and alignment to the Provincial Growth Fund.

The implementation of the trails will provide significant value to users as well as to local communities. Together the trails form part of an integrated network with significant benefits Northland wide. Central to the success of a network of walking and cycling trails across Northland is making it legible and accessible as not only a place of pristine coastline and great forests, but also a distinct cultural landscape with a long historical narrative that is still being written. Through understanding a place as being 'more than meets the eye', a deeper appreciation, sense of commitment and stewardship develops.

## 2 Introduction

The existing Twin Coast Discovery Route is an 880km road network around Northland, which travels along the east coast from Whangarei, through Kawakawa and then on to SH10 through Kerikeri, before reconnecting with SH1 to Cape Reinga at the top of New Zealand. The route follows the picturesque coastline of both of Northland's east and west coasts as well as running through dense kauri forests, small Northland towns, vineyards and orchards.

The existing Twin Coast Discovery Route is currently complemented by an 80km off-road New Zealand Cycle Trail called Pou Herenga Tai (Twin Coast Cycle Trail), which runs from Opuā to Horeke. To fully develop an off-road trail around the Twin Coast Discovery Route requires the development of approximately 700km (see Figure 1. Overall Map of Routes) of off-road cycleway and a \$103M investment.

There are currently approximately 20,000 people per annum utilising the existing Pou Herenga Tai Trail, which runs from Opuā to Horeke. With a fuller network of off-road trails, there is the potential for over 100,000 cyclists per annum as evidenced by the successful New Zealand Cycle Trail, which included 22 Great Rides, such as the Hauraki Rail Trail. MBIE's 2016 evaluation of the New Zealand Cycle Trails shows strong and lasting returns from investment in regional trails. In 2015, there were approximately 1.3 million trail users, 13.5% were international visitors, and the overall benefits were \$3.55 for every \$1 invested.

The New Zealand Cycle Trails consist of 22 Great Rides and 24 Heartland Rides. The Great Rides are led by MBIE and local authorities, and the Heartland Rides are led by NZTA and local authorities.

This implementation plan strongly aligns with the wider Twin Coast Discovery Route Business Case (2017), and the Northland Walking and Cycling Strategy (2017), which both seek to provide greater dispersal of visitors throughout the region and throughout the year, through improved transport infrastructure. This, overlapped with improved visitor infrastructure, seeks to create investment and employment opportunities throughout Northland. The economic benefit to Northland for the fully developed Northland cycle trail network is 2% to 4% growth in GDP.

The Northland Integrated Cycling Implementation Plan project has used multi-criteria analysis to assess the 13 routes detailed in the Northland Walking and Cycling Strategy (2017). The assessment criteria are explained in the previous document, the Northland Integrated Cycling Implementation Plan Problem Statements & Evaluation Framework. The criteria fell into three categories:

1. Strategic Alignment with regional and national objectives/goals outlined in the GPS, the PGF, the Northland Economic Action Plan, etc.
2. The feasibility and deliverability of each trail, depending on factors such as land access, consents, engineering challenges, community support, etc.
3. The estimated economic benefits from each trail, primarily the Net Present Value, the BCR, and job numbers.

The assessment involved working with Northland's councils to identify five high-value, and low-risk, trails totalling approximately 140km (see Table 1) that could be developed with an investment total of \$19M. The Plan demonstrates a programme for building these trails to deliver a network that could be installed in prescribed stages, developed preliminary designs for each trail.

The following trails have been assessed as ready for early delivery:

Table 1: Routes Prioritised for First Stage of Delivery

Route	Length	Grade
Waitangi to Kerikeri	13.7km	Grade 2–3
Opua to Paihia Walkway (Te Araroa Trail) Opua to Paihia on-road cycle route via Aucks Road	6.8km 8km	Walking track Grade 4
Waoku Old Coach Road	53km	Grade 3-4
Kaihu Valley Rail Trail	41km	Grade 1-2
Langs Beach to Ruakaka	25km	Grade 1-2
Total	140km	

Notes on Cycle Trail Grades

Grade 1 (Easiest) is off-road and suitable for absolute beginners

Grade 2 (Easy) is off-road and suitable for families

Grade 3 (Intermediate) is on- or off-road and may include some hills and traffic

Grade 4 (Advanced) is on- or off-road and will involve challenging terrain and/or busy traffic and is only suitable for experienced cyclists.

Grade 5 (Expert) is for very experienced cycle enthusiasts only.

**Additional Heartland Rides**

In addition to these priority projects, there is potential for the early development of three Heartland Rides. Heartland Rides are predominantly on-road cycle touring routes that are ‘low cost’ and ‘low risk’ because they follow existing roads and do not require any consents or major construction. They would be designated as part of the New Zealand Cycle Trail and would attract experienced, adult cyclists. Although user numbers are relatively low, so are the costs of implementation, and therefore BCRs are often high. The three Heartland Rides proposed for early implementation would be:

- Ruakaka to Tutukaka Coast (Ngunguru): 98km, Grade 3-4;
- Tutukaka Coast (Ngunguru) to Kawakawa: 80km, Grade 4;
- Dargaville to Maungaturoto: 78km, Grade 4.



## 3 Overall Northland Cycling Plan

### 3.1 Overall Route and Project

The regional vision for walking and cycling in Northland would see *'Northland as one of the world's best coastal walking and cycling destinations, where the journeys and stories are as impressive and memorable as the scenery.'* The Northland Walking and Cycling Strategy (2018) highlights four strategic focus areas:

- 1 Developing appealing and cohesive walking and cycling networks that connect Northland;
- 2 Growing walking and cycling participation and promoting Northland's Coastal point of difference;
- 3 Improving community wellbeing, including creating economic opportunities; and
- 4 Ensuring the walking and cycling infrastructure and its use is sustainable.

Through this strategy, 13 cycle routes (see Figure 1) have been selected, which seek to achieve this vision. Of the 13 cycle routes, this Implementation Plan has prioritised five projects for early delivery. If the five projects proposed are implemented, then 30% of the 700km network will be off road.

The five projects (see Table 1) are planned for implementation in 2019-2020. They would attract an additional 66,000 users per year to the current 20,000 using the existing Pou Herenga Tai cycle trail. The five priority projects have a combined BCR of 5.22 and would create an estimated 265 jobs.



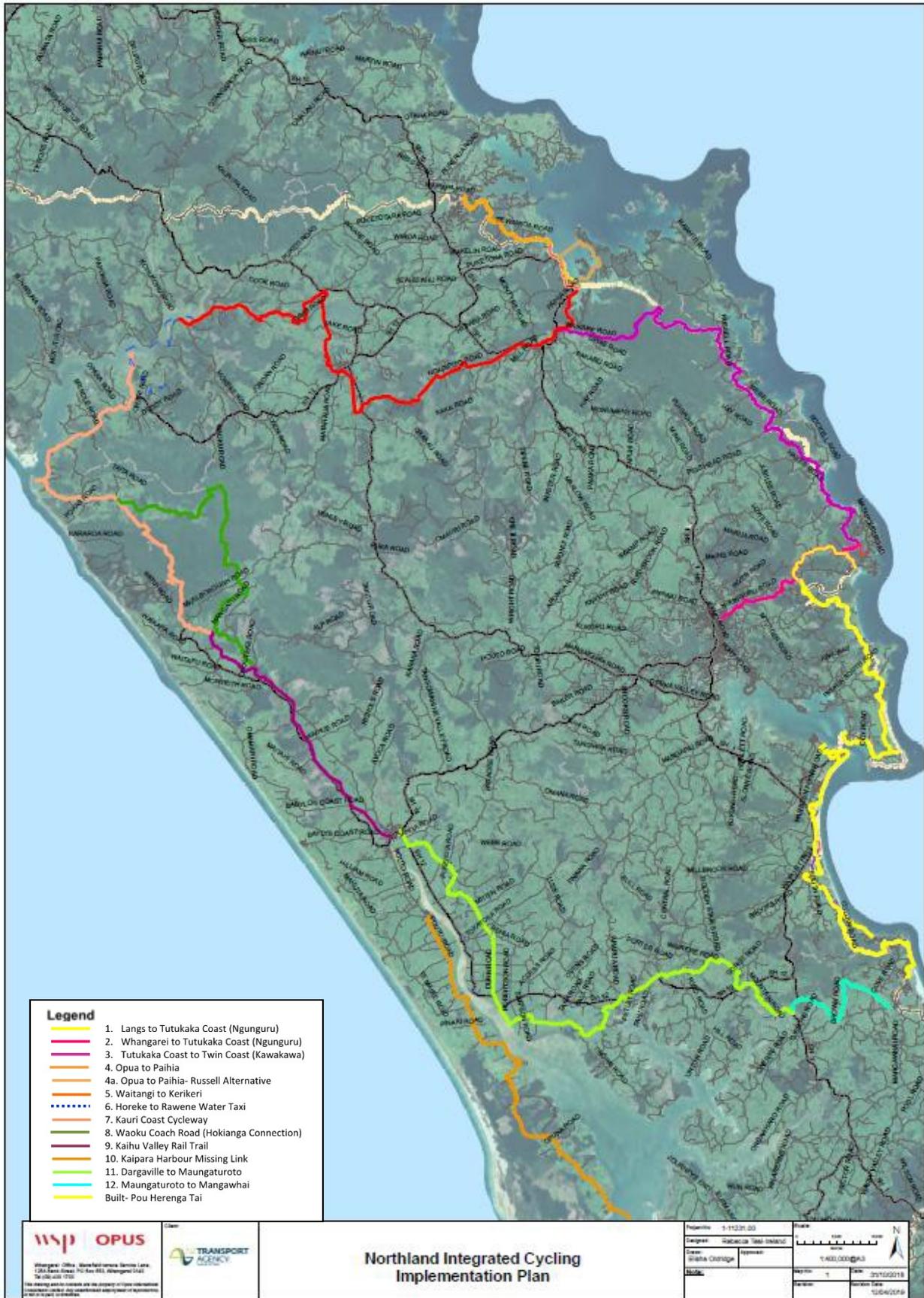


Figure 1: Overall Map of Routes

## 3.2 The Network Effect

### 3.2.1 *The Individual Trails*

The individual cycle routes will deliver riders from points of interest and destinations across Northland and beyond via a network ranging from mountain bike trails to relatively flat and easy rail trails to quiet country road experiences. Riders will choose interconnected routes based on their ability, preferred start and finish points, local attractions and time commitment.

Ferry crossings provide links for some of the rides, adding a dimension of interest and interaction with Northland's coast and waterways that will broaden the appeal of the overall experience.

Most of these trails will be attractive to walkers, who may be looking for the same features as cyclists – the off-road landscape and cultural immersion facilitated by well-designed trails linking nodes with a range of food and rest options. There is some alignment between the Te Araroa Trail and the Northland Cycleways along the east coast at the Bay of Islands.

### 3.2.2 *The Trails Combined*

In the initial BCA, use, spend and length of stay were determined for each trail in isolation. While individual trails provide value to users as well as to local communities, the separate trails will be part of an integrated network. As discussed elsewhere, there will be five trails (Table 1) developed initially, with others added over time as use increases and resources become available.

Networked effects are the additional benefits that we expect to accrue based on activity generated by the combined set of priority trails that have been recommended to the Steering Group. In this case, the combined priority trails are:

- Opuia to Paihia
- Waitangi to Kerikeri
- Waoku Old Coach Road (to SH12)
- Kaihu Valley Rail Trail
- Lings Beach to Ruakaka (Waipu Trail)

The following points are considered when looking at this set of trails in relation to network effect:

- Opuia to Paihia. Two routes are proposed, one walking track and one cycling route. There are no additional benefits to the wider Pou Herenga Tai Great Ride from the walking track.
- Waitangi to Kerikeri. This track will create a new start/finish point for riders of the Pou Herenga Tai Great Ride. This will result in additional users across the whole trail, and therefore increase length of stay by a further day for many trail riders.
- Waoku Old Coach Road connects to the proposed Kaihu Valley Rail Trail and as well as the existing Kauri Coast Cycleway, which leads north to Opononi and the Hokianga area. Users may therefore be attracted to ride multiple trails. Those doing the Waoku Old Coach Road could continue through to Dargaville along the Kaihu Valley Rail Trail as a connection to routes heading south. There may be potential for attracting families where they would all do Kaihu Valley Rail Trail and then the more advanced would do Waoku Old Coach Road before returning to Dargaville. However, they are different trails in terms of grade and so may also attract unique user groups.

- Langs Beach to Ruakaka (Waipu Trail) would eventually link to Pou Herenga Tai in the north via the proposed Heartland Rides, thus creating an attractive opportunity for cyclists to stay longer in Northland and ride across to the West Coast.
- Overall, a network creates the ability to market a broader set of cycle trails in the region that can result in a greater number of users.
- There may be an increase in expenditure as more amenities will be available along these routes due to increased users and itineraries (accommodation/food and cycling services – shuttles and rentals).

### 3.3 Networked assumptions

Considering the relationship of the prioritised trails and the improved marketing across all trails in Northland, we have assumed;

- initial out-of-region and international visitor number increase of 5%
- out-of-region and international visitor number growth by an additional 0.5% per annum
- length of stay for multi-day riders sees 80% staying 1 night, 15% staying 2 nights, and 5% staying 3 nights compared with 93% staying 1 night.

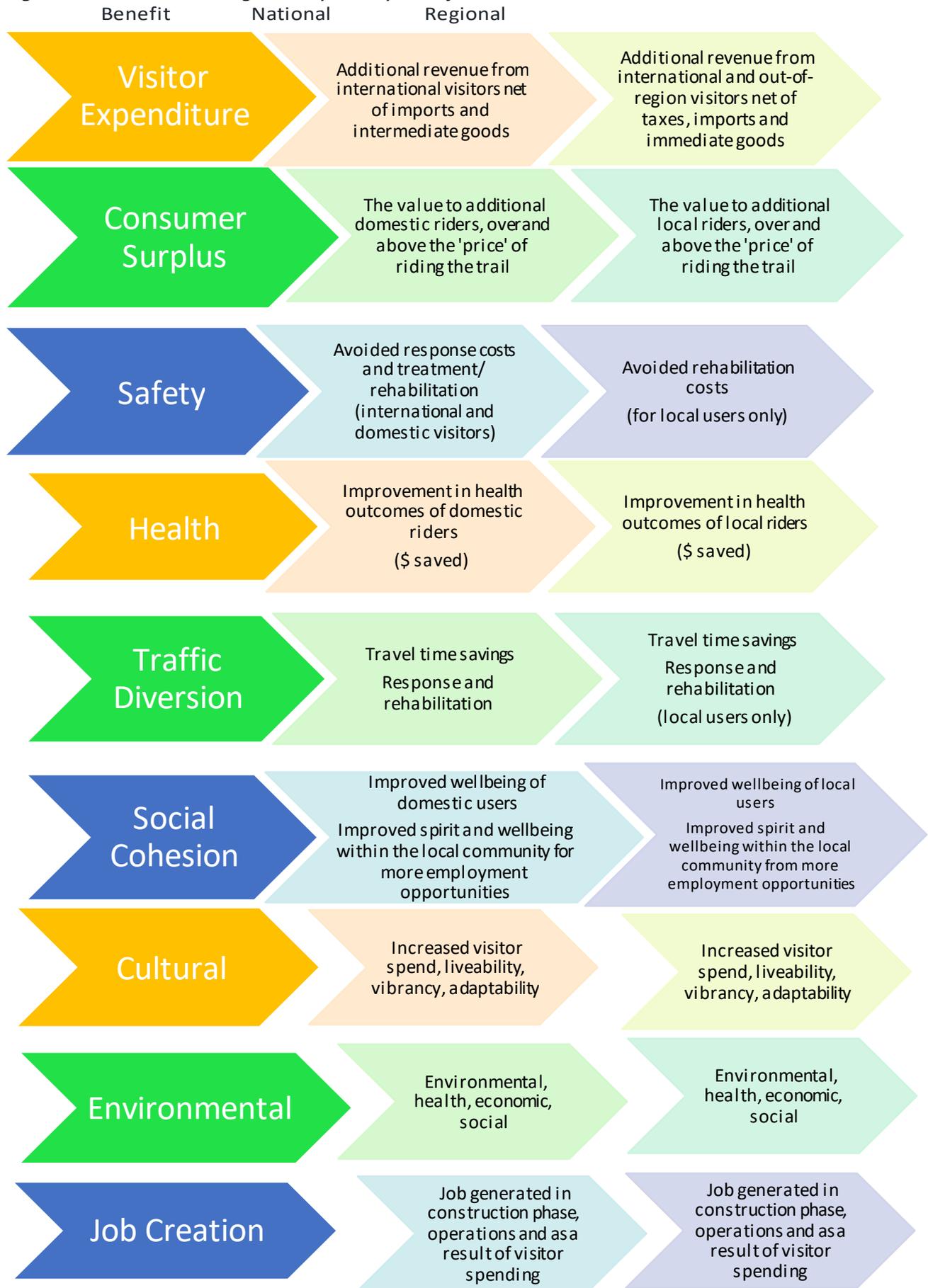
### 3.4 Networked effects

Based on the above assumptions, the BCA for all five trails combined results in benefits higher than the sum of the BCA benefits for each of the five trails. The breakdown across BCA and individual benefits is shown in the following table.

	Opua to Paihia	Waitangi to Kerikeri	Waoku Old Coach Road	Kaihu Valley Rail Trail	Langs Beach to Ruakaka	Total	Networked effects	Difference
NPV	\$22.15	\$14.56	\$8.18	\$37.57	\$16.47	\$98.19	\$159.6	\$61.41
BCR	17.58	11.873	4.59	4.19	3.34	5.22	7.86	na
Jobs	52	30	24	128	47	265	389	124
Total costs	\$1.34	\$1.34	\$2.28	\$11.7	\$7.03	\$23.7	\$23.7	0
Total benefits	\$23.49	\$15.9	\$10.47	\$49.36	\$23.49	\$121.5	\$182.94	\$61.44
Visitor spend	\$16.25	\$10.56	\$8.41	\$41.06	\$15.31	\$89.69	\$135.9	\$46.21
Health	\$2.41	\$2.36	\$0.61	\$2.18	\$3.70	\$11.89	\$15.12	\$3.23
Consumer surplus	\$4.83	\$2.97	\$1.46	\$6.12	\$4.48	\$19.9	\$31.91	\$12.01

The networked effect could improve benefits by \$10.4M within a 15-year period. About \$7.85M will be from increased visitor spend, \$700k from health benefits, and \$1.85M from consumer surplus.

Figure 2: National and Regional Cycleway Benefits



## 4 Design Philosophy Statement

### 4.1 Introduction

The age-old human experience of moving through the landscape, interpreting and articulating the experiences and sites along the way is the basis of narrative, storytelling. This takes place at human pace and scale, originally through walking, with riding a bicycle being a modern equivalent.

Central to the success of a network of cycleways across Northland is making it legible and accessible as more than a place of pristine coastline and great forests, instead a distinct cultural landscape with a long historical narrative that is still being written. Through understanding a place as being 'more than meets the eye', a deeper appreciation, sense of commitment and stewardship develops.

Narrative and experience has a direct application to the Northland Integrated Cycling Implementation Plan (NICIP) and can be applied at multiple scales. To attract users, the cycling network's narrative needs to be a persuasive and compelling story of diverse yet interrelated journeys that engage the imagination, convincing people to commit to the experience.

Also, at the local community level, those who know the narratives of landscape and culture have the opportunity to benefit from sharing them with those who visit to absorb them. And at the scale of individual rider, a layered experience of interpretative media, enhanced plantings, sculpture, heritage sites and other features increase a sense of and prolonged engagement with place.

Northland's rich cultural and environmental narratives are not often apparent to visitors, though local communities are often very open to sharing their stories and experiences, given the opportunity. Visitors travel great distances to see the most accessible key features of Northland's cultural and landscape narratives, flocking to Waitangi for both Maori and Pakeha histories and to Tane Mahuta, an iconic piece of Aotearoa New Zealand's environmental narrative. The full stories though are even richer, more complex and more compelling, requiring time moving through Northland at a human pace to read.

Part of the original vision of the Northland Walking and Cycling Strategy was a loop composed of individual rides that circled Northland, loosely aligned with the Twin Coast Discovery Route. This is a compelling narrative. However, with a clearer understanding of each route's characteristics, the likely users and their ambitions and requirements, the combined trails are now conceptualised as more of a network, providing strong connections between communities and key destinations.

### 4.2 An Evolving Narrative

For people very familiar with Northland, immersed every day in a unique landscape and culture, features that impress visitors with their beauty and richness can seem ordinary. It can be hard to recall that mangroves for example, are an exceptional sub-tropical experience to many. Therefore, it is worth emphasising a couple of the layers of the cycling experience that are exceptionally Northland, as these have potential to make significant contributions to the overall long-term success and widest appeal of the cycle network. There are undoubtedly other layers that are worth investigation and development.

#### *East – Centre – West*

It is convenient to frame the Northland's east as the holiday destination, the centre as the cultural heartland and the west as remote kauri stands and the Hokianga. Waitangi is well known as where Te Tiriti o Waitangi was signed, but Northland is steeped in authentic Aotearoa New Zealand

culture, from marae to arts communities, while both shores have excellent coastal experiences and unique ecology. The trail network will create accessible connections throughout these areas, making their inherent integrated character apparent and appealing to visitors, and as a means of improved socio-economic opportunities for local communities.

### *Ecology - Kauri*

Kauri are arguably as iconic a piece of Aotearoa New Zealand's sense of self as the pohutukawa and the kiwi. Northland is home to all three. Kauri though, exist naturally only here, south to Auckland and on Coromandel Peninsula. The development of the Northland cycleway network coincides with kauri needing protection from die-back disease and with a need for heightened awareness and improved stewardship. Creating well-designed gravel trails will help prevent the spread of this disease from one area to another, while narratives around ecology and kaitiakitanga present opportunities for local communities to spread awareness while developing business opportunities.



## 5 Trail Descriptions

Among the trails currently being developed as part of the network are a range of grades, from low grade 1–2 rides that are suitable for family groups and recreational riders, through to grade 3-4 rides, which are suited to experienced mountain bikers. Each ride has been examined individually to understand how well it aligns with the project strategy, how easy or difficult it will be to build and what economic benefits it is likely to deliver to local communities.

An overview of each trail is provided below, with brief outlines regarding:

*Design Philosophy and Intent* – what is the vision for this particular trail?

*Trail Specific Opportunities and Constraints* – With a thorough understanding of the intent for this trail, what opportunities and constraints specific to this trail have become apparent? How will this specific trail contribute to the overall network? How will it contribute to the local community and its economy?

*Land Access and Risk* - What area of the trail runs along private land? What consultation has been undertaken with these landowners? Are there any resource consent risks associated with the trail development? Risk is defined as:

Risk	Land Owner Status	Consenting Status
No	The route, and directly adjoining land, is owned by Council.	No resource consent required.
Low	Small % of private landowners adjoining route. Consultation undertaken.	Possibility of requiring resource consent, unlikely to be notified.
Medium	Some private landowners, evidence of encroachment into route location. Low to moderate level consultation undertaken.	Resource Consent required. Limited notification required.
High	High % of private landowners. No consultation undertaken.	Resource consent required. Public notification required.

*Leadership and Stakeholders* - Does the trail have a clear leader to take it through the funding, construction and long-term maintenance processes? Have all stakeholders provided their support of the project?

*Geotechnical Requirements* - Rock and soil type has been analysed on the route to determine where additional structures may be required to stabilise land.

*Design Assumptions* – What factors and contextual considerations have been understood as influences on the design process and outcomes?

*Design Geometry and NZCT Design Guide Criteria* – What specific engineering characteristics will the trail have? These will contribute directly to the cycling experience.

*Maintenance Implications and Requirements* – Are there whole-of-life maintenance implications, to what extent and has consideration been given to who will bear these?

*Funding Recommendations* - What funding stream does this trail align with?

Developing cycling's contribution to the regional economy entails prioritising the trails to arrive at relatively "easy wins", which could be implementing as practicable. This is achieved through the MCA process, elsewhere in this document. The overall goal is an integrated system of cycle trails, with each contributing to the success of the whole network.



## 5.1 Waoku Old Coach Road - (Hokianga Connection)

Length: 53km, Grade: 3–4, Cost: \$1.6M

### 5.1.1 *Specific Design Philosophy and Intent*

The trail begins at Waimamaku and ends at Donnellys Crossing.

Building on a piece of transport history, this open-secret mountain biking route through native-bush clad hills has the potential to be a destination ride that also draws bike-packers from afar. Improvements will avoid reducing the challenge of the ride, which will be developed to have as little environmental impact as possible. The trail links well with the Kaihu Rail Trail to the south and the Opononi and Hokianga drawcard in the north.

### 5.1.2 *Trail-specific Opportunities and Constraints*

- Historical infrastructure such as handmade stone walls and culverts.
- Potential for involvement of tangata whenua in catering to visitors and maybe trail / environmental stewardship / maintenance.
- Significant level of service change between this and the cycle trails that connect to either end of it.
- Requires the participation of DOC and local tangata whenua.
- Existing track, being ridden in low numbers now by keen mountain bikers.
- With a route already established, and an existing body of users, it will be relatively easy to increase user numbers through an upgrade to the existing trail.
- Upgrading the trail to be gravel in wetter areas has the additional benefit of reducing the risk of kauri die back becoming established.

### 5.1.3 *Land Access and Risk*

The overall land access risk is considered low due to the small number of landowners adjoining the route. As the route is currently used as a walking track to the public, utilisation of the route by the public is unlikely to generate significant issues. Any bridges or other significant structures would require resource consent. See supporting information for a more detailed assessment of each section of the route.

### 5.1.4 *Leadership and Stakeholders-*

Stakeholders on this route are DOC, Far North District Council (FNDC), Kaipara District Council (KDC) and Te Roroa. All stakeholders have provided support for the proposal. Te Roroa and Bike Northland have expressed an interest in the leadership role. Discussions between DOC, Te Roroa and FNDC are ongoing.

### 5.1.5 *Geotechnical Requirements-*

The geology along this route is complex, consisting of younger alluvium units on the flat of valleys, units of the Northland Allochthon and as well Autochthonous units in the low foothills and the steeper terrain predominantly Waipoua Basalt flows. Overall, the terrain is gently rolling to steep to rugged. Given that the route for the cycleway follows existing roads and an old coach road it is not anticipated that significant earthworks will be required. There do not appear to be any large scale instability features along the route, with most instability being small to medium scale localised features, generally encountered on steeper slopes.

The flexibility of the geometric parameters allows the option for the route to be shifted where possible to avoid the worst effects of any areas of instability that may

be encountered. Where the route is too narrow, typically in steep terrain constrained by gully features, timber pole retaining walls may be required to provide the formation width of the cycleway. Structures of those types will be subject to geotechnical investigation and design.

It is anticipated that geotechnical constraints for the Waoku Old Coach Road section will be moderate. Moderate geotechnical constraints indicate minor levels of geotechnical investigation and mitigation in the terms of retaining walls or foundation improvement will be required for that route. It is expected that any investigations and mitigation measures will be localised to specific features and may be easily mitigated with route realignment.

5.1.6 *NZCT Design Guide Criteria*

Grade	3/4 - Off Road
Gradient	0–6.5 degrees for 90% Absolute max – 10 degrees unsealed
Width	Min 0.9m but up to 2m
Bends	Min 2.5m radius
Surface	Well compacted GAP 20
Grade	3/4 - On Road (Unsealed)
AADT	100
Operating Speed	60km/h
Gradient	0–6.5 degrees for 90% Absolute max – 10 degrees unsealed
Width	N/A
Bends	N/A
Surface	GAP 40

5.1.7 *Maintenance Implications and Requirements*

A well-draining aggregate trail that requires minimal maintenance aligned with its expected use. Potential water erosion and trail damage will be insured against through regular grade reversals and culverts where needed. In some flat areas, boardwalk will be used.

Ongoing vegetation management will be required to maintain the route. Operations and maintenance will be shared between FNDC/DOC/KDC.

5.1.8 *Funding*

The project has been prioritised based on multi criteria analysis against:

- Strategic Alignment;
- Trail Development;
- Cost.

The project has a benefit cost ratio (BCR) of 4.59.

Preliminary design has been undertaken with a proposed costing of \$1.6M.

The findings support funding the Waoku Old Coach Road project.

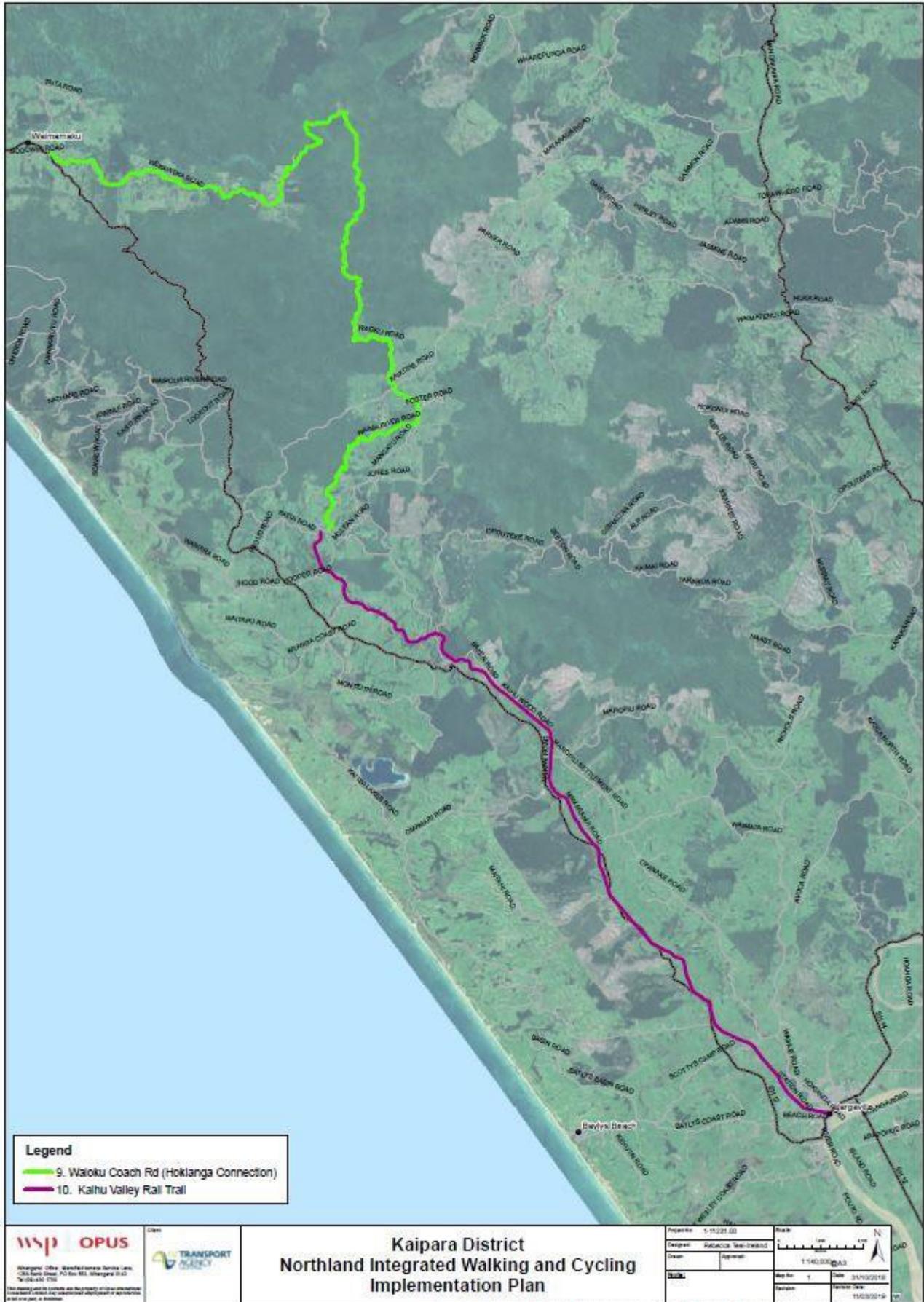


Figure 3 Waikou Old Coach Road and Kaihu Valley Rail Trail Routes

## 5.2 Kaihu Valley Rail Trail

Length: 41km, Grade: 1–2, Cost: \$9.6M

### 5.2.1 *Specific Design philosophy and intent*

The trail begins at Donnellys Crossing and ends at Dargaville.

Based on a long-disused railway, this will be a strong northward route from Dargaville, linking several marae. A day's easy ride ending at a node with development potential as an appealing stop over on the way further north. This will be a family-friendly rail-based trail with diverse places to stop along the way and within easy reach of the coast. This trail links well with the Waiku Old Coach Road, Kauri Coast Cycleway and the Kaipara Harbour Missing Link trails.

### 5.2.2 *Trail Specific Opportunities and Constraints*

- Need for bridges over water ways between sections of alignment that were designed for train passage.
- High estimated user numbers.
- Strong cultural potential with several marae along the route.
- Mostly off road, with a small portion of low-volume local roads.
- Donnellys Crossing has potential to develop as a base for trail users, already has basic accommodation.

### 5.2.3 *Land Access and Risk*

The overall land access risk is considered low to medium as the route is a rail corridor owned by KDC. There are 112 private landowners directly adjoining the route. Consultation is in the early stages. Any bridges may require resource consent. See supporting information for a more detailed assessment of each section of the route.

### 5.2.4 *Leadership and Stakeholders-*

Kaipara District Council (KDC) has taken the leadership role in this project. A governance group has been established with representatives from Northland Transportation Alliance, KDC, Te Roroa Iwi, DOC, Northland Chief Executive's Forum and Northland Inc.

### 5.2.5 *Geotechnical Requirements-*

The geology units along this route include: Waipoua Basalts at the northern end, passing through foothills of Northland Allochthon soils and recent alluvium deposits, to older alluvium deposits along most of the southern portion of the route south of Kai Iwi Lakes to Dargaville.

Given most of the route will follow existing railway formation (disused), there will be little earthworks associated with the formation of the cycleway route.

It is anticipated that the geotechnical constraints associated with this route will be low. Low geotechnical constraints indicate little to minor levels of geotechnical investigation and mitigation in the terms of retaining walls or foundation improvement will be required for that route.

5.2.6 *Design Assumptions*

- Assumed rights to use the rail bed by private and owners through decades of informal use.
- The route will follow the abandoned rail way. This will be an ‘easy’ experience suitable for all abilities.

5.2.7 *NZCT Design Guide Criteria*

Grade	1/2 - Off Road
Gradient	0–3.5 degrees for 95% Absolute max – 6 degrees unsealed or 7 degrees sealed
Width	Target 2m
Bends	Min 4m radius
Surface	Well-compacted GAP 20

Grade 1-2 trail, highly influenced determined by alignment with the railway; wide consistent surface, flat, easy curves, minimum 2.2m wide for up to 90% of the trail, with some sections of ‘single trail’ 1.5m width at bridges and/or other pinch points. Relatively straight alignment, gentle climbs, wider profile.

5.2.8 *Maintenance implications and requirements*

With a well-constructed deep base inherited from the railway, there should be lower maintenance requirements over whole of life.

5.2.9 *Funding*

The project has been prioritised based on multi-criteria analysis against:

- Strategic Alignment;
- Trail Development;
- Cost.

The project has a benefit cost ratio (BCR) of 4.19.

Preliminary design has been undertaken with a proposed costing of \$9.6M.

The findings support the funding of the Kaihu Valley Rail Trail project.



## 5.3 Langs Beach to Ruakaka

*Length: 25km, Grade: 1–2, Cost: \$5.8M*

### 5.3.1 *Design philosophy and Intent*

The trail begins at Langs Beach and ends at Ruakaka Beach.

An all-abilities trail, Grade 1-2, providing opportunities for commuting and recreation. The route follows the coastline of Langs Beach, Waipu Cove and Ruakaka, meandering through sand dunes and small beach settlements. The trail is the first stage of the Mangawhai to Tutukaka Coast route, which will be a multi-day route along the stunning east coast of the Northland.

### 5.3.2 *Trail Specific Opportunities and Constraints*

- Some land access issues.
- There is potential to tie into Whangarei trails and provide bike access to the city from rural coast areas.
- Great beaches, spectacular views to the ocean.
- Achieving an off-road route that is safe and provides a consistent level of service.
- Important link in creating northward and southward options, integrating Whangarei with the overall network. Health benefits for locals commuting or riding recreationally.

### 5.3.3 *Land Access and Risk*

The overall land-access risk is considered low as a high percent of the route is on Council road reserve. Alternative routes have been established to mitigate any risk areas. Any bridges may require resource consent. supporting information for a more detailed assessment of each section of the route.

### 5.3.4 *Leadership and Stakeholders-*

Whangarei District Council (WDC) has taken the leadership role in this project. WDC has also obtained a letter of support from DOC for the Waipu section of the route. The trail has strong community support with locals currently fundraising for the route.

### 5.3.5 *Geotechnical Requirements-*

Lang's Beach to Waipu Cove - The stratigraphic geology units along this route are complex between Lang's Beach and Waipu Cove, passing through beach dune deposits, Waitemata Group sandstone and mudstone (Ruarangi Formation) and Whangarei Limestone. Most of the route is following existing roads along the flat dune sands and will involve minimal earthworks and low geotechnical constraints. However, the route turns and follows the cliff-top Waipu walking track north of Lang's Beach. The walking track section, which crosses gentle to moderate terrain, is to be enhanced with minor widening and will likely require small timber pole retaining walls in places. Those structures will require geotechnical investigation and design.

Waipu Cove to Ruakaka - From Waipu Cove north to Ruakaka, the geology is less complex, consisting predominantly of Pleistocene-aged dune deposits and back-dune alluvium, with occasional outcrop of Northland Allochthon mudstone. The dune deposits are old and generally considered stable, however, careful management of stormwater design will be required to ensure that no adverse erosion effects are created. Most of the route is following an existing road formation

and will either be built on existing road or built on minor widened portions. The route is to be on flat to gentle terrain.

It is anticipated that geotechnical constraints associated with this route will be generally low. Low geotechnical constraints indicate little to minor levels of geotechnical investigation and mitigation in terms of retaining walls or foundation improvement will be required for that route.

5.3.6 *NZCT Design Guide Criteria*

Grade	1/2 - Off Road
Gradient	0–3.5 degrees for 95% Absolute max – 6 degrees unsealed or 7 degrees sealed
Width	Target 2m (1.5m for bridges)
Bends	Min 4m radius
Surface	Well compacted GAP 20 Some Concrete Some AC

5.3.7 *Funding*

The project has been prioritised based on multi-criteria analysis against:

- Strategic Alignment;
- Trail Development;
- Cost.

The project has a benefit cost ratio (BCR) of 3.34.

Preliminary design has been undertaken with a proposed costing of: \$5.8M.

The findings support the funding of the Langs Beach to Ruakaka project.



## 5.4 Opuā to Paihia

*Opuā to Paihia Walkway: Length: 6.8km, Walking track, Cost: \$984,000*

*Aucks Road Cycle Route: Length: 8km, Grade: 4, Cost: \$250,000*

### 5.4.1 *Design philosophy and Intent*

The renewal begins at Opuā and ends at Paihia.

Two routes are being proposed, one for walkers and one for cyclists. Walkers range from those looking to enjoy a short (2-hour) coastal experience, right through to the Te Araroa Trail hikers, for whom this is only part of their 3,000 km journey to Bluff.

The walking route between Opuā and Paihia will provide a land connection between these two popular tourist locations. The walking track will provide a safe land route and take walkers off the road.

The on-road cycling route begins at the ferry from Opuā to Okiato. Cyclists hop off the ferry at Aucks Road, with a scenic ride through the beautiful Russell vineyards, rolling hills and boutique shops and cafes. The ferry then takes cyclists from Russell through to Paihia. The ferry adds another element to the journey.

### 5.4.2 *Trail Specific Opportunities and Constraints*

- Requires greater 'cycle awareness' through signage and slower vehicle speeds.
- Great coastline, spectacular views to the ocean.
- Achieving an on-road route from Opuā to Paihia that is suitable for Grade 3-4 cyclists.
- Important walking link in the Te Araroa Trail and an attraction for the many tourists who visit the area.

### 5.4.1 *Land Access and Risk*

The overall land access risk is considered low as the Opuā to Paihia route is an upgrade of an existing track. The Aucks Road route is on road with the utilisation of some road reserve. Resource consent may be required for the Opuā to Paihia route, however, the risk of this is low. See supporting information for a more detailed assessment of each section of the route.

### 5.4.2 *Leadership and Stakeholders-*

Far North District Council (FNDC) has taken the leadership role in this project. Stakeholder engagement will be led by FNDC.

### 5.4.3 *Geotechnical Requirements-*

#### *Opuā to Paihia - Te Araroa Trail*

The geology units along this route include:

Kariotahi Group – Holocene to recent soils comprising loose sand, gravel and shell underlying beaches and forming beach ridges and shell banks.

Found along the flat low-lying sections of the route, there are no signs of land instability, and foundation conditions for subgrade purposes are suitable for the cycleway construction. The soils are prone to erosion around stormwater outlets, and design of culvert outlets will need to consider ways to prevent soil erosion that could lead to problems with the track integrity.

These sections of the route have low geotechnical constraints.

Waipapa Group – Jurassic-aged greywacke and minor argillite that weathers residually to reddish brown silty clay and clay soils.

This material is found in all the hilly and topographically high areas along the route. Land instability issues may occur at the heads of gully features, on steep slopes and at the crest of cliffs on the coast. The track design parameters allow some flexibility in the horizontal alignment to allow the track to be moved away from unstable land features, and in locations where erosion of steep slopes has narrowed the track, it may also be appropriate to construct low-height timber walls. In addition, where the track crosses the head of gully features, careful management of stormwater will be required. Any structures will be subject to geotechnical investigation and design.

In the case of enhancing an existing walking trail for walking purposes, it is not anticipated that significant cutting or filling will be required and therefore the geotechnical constraints are low. Low geotechnical constraints indicate little to minor levels of geotechnical investigation and mitigation in terms of retaining walls or foundation improvement that will be required for the route.

#### *Opuā to Paihia (via Auck's Road and Russell)*

The geology units along this route include:

Tauranga Group Holocene to recent alluvium soils – comprising unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins.

Found along the flat low-lying sections of the route closer to Opuā, there are no signs of land instability and foundation conditions for subgrade purposes are suitable for the cycleway construction as required to widen the road width, given most of the route will be on existing road formation. The soils are prone to settlement initially, so some undercutting, especially of peat, and ground improvement will likely be necessary to facilitate widening.

These sections of the route have low geotechnical constraints.

Tauranga Group Pleistocene alluvium soils – comprising partly consolidated mud, sand, gravel and peat or lignite of alluvial, colluvial, lacustrine, swamp and estuarine origins.

Found along the flat low-lying sections of the route closer to Russell (including Russell township), there are no signs of land instability, and foundation conditions for subgrade purposes are suitable for the cycleway construction as required to widen the road width, given most of the route will be on existing road formation. The soils aren't generally prone to settlement, however, some undercutting of peat if encountered and ground improvement will be necessary to facilitate widening.

These sections of the route have low geotechnical constraints.

Waipapa Group – Jurassic-aged greywacke and minor argillite that weathers residually to reddish brown silty clay and clay soils.

This material is found in all the hilly and topographically high areas along the route. Land instability issues may occur at the heads of gully features, on steep slopes and at the crest of cliffs on the coast. The cycleway design parameters outline this cycleway route as following the existing road corridor, where it is expected that much of the route will be accommodated in the existing road formation, however, in locations where additional width may be necessary and the road is in steep terrain, it is anticipated that timber pole retaining walls will be required. Structures of those types will be subject to geotechnical investigation and design.

In the case of using the existing road network to accommodate the cycleway, it is not anticipated that significant cutting or filling will be required, and therefore the geotechnical constraints are low. Low geotechnical constraints indicate little to minor levels of geotechnical investigation and mitigation in terms of retaining walls or foundation improvement that will be required for the route.

**Design Assumptions**

- That the Opuia to Paihia route is a renewal of the existing walking track.

**5.4.4 NZCT Design Guide Criteria**

Opuia to Paihia (via Aucks Road and Russell)

Grade	4 - On Road (Sealed)
AADT	1200
Operating Speed	80km/h
Gradient	N/A
Width	Min 1.0m
Bends	N/A
Surface	Chipseal

Opuia to Paihia (Te Araroa Trail)

Gradient	Existing
Width	1–1.5m
Surface	Well compacted GAP 20 Boardwalk Concrete (existing)

**5.4.5 Funding**

The project has been prioritised based on multi-criteria analysis against:

- Strategic Alignment;
- Trail Development;
- Cost.

The project has a benefit cost ratio (BCR) of 17.58.

Preliminary design has been undertaken with a proposed costing of:

- Opuia to Paihia Walkway: \$984,000;
- Opuia to Paihia Cycle Route: \$250,000.

The findings support the funding of the Opuia to Paihia Walkway and Aucks Road Cycle projects.

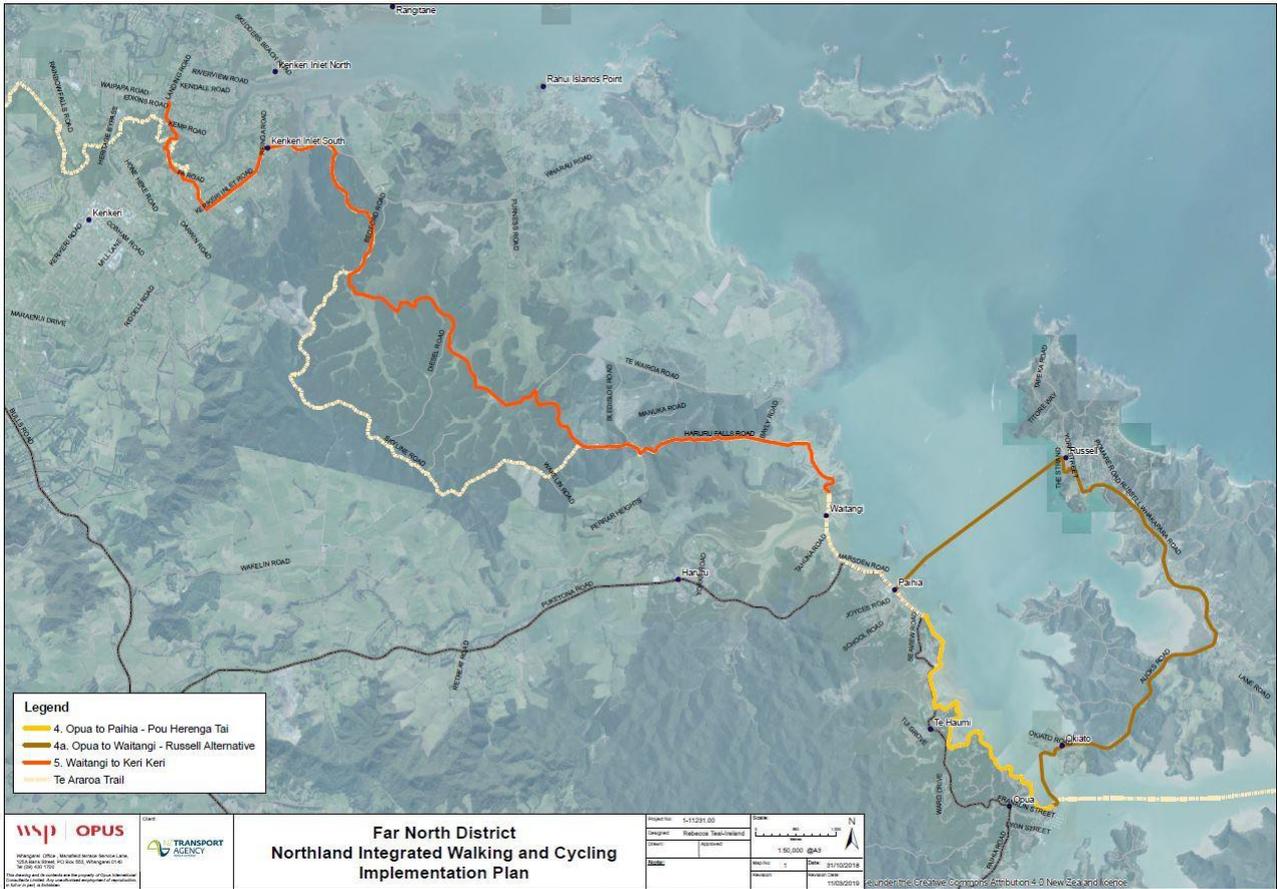


Figure 4 Opua to Paihia and Waitangi to Kerikeri Trail Routes

## 5.5 Waitangi to Kerikeri

Length: 13.7km, Grade: 3, Cost: \$997,000

### 5.5.1 *Design philosophy and Intent*

The trail begins at Waitangi Mountain Bike Park and ends at Kerikeri township.

It complements the Pou Herenga Tai Cycle Trail, allowing for increased length of experience and opportunity to stay locally. A grade 2-3 cycling experience to connect residents and visitors based in Kerikeri to Waitangi, the Waitangi Mountain Bike Park and to Paihia and the Pou Herenga Tai Cycle Trail.

This route will also be used by commuters, looking to incorporate daily exercise into a healthy and enjoyable transport experience.

Encourages dispersal west, extending the cycling experience beyond the Bay of Islands. Strong cultural component that could be built upon.

### 5.5.2 *Land Access and Risk*

The overall land access risk is considered low as all landowners have provided formal written support for the project. See supporting information for a detailed assessment of the landowner risk.

### 5.5.3 *Leadership and Stakeholders-*

Pou Herenga Tai Twin Coast Cycle Trail Trust and Far North District Council (FNDC) have taken the leadership role in this project. Support has been provided by all stakeholders.

### 5.5.4 *Geotechnical Requirements-*

The geology units along this route include:

Tauranga Group Holocene to recent swamp alluvium soils – comprising unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins. Found along the flat low-lying sections at the heads of valleys in the Waitangi Forest section. There are no signs of land instability. Foundation conditions for subgrade purposes are anticipated to be suitable for the cycleway construction, given most of the route will be on existing road formation fill. In places, the alignment may require construction across swampy ground, in which case subgrade improvement fill will likely be necessary as the swamp soils will not be suitable for cycleway traffic.

These sections of the route have low geotechnical constraints.

Kerikeri Volcanic Group – comprising late to early Pleistocene-aged basalt, scoria and ash soils.

The route crosses small portions of what has been mapped as basalt and scoria deposits, as for a short length it runs along the edge of a basalt flow. Given the route follows existing roads, it appears likely that the existing roads are constrained to some extent by the terrain. All sections of volcanic terrain are gentle to moderately sloping with no signs of land instability. Subgrade soils are all suitable for cycleway construction, and it is considered that there will not be any geotechnical constraints where the cycleway crosses volcanic terrain.

Waipapa Group – Jurassic-aged greywacke and minor argillite that weathers residually to reddish brown silty clay and clay soils.

This material is found over most of the route alignment, typically in all the hilly and topographically high areas along the route. Land instability issues may occur at the heads of gully features, on steep slopes and at the crest of cliffs on the coast. The cycleway design parameters outline this cycleway route as following the existing roads, where it is expected that much of the route will be accommodated in the existing road formation. However, in locations where additional width may be necessary and the road is in steep terrain, it is anticipated that timber pole retaining walls may be required. Structures of those types will be subject to geotechnical investigation and design.

In the case of using the existing road network to accommodate the cycleway, it is not anticipated that significant cutting or filling will be required, and therefore the geotechnical constraints are low. Low geotechnical constraints indicate little to minor levels of geotechnical investigation and mitigation in terms of retaining walls or foundation improvement that will be required for that route.

**5.5.5 Trail Specific Opportunities and Constraints**

- Achieves an off-road route between two popular visitor bases.
- Opens up accommodation options and attractions outside Paihia for tourists and locals.
- Provides an opportunity to work with tangata whenua on Treaty settlement land.
- Requires working with the harvesting cycle of the forestry establishment.

**NZCT Design Guide Criteria**

Grade	3 - Off Road
Gradient	0–5 degrees for 95% Absolute max – 8 degrees unsealed
Width	Min 0.9m but up to 1.5m
Bends	Min 3m radius
Surface	Well compacted GAP 20
Grade	2 - On Road (Unsealed)
AADT	200
Operating Speed	60km/h
Gradient	0–3.5 degrees for 95% Absolute max – 6 degrees unsealed
Width	N/A
Bends	N/A
Surface	GAP 40

**5.5.6 Funding**

The project has been prioritised based on multi-criteria analysis against:

- Strategic Alignment;
- Trail Development;
- Cost.

The project has a benefit cost ratio (BCR) of 11.87.

Preliminary design has been undertaken with a proposed costing of \$997,000.

The findings support the funding of the Waitangi to Kerikeri project.

## 6 Overall Programme

The following timeline is proposed for project implementation of the thirteen projects:

Table 2: Project Timeline

No	Route Name	Stage 1 2019-2020	Stage 2 2020-2023	Stage 3 2023-2026
1	Mangawhai to Tutukaka Coast (Ngunguru)			
1b	Langs Beach to Ruakaka			
2	Whangarei to Tutukaka Coast (Ngunguru)			
3	Tutukaka Coast (Ngunguru) to Kawakawa			
4a	Opuia to Paihia walking track (Te Araroa Trail)			
4b	Opuia to Paihia (Heartland Ride via Ferry and Aucks Road)			
5	Waitangi to Kerikeri			
6	Horeke to Maungungu (Pou Herenga Tai enhancements)			
7	Maungungu to Rawene (water taxi) (Pou Herenga Tai enhancements)			
8	Kauri Coast Cycleway <sup>1</sup> (Rawene to Donnellys Crossing via Tane Mahuta)			
9	Waoku Old Coach Road (Donnellys Crossing to Waimamaku)			
10	Kaihu Valley Rail Trail (Dargaville to Donnellys Crossing)			
11	Kaipara Missing Link (Dargaville to Helensville)			
12a	Dargaville to Maungaturoto Heartland Ride			
12b	Maungaturoto to Mangawhai			

The Northland Walking and Cycling Strategy (2017) proposed that all 13 trails be built off-road. Investigation during the development of this plan has indicated that this is not achievable in the near-term for the following trails, or sections of trails:

Trail 1: Ruakaka to Tutukaka Coast section. An off-road alignment has not yet been found. Instead, this would be progressed as an on-road Heartland Ride.

<sup>1</sup> This route is being looked at as part of a SH12 project.

Trail 2: Whangarei to Tutukaka Coast. An off-road alignment has not yet been found and is considered challenging, but not impossible.

Trail 3: Tutukaka Coast to Kawakawa. An off-road alignment has not yet been found. Instead, this would be progressed as an on-road Heartland Ride.

Trail 7: Maungunu to Rawene. Would require a 200m-long bridge and land access is unlikely. Therefore it is considered infeasible, and an existing boat option will suffice.

Trail 8: Kauri Coast Cycleway. This is an existing on-road Heartland Ride. Building a new trail through kauri forest would not be possible due to risks of spreading kauri die-back disease.

Trail 11: Kaipara Missing Link. This is an existing on-road Heartland Ride. The Kaipara Package works will likely induce traffic to such a level that shoulder widening or an off-road trail is required between Dargaville and Te Kopuru.

Trail 12: Dargaville to Mangawhai. An off-road route is not seen as a priority at this stage, and there is potential for an on-road Heartland Ride.

The remaining trails are considered deliverable within two years and have a low risk profile. This is partly why they have been prioritised.

## 6.1 Next Steps for Councils to Progress Priority Projects

### *Langs Beach to Ruakaka*

Whangarei District Council to survey the route and confirm land access with local land owners and the Department of Conservation.

Local share of budget to be confirmed.

Consents, if any, to be obtained.

### *Opua to Paihia – Te Araroa Trail walking track*

Far North District Council to consult with hapu on proposed upgrade works.

Local share of budget, if any, to be confirmed.

Consents for any structures (ie, replacement of existing boardwalk) to be obtained.

### *Opua to Paihia Heartland Ride via Aucks Road*

Far North District Council to confirm local share, if any.

Land access is already confirmed. No consents required.

### *Waitangi to Kerikeri*

Far North District Council and Pou Herenga Tai Trail Trust to develop/confirm governance model with local iwi and landowners for trail construction and management.

Local share of budget, if any, to be confirmed.

No consents required.

### *Waoku Old Coach Road (Donnellys Crossing to Waimamamku)*

Department of Conservation, Kaipara District Council, Far North District Council and Te Roroa to develop governance model for this trail.

Local share of budget to be confirmed.

No consents or land access required.

*Kaihu Valley Rail Trail (Dargaville to Donnellys Crossing)*

Kaipara District Council, Department of Conservation and Te Roroa have developed partnership model for governance.

Exact route alignment to be confirmed following recent public consultation. It may be beneficial to realign some short sections.

Consents are required for several suspension bridges.

## 6.2 Heartland Rides

Three Heartland Rides have been proposed for early implementation as they are considered 'low cost' (ie, under \$1M) and 'low risk' (ie, they follow existing roads/trails and do not require any additional land access or consents).

*Ruakaka to Tutukaka Coast (Ngunguru)*

Whangarei District Council to confirm the ideal route alignment, generally following and connecting 'dead end' local roads before signposting the route.

*Tutukaka Coast (Ngunguru) to Kawakawa*

Whangarei District Council to confirm the ideal route alignment and signpost the route following low-volume local roads.

*Dargaville to Maungaturoto*

Kaipara District Council and NZTA to confirm the ideal route, and NZTA to undertake safety treatments (active warning signs and shoulder widening on SH12) before signposting.

## 7 Overall Project Risk Register

Low risk
  Medium risk
  High risk

Route	Risk				Mitigation
	Technical	Consenting	Leadership/ Stakeholder Approval	Landowner Support	
Waipu Cove to Ruakaka					<ul style="list-style-type: none"> <li>- Consider alternative on-road route to avoid waterways and allow time to work through consenting and environmental issues.</li> </ul>
Waitangi to Kerikeri					<ul style="list-style-type: none"> <li>- Understand the level of vegetation clearance early.</li> <li>- Start the consenting process early.</li> <li>- Involve arborists and ecologists in construction process.</li> </ul>
Waoku Old Coach Road					<ul style="list-style-type: none"> <li>- Undertake stakeholder consultation early.</li> <li>- Enter into a memorandum of understanding to determine relationship between stakeholders.</li> </ul>
Kaihu Valley Rail Trail					<ul style="list-style-type: none"> <li>- Undertake stakeholder consultation early.</li> <li>- Start the consenting process early.</li> </ul>
Opuā to Paihia Walking Track					<ul style="list-style-type: none"> <li>- Avoid reclamation where possible.</li> <li>- Undertake landowner consultation early.</li> </ul>
Opuā to Paihia via Aucks Road					<ul style="list-style-type: none"> <li>- Utilise signage to encourage low speed environment.</li> </ul>

Technical Risk: Significant structures, environmental risks e.g. proximity to coastal area, geotechnical risks.

Consenting Risk: Technical reports, limited/public notification, hearing.

Leadership/Stakeholder Approval Risk: Where leadership is not clearly defined and all stakeholders have not provided written support to the project.

Landowner Support: Where landowner consultation has not been undertaken.

## 8 Alignment to Provincial Growth Fund

Table 3: Provincial Growth Fund Outcomes, Objectives and Criteria

Provincial Growth Fund	Criteria	Lift the productivity of a region or regions
		Contribute to the Provincial Growth Fund objectives
		Create additional value and avoid duplicating existing efforts
		Have a link to the regional priorities and be supported by stakeholders
		Be well managed, well-governed and have appropriate trade-offs between risk and reward
		Fit with the region's transport network
	Objectives	creating jobs, leading to sustainable economic growth
		increasing social inclusion and participation
		enabling Maori to realise aspirations in all aspects of the economy
		encouraging environmental sustainability and helping New Zealand meet climate change commitments alongside productive use of land, water and other resources
	Outcomes	improving resilience, particularly of critical infrastructure and by diversifying our economy
		increase economic output
		enhance utilisation of and/or returns for Maori assets
		increase productivity and growth
		increase local employment and wages (in general and for Maori)
		increase local employment, education and/or training opportunities for youth (in general and for Maori)
		improved digital communications within and/or between regions
		improve resilience and sustainability of transport infrastructure, within and/or between regions
		contribute to mitigating or adapting to climate change
		increase the sustainable use of and benefits from natural assets
enhance wellbeing within and/or between regions		

The Northland Integrated Cycling Implementation Plan directly aligns to the Provincial Growth Fund criteria, objectives and outcomes by:

- creating local employment through the construction of the cycle trails as well as long-term employment through tourism-based activities near the trail locations
- increasing social inclusion and participation by creating cycle routes through rural areas and connecting these to larger towns. Also, by providing infrastructure to facilitate an activity with no cost in participation
- enabling Māori to realise aspirations by providing an opportunity to share traditional stories associated with the area and link these to the cycle routes
- encouraging environmental sustainability and adapting to climate change by encouraging cycling as a form of transport
- linking with the wider Twin Coast Discovery Route programme including town centre improvements, wayfinding and road safety improvements.

## Supporting information: Preliminary Design Drawings

Preliminary design drawings have been completed for each of the five prioritised off-road trails.

