

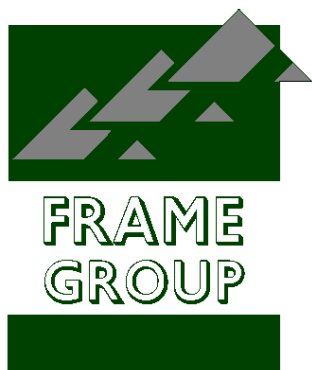
# **Snells Beach Ratepayers and Residents Association Inc**

## **Snells Beach to Warkworth Walkway/Cycleway**

### **Feasibility Report**

(Version 2 - Final)

FGL 15/52



**Prepared by: Trevor Butler**

**Frame Group Limited**

**PO Box 147 211**

**Ponsonby, Auckland**

**Ph: (09) 638 7221, Fax: (09) 376 0513**

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## 1.0 Executive Summary

This report prepared by Frame Group Ltd (FGL) for the Snells Beach Ratepayers and Residents Association Incorporated (SBRRA) covers the feasibility of establishing a walking and cycling trail from Snells Beach to Warkworth, including appropriate links to locations in the Snells Beach area.

The SBRRA has carried out extensive field work to identify possible linkages for walkways and cycleways that provide an off-road route between Snells Beach and Warkworth. These options have been evaluated by FGL together with some other possible routes. Evaluation has involved consideration of walkway/cycleway standards, assessment of suitability for the intended users and evaluation of land tenure, environmental and construction issues.

The recommended standard for the Snells Beach to Warkworth trail is a Walking Track/Grade 2 Cycleway. This is likely to attract the highest number of users and provide the greatest benefit from the significant capital expenditure required. A route that follows existing low use rural roads over part of the route is recommended, because this avoids the need to obtain easements over several private properties, and it offers a better standard of trail. Whilst a trail that passes the Mahurangi Winery would be desirable, it would be difficult to achieve suitable standards on such a trail without migrating widely over private land.

The estimated cost of construction of a Walking Track/Grade 2 cycleway between Snells Beach and Warkworth is between \$1.92M to \$2.06M. With design, consenting and management costs, the total project cost is estimated to be \$2.57M. This cost could be spread over two or more years by taking a staged approach to the development. For efficiency, it is recommended that concept design work and consenting should take place on logical portions of the trail rather than on a piece by piece basis.

The estimated average annual maintenance cost for the whole route is likely to be \$20,000 to \$30,000. This may be reduced, if some maintenance is carried out by local volunteers.

The next stage for this project is to confirm the proposed route and the standard for each of the various links and to evaluate if the estimated expenditure necessary to create these links is justified.

## 2.0 Background

### 2.1. Walkways and Cycleways in the Warkworth / Snells Beach Area

The SBRRA has been investigating potential routes for a walkway linking Snells Beach to Warkworth. This has included extensive reconnaissance of possible public corridors

through reserve land, road reserves and esplanade reserves as well as possible routes through private land, subject to the approval of the landowners.

In 2009, Frame Group Ltd undertook a feasibility study for the development of a walking track along the northern bank of the Mahurangi River from the Elizabeth St bridge in Warkworth to a point opposite the Cement Works ruins. The development of this track did not proceed; however the work done in this feasibility is relevant to this current proposed walkway development because the logical route for a walkway extending to Snells Beach is along the banks of the Mahurangi River rather than beside the busy Sandspit Road and Mahurangi East Road.

There is also a desire by the SBRRA to ensure that any walkway between Snells Beach and Warkworth is also consistent with any wider walking and cycling network, and has suitable linkages with possible future development of walkways that connect with Sandspit and Matakana.

There has been a growth in recreational cycling in recent years and a corresponding demand for quality off-road cycle routes that provide safe cycling opportunities. This demand has been stimulated by the several NZ Cycleway, Nga Haerenga trails throughout New Zealand. Similarly, there has been a drive to encourage cycling as an alternative to vehicular road transport for short journeys, both for work commuting, and for recreational and social visits. As a consequence of this, there is a strong incentive to consider the potential for cycling as part of any walkway proposal, especially if there is an opportunity to provide a cycling link that would be used by commuters as well as recreational cyclists.

The approximate distance by road between Snells Beach and Warkworth is 8km. If a walkway/cycle trail is developed between these centres that is less than 10km in length, a cycle journey from Snells Beach to Warkworth will typically take between 30 mins and one hour depending on the level of fitness of the rider. This is a duration that would attract some commuting cycle journeys by workers or people making a visit for other purposes. A recreational cyclist may spend longer and make a few stops on the way to enjoy the scenery, but a cycle journey between these locations of less than 1.5 hours duration is likely to be within the capability of most people. Hence a return journey by cycle on such a trail is extremely likely.

The walking time for a 10km trail between Snells Beach and Warkworth is likely to be about 2 to 3 hours. As a consequence, it is unlikely that people will commute by walking on such a walkway. It is more likely that people walking such a trail would traverse that track one way as a recreational experience and take alternative transport for the return journey. The availability of a bus service between Snells beach and Warkworth facilitates such recreational walking.

3.0 Objectives and Standards

3.1. Objectives

The objectives for establishment of a walkway between Snells beach and Warkworth, with the potential for links to Sandspit and further beyond to Matakana are taken to be as follows:

- To provide a quality walkway that compliments the existing walkways in the Snells Beach vicinity and provides opportunities for extended recreational walking between Snells Beach and Warkworth for residents and for visitors to these communities.
- To provide linkages between destinations within Snells Beach and within the adjacent surrounding area that may encourage walking journeys as an alternative to vehicular trips.
- To provide the opportunity for commuter cycling between Snells Beach and Warkworth for work, and other visit purposes as an alternative to vehicular trips.
- To facilitate where appropriate, destination based short walking activity in reserves and places of interest that are currently inaccessible to the public.

3.2. Expected Walking Track Users and Categories

The standard of any walkway that is developed needs to be appropriate for the expected users of the walkway. The Standards New Zealand “NZ Handbook for Tracks and Outdoor Visitor Structures” (SNZ HB8630:2004) classifies users of walkways into User Groups, depending on the type of visitor, their physical capability and the likely duration of their walk. The relevant user group classifications and walking track categories for the proposed Snells Beach to Warkworth walkway are summarised in Table 1:

Table 1 – Walking Track User Group Classifications and Track Categories		
User Group	User Description	Track Category
Group 1 Urban Resident (UR)]	Users of urban parks, the majority of which are local residents including unsupervised children, elderly people, people with mobility difficulties and a wide range of physical abilities. People entering parks for recreation or for simply accessing other locations.	<b>Path:</b> Easy track catering for all ages and most walking abilities. Usually high standard of track surface and structures suitable for access in all types of footwear. Low risk tracks. Most will be accessible by people with mobility difficulties or limitations. This category is appropriate for the sections of walkway adjacent to and within Snells Beach town centre and Warkworth centre.
Group 2 Short Stop Traveller (SST)	Users including local residents and visitors from a wider area, undertaking a short walk from a few minutes up to an hour duration. Includes parents with toddlers, school age children, elderly people and some people with mobility difficulties.	<b>Short Walk:</b> Easy tracks catering for all ages and most walking abilities. Formed firm path suitable for safe use by most pedestrians wearing walking footwear. Low risk tracks. May be accessible by people with mobility difficulties. Some of the sections of the proposed Snells Beach to Warkworth walkway may be walked by users in this category.
Group 3 Day Visitor (DV)	Users consisting visitors undertaking an extended walk up to a full day in duration, seeking an outdoor experience in a natural setting with a sense of space. Includes families with young children, school parties and elderly people, but not generally including people who are physically challenged.	<b>Walking Track:</b> Relatively easy tracks, often of extended distance, formed to a high standard that is suitable for physically able users wearing walking footwear. Low risk tracks. May be suitable for people with minor mobility difficulties. This category is appropriate for the main walkway and linkage tracks off the main Snells Beach to Warkworth route.

Some sections of the proposed walkway, particularly those sections nearest to the Snells Beach commercial centre and to the Warkworth centre, may be walked as a short walk excursion by residents or visitors to these centres; however the majority of the walkers who traverse the proposed walkway over the full distance from Snells Beach to Warkworth are likely to be in the Group 3 User Group category. These people will be of a level of fitness and agility to undertake a walk of over 2.0hrs duration.

3.3. Cycling Trail Standards

Recreational cycle trail grades are best described by the Cycle Trail Design Guide prepared for the Ministry of Business, Innovation & Employment. This guide describes various grades of cycleway for different levels of cyclist capability and type of experience offered, and is used as the basis for grading of the NZ Cycle Trail cycleways. The relevant grades for the proposed Snells Beach to Warkworth trail are summarized in Table 2.

Table 2 – Off-road Cycle Trail Grades and Trail Description	
Grade	User Description
Grade 1: Easiest	Flat, wide smooth trail. Trail feels safe to ride. Ideal as a first ride for non-cyclists, and those wanting an easy grade or experience. Trail allows for cyclists to ride two abreast most of the time, and provides a social component to the ride. Cyclists will be able to ride the total distance without dismounting for obstacles.
Grade 2: Easy	Some gentle climbs, smooth trail. Suitable for beginner riders, the trail is predictable with no surprises. Social component with riders able to ride side by side at times, but possibly large sections of single trail.
Grade 3: Intermediate	Narrow trail, there will be some hills to climb, obstacles may be encountered on the trail, and there may be exposure on the edge of the trail. Suitable for riders with intermediate level skills.

If a cycle link between Snells Beach and Warkworth is to be attractive for commuters as well as recreational riders, it must be of a standard that enables users to traverse the trail easily and safely without an excess of exertion or adrenalin. It is unlikely to be a “first ride” opportunity for cyclists; hence a Grade 1 standard is not necessary. This cycleway is however likely to attract riders with relatively low skill level, hence the preferred standard is Grade 2 rather than Grade 3. If a Grade 2 standard is provided, it is more likely to attract commuters and larger numbers of recreational cyclists.

Given there is likely to be two way cycle use as well as pedestrian use on the trail, provision of sufficient width for passing, and where possible, side by side cycling would significantly increase the safety and appeal of the walkway/cycleway. Good visibility ahead is also necessary to ensure that walkers and cyclists can safely use a common trail.

3.4. Design Parameters

The recommended design parameters for the Snells Beach to Warkworth walkway/cycleway links are derived from the above standards and are shown in Table 3. The recommendations are largely driven by the more stringent cycleway standards; however this means that a quality walking experience is also provided. Recommendations

for walking-only linkages are also made as these are applicable for certain links investigated as part of this study.

Table 3 – Design Parameters		
Item	Walkway/Cycleway (Short Walk/Grade 2 Cycleway)	Walking Tracks (no cycling) (Day Visitor Walking Track)
Formation	Benched with cross fall of 2% to 3% to one or both sides. Well formed with drainage provisions to ensure surface water is removed in all conditions.	Benched with cross fall of 2% to 3% to one or both sides. Well formed with drainage provisions to ensure surface water is removed in all conditions.
Gradient	Gradient maximum up to 6% (3.5 degrees) for 95% of route. Maximum 8% (5 degrees) for sections up to 100m. Steeped gradient accepted where trail follows road. No steps	Gradient maximum 17% (10 degrees) Steps may be used where grades are steeper than 17%
Width	1.5m minimum. Preferably 2.0m over most of the trail. (Note where existing road is used, width may be wider, but it is expected cyclists would ride one or two abreast only)	0.75m minimum. Widened to 1.2m where use level is expected to be higher.
Vegetation	Cleared to a height of 2.5m over a width of the path surface. Side vegetation cleared to ensure sight distance of trail ahead for 15m	Cleared to a height of 2.5m over a width of the path surface. Minor encroachment by soft vegetation acceptable.
Surfacing	Durable surface generally consisting of well bound aggregate with resistance to rutting under cycle wheel passage in all conditions.	Well bound aggregate with resistance to slipping.
Drainage	Well drained surface which remains suitable for all types of walking footwear in all conditions. Free from ponded surface water.	Well drained and free from ponded water in most conditions. Some surface water acceptable in adverse weather.
Structures	Boardwalk and bridges 2.0m wide. Barriers where fall heights exceed 1.5m.	Boardwalk 0.75m wide. Barriers required one side where fall height exceeds 1.5m.
Signage	Junctions with link tracks provided with directional finger signage.	Junctions with link tracks provided with directional finger signage.

4.0 Proposed Route

A number of possible routes have been investigated by the SBRRA involving extensive field work in the search of suitable options, especially in the more challenging sections. The findings of the SBRRA have been used in this feasibility, together with a field assessment of selected portions of possible routes. This information, and an analysis of topographical and map data has resulted in the conclusions on the viability of various sections as outlined below.

The appended drawings 15/052 Sheets 00-05 show the routes and links evaluated as part of this feasibility. A summary and description of these links is included in Table 4.



Table 4 - Route Link Options and Evaluation							
Link	Length [m]	Description	Recommended / Possible Standard	Land Tenure	Construction Requirements / Issues	Comments	Est. Construction Cost
C-C1 Hamatana Rd to Marginal Strip	360	Wastewater plant vehicle access road, low traffic use. Unsurfaced road 3.5m wide. Grades up to 12%	Walking/Cycling 2m wide (Main Route)	AC (Watercare?). Current vehicle restricted access.	Signage only. Suitable for cycling and walking in current condition.	Agreement required with Watercare	\$200
C1-D Marginal Strip to end of Grange Street	395	Follows marginal strip, pine plantation, grass areas, undulating near stream. One gully crossing. Steep grade up to Grange Rd will require zig zag.	Walking/Cycling 2m wide (Main Route)	Marginal Strip	Formation, some cut/fill to achieve grade, 8m boardwalk over gully	Pleasant walking/riding environment.	\$62,805
D-E Grange St to Muncaster Rd	310	From below end of Grange Rd , stream crossing and climb to mowed grass area then following road reserve to join existing path in front of #5 Parkdale Close near end of Muncaster Rd.	Walking/cycling 1.5m width (Secondary Link)	Road Reserve, Unformed. AC Reserve	Intersect with main route below end of Grange Rd to minimise grade to stream, 8m bridge over stream, Locate intersection with C-D below end of Grange St. Follow western fenceline before crossing stream on boardwalk below Parkdale Close.	Keep as clear as possible from house at #143 Grange Rd to maintain privacy.	\$66,790
D-F Grange Street from #137 to #21	1210	Existing unsealed road 4-4.6m wide. Sealed from #52. Grades up to 17%, typically 10%. Limited shoulders and berms, but reasonable visibility. Low speed environment.	Walking/Cycling 2m wide (Main Route)	Road Reserve, Formed	Signage, vegetation clearance, possible formation on verge at bends.	Possible speed limit. Future walkway formation on verge over whole distance.	\$13,500
F1-F Mahurangi East Road to Grange Street	1390	From opposite Arabella Lane following existing ROW to lookout point then through Lawries reserve to cross stream then via AC land adjacent to #12 Grange Street. Steep grades in Lawries Reserve and AC land require zig zag route.	Walking Track 0.75m or 1.2m (Grade 2 or 3 cycling route impracticable)	DOC Managed Scenic Reserve, Auckland Council (Wastewater and refuse)	Topography not suitable for Grade 2 or Grade 3 cycling route. Walking track formation with grades up to 17% recommended. Boardwalk, 8m long required over stream.	Route descends 50m elevation to stream and then climbs 50m. AC area currently used for spray irrigation. Hazardous crossing point on Mahurangi East Road. This is not a suitable route for a cycling link to northern Snells Beach.	\$77,400
F-G Grange Street #21 to Lawrie Rd/Hamilton Rd intersection.	650	Follows sealed portion of Grange St and the unsealed portion of Lawrie Rd. Grades up to 10%. Limited verge and poor visibility in places on east side of Lawrie Rd.	Walking/Cycling 2m wide (Main Route)	Road Reserve, Formed	Signage, verge formation (benching) in bends, vegetation trimming. May require fence relocation.	Traffic on Lawrie Rd is moderate during summer, hence potential conflict. Road reserve boundary appears to be well beyond existing fence, hence future verge formed walkway possible.	\$23,000
F-G Alternative direct route from Grange Rd to Lawrie Rd via private land.	350	Across Harvey land and then Hamilton & Withers land to Lawrie Rd/Hamilton Rd intersection.	Walking/Cycling 2m wide (Main Route)	Private Land Harvey Hamilton & Withers	Migration across open paddock would be necessary to achieve required standard and grades. Following eastern boundary adjacent to kauri plantation not viable.	Not recommended. Approval to pass through private land unlikely.	\$40,250
G-G1 Lawrie Rd/Hamilton Rd intersection to Mahurangi River Winery	550	Follows unformed Craigieburn Rd, grade 5%-10%. Currently grazed pasture.	Walking/cycling, either Main route or Link, 1.5m or 2m width	Road Reserve, Unformed.	Easy benching, drainage and surfacing. May require fencing one or both sides or stock grates.	Possible side link to winery that may not be part of main Warkworth to Snells route.	\$63,250
G1-H Mahurangi River Winery to #55 Duck Creek Rd	1290	Initially via unformed Craigieburn Rd, then via route over private land near boundary of private land lots, avoiding mature kauri plantations. Parts of route on boundary have grades up to 25%.	Achievement of Grade 2 or 3 cycleway on this route is not possible without significant zig zag over private land.	Road Reserve, Unformed. Private Land, Treisom & Trotter, Hamilton & Withers, Glen	Migration well into provate land areas would be necessary to achieve suitable cycleway grades. A walking track with boxed steps could be formed adjavent to the boundary.	Not receommeded for main Warkworth to Snells Beach route. Limited value as a walking route.	\$160,350

**Table 4 (continued) - Route Link Options and Evaluation**

Link	Length [m]	Description	Recommended / Possible Standard	Land Tenure	Construction Requirements / Issues	Comments	Est. Construction Cost
G-G2 Lawrie Rd/Hamilton Rd intersection to Duck Creek Rd/Hamilton Rd intersection	890	Follows formed road, 5m unsealed width with minimal shoulder. Close vegetation on verge limits visibility in places. Moderate use road during summer periods, access to Mahurangi winery/restaurant	Walking/Cycling 2m wide (Main Route)	Road Reserve, Formed	Signage, vegetation clearance to improve visitibity, shoulder formation/road widening.	Possible future formation of walkway/cycleway on verge.	\$17,500
G2-G3 Duck Creek Rd/Hamilton Rd intersection to bridge at #99 Hamilton Rd	240	Unsealed road, 5m width with limited shoulder. Straight with good visibility.	Suitable for Walking/Cycling 2m wide (Main Route)	Road Reserve, Formed	Signage.	Low to moderate traffic. Possible future formation of walkway/cycleway on verge. Potential cycleway linkage to Sandspit	\$2,000
G2-H Hamilton Rd/Duck Creek Rd intersection to #55 Duck Creek Rd	520	Unsealed road, 3.5m width, one lane bridge. Reasonable visibility, grass shoulders, low traffic volume.	Walking/Cycling 2m wide (Main Route)	Road Reserve, Formed	Signage.	Suitable for main route due to low traffic volumes.	\$2,000
G3-H Alternative route from bridge at #99 Hamilton Rd to end of Duck Creek Rd	810	Follows fenced stream margin on private land (covenanted) to AC reserve. Mature forest with several large kauri on steep slopes above stream.	Walking Track 0.75m (Grade 2 or 3 cycling route impracticle)	Private land, Babbott & Mermound-Babbott. Auckland Council Scenic Reserve	Extensive mature kauri may necessitate extensive boardwalk and restrictions on track formation.	Not recommended. Possible short walk opportunity, but potential impact on mature kauri may preclude this. Not a viable option for cycleway.	\$172,900
H-H1 End of Duck Creek Rd to tide limit of Duck creek via Private Land	255	From end of Duck Creek Rd following fenced stream margin on private land to pond at tidal limit of Duck Creek.	Walking/Cycling 2m wide (Main Route)	Private land, Glen	Easy benching and surfacing on flat berm above stream, 8m bridge over stream to Duck Creek Reserve at H1.	This option would have less impact on the stream edge in lower Duck Creek.	\$51,805
H-H1 End of Duck Creek Rd to tide limit of Duck creek via Duck Creek Reserve	340	From AC Land, cross Duck Creek and follow streamside bench and steep heavily vegetated north bank to tidal limit of Duck Creek	Walking/Cycling 2m wide (Main Route)	DOC Managed Scenic Reserve	Bridge 15m long over Duck Creek, benched track with possible gantry structure and/or retained portions to minimise impact on trees.	Very scenic option that also offers a good short walk for visitors who drive to end of Duck Creek Rd.	\$171,750
H1-I Tide limit of Duck creek to opposite Cement Works Ruins	1660	Follows slopes on north bank of Duck Creek through Duck Creek Scenic Reserve and then edge of Mahurangi River along base of heavily vegetated slopes through Dunning Scenic Reserve and Rows Scenic Reserve.	Walking/Cycling 2m wide (Main Route). May need to reduce width to 1.5m in places to limit impact on vegetation.	DOC Managed Scenic Reserve	Benching and occasional retaining on moderate to steep slopes. Mature kauri higher on slopes avoided. Boardwalks over side gullies and streams.	Visible impact minimised by mature forest cover. Potential periodic ferry service to Cement Works.	\$592,800
I-J Mahurangi River Bank opposite Cement Works to opposite Percy Street	2023	Follows steep heavily vegetated land on north bank through Rows Scenic Reserve, private land, AC Local Purpose Reserve and Puhinui Scenic Reserve. Route passes over headland opposite Robertson Boat Yard.	Walking/Cycling 2m wide (Main Route). May need to reduce width to 1.5m in places to limit impact on vegetation.	DOC Managed Scenic Reserve, Private Land, Adolph AC Local Purpose Reserve and Esplanade Reserve	Benching and occasional retaining. Boardwalks and bridges across side streams and deep gullies.	Very attarctive riverside walk/cycleway that has potential as a popular return walk from Warkworth or through route to Duck Creek.	\$676,900
J-K Mahurangi River Bank from opposite Percy St to Elizabeth St bridge.	605	Follows existing benching where present on vegetated river margin opposite Warkworth wharf and past historic kilns and following Esplanade Reserve to small park at end of Elizabeth St bridge.	Walking/Cycling 2m wide (Main Route)	DOC Managed Scenic Reserve, Esplanade Reserve, Private land, Garner & Middleton-Garner	Benching and occasional retaining. Boardwalks and bridges across side streams and deep gullies.	Some structures may be necessary to protect historic kilns and some mature trees. This section will be an attractive short walk for Warkworth residents.	\$228,750
Total (For Preferred Option Main Route only)							\$1,669,260
	8,568						
						Contingency 15%	\$250,000
\$1,919,260							

## 5.0 Review of Proposed Route

The recommended main route linking Snells Beach and Warkworth follows the following nodes shown on the plans:

- C-C1-D-F-G-G2-H-H1-I-J-K (8.6km)

This route consists of a significant portion of new trail construction (C-D, H-H1-I-J-K) totalling 4.9km. Most of this new route construction is along the north bank of the Mahurangi river. Whilst this route is challenging from a construction perspective, it has several key advantages as follows:

- This route offers the best opportunity to meet the desired trail standard, especially the required grade limits.
- This route provides access to reserve land that is not currently accessible to the public.
- It provides an appealing walking and cycling route with good views and experiences.
- It has minimal passage through mature kauri groves where new trail construction will meet with resistance due to kauri dieback concerns.
- It requires easement negotiations with only a small number of private landowners.

Whilst the SBRRA investigated other route options that are located higher above the river, these are not recommended because:

- These require a significant climb which would be difficult to achieve within the recommended gradient limits for a cycleway.
- Passage through large groves of mature kauri would be necessary if the trail is higher above the river.
- The trail length and travel time between Snells Beach and Warkworth would be increased, making it less desirable as a commuting route.

The route investigated by SBRRA on the north side of Duck Creek (G3 – H) is also not recommended because it passes along steep slopes with mature kauri. Gaining consent for a walkway/cycleway through this area likely to be difficult and would most likely only be permitted if much of the route was constructed as boardwalk. This link may have merit as a local short walking track.

Alternative routes from the intersection of Lawrie Rd and Hamilton Rd have been investigated by SBRRA. A desirable route via the Mahurangi River Winery and then down to Duck Creek (G-G1-H) has been proposed. This route however would require a climb

from 60m elevation at the Lawrie Rd/Hamilton Rd intersection to over 85m near the Winery, and then a descent of over 70m altitude to the end of Duck Creek Rd. This descent would require zig zags within private land to achieve suitable grades for bi-directional cycling. A steady climb from 15m to 85m on the main route would be a significant detract from the appeal of cycling from Warkworth to Snells Beach. The steady climb via Hamilton Rd proposed in this report has much greater appeal for most users, even though it follows a road. In the future, there may be sufficient demand to justify formation of a separated walkway/cycleway beside Hamilton Rd over this portion of the route.

The section of the proposed main route on Lawrie Rd (F-G) is not ideal, and may require batter trimming within the road reserve to ensure there is sufficient safe width and sight distance to minimise the risk of vehicle/cycle conflicts. The alternative routes in this location investigated by SBRRA which cross private pasture or follow an area of mature kauri are both considered impractical. It is unlikely that the landowner would agree to a trail passing through the middle of a paddock, and the kauri forest route is not feasible because of steep grades and the likely impact on kauri trees. Whilst the deviation via the Lawrie Rd/Grange St intersection adds to the overall route distance between Snells Beach and Warkworth, it is not a significant increase and it provides easier grades for cyclists making the ascent from 60m elevation on Hamilton Rd to the high point of 84m on Grange St when riding from Warkworth to Snells Beach.

The proposed connector trail to Muncaster Rd follows a road reserve where it will be possible to achieve the desired cycleway standard. The stream crossing will require a bridge and there are merits in keeping this bridge elevated as high as possible above the stream to reduce the descent and climb on the trail that will be necessary to reach the end of Grange St.

The connecting link proposed by SBRRA through Lawries Reserve and the Auckland Council land occupied by the recycling centre crosses land of topography that is not conducive to formation of a Grade 2 cycleway. This route could provide a very appealing walking track for recreational walking, but the descent from the high point at 83m elevation on the vehicle access off Mahurangi East Road, down to the stream crossing point at 27m elevation and then back up to 84m elevation on Grange St would be challenging for many cyclists. To provide a gradient suitable for a Grade 2 or Grade 3 cycleway on this link would require a trail length of at least 2km which would contain considerable zig zag alignment on the descent and the ascent. Given the lesser appeal for such a cycleway, it is recommended that this link be constructed as a walking track only. This route is not suitable as part of a recreational cycleway link to Sandspit, but it may have appeal for local mountain bikers.

## 6.0 Construction Issues

The development of the new sections of this walkway/cycleway will consist of conventional construction methods that have been used for development of similar walkways and cycleways. This will include:

- Cut and fill formation on rolling to moderately sloping ground to achieve the required formation width and grade. Cut soil will be placed and compacted into fill areas to minimise the amount of total earthworks necessary to form the trail.
- Benched formation on steeply sloping ground where the cross-slope is too steep to place fill material.
- Retained bench formation where the presence of trees or rock limit the amount of excavation that may take place. Some sections of trail beside Duck Creek and the Mahurangi River may require this method of construction.
- Raised timber boardwalk or gantry structures on ground where tree root disturbance is to be avoided, or where wetland or gullies are to be traversed.
- Bridges where streams are crossed. For the bridge over Duck Creek (H-H1, reserve option), a glue laminated timber beam type bridge is recommended.

Walkway/cycleway formation would be carried out using small mechanical excavators and compaction equipment. Given the close proximity to waterways and the steeply sloping ground in places, the construction of the new walkway sections should be carried out during the drier summer periods. Prior to construction of each section of trail, it is recommended that it be surveyed and designed in detail so that proper set-out can be provided for construction. This will enable construction to be confined to the minimum width necessary and avoid disturbance of ground outside the trail formation.

Surfacing of all the new sections of trail with aggregate is recommended. It is not necessary to provide a sealed surface on these trails, but a well bound stable aggregate pavement is essential if a low maintenance all weather trail surface is to be achieved. If constructed from appropriate materials, an aggregate pavement will be suitable for cycling as well as walking.

Provision of the trail on the road sections (Grange Street, Lawrie Rd, Hamilton Rd and Duck Creek Rd) will require significantly less work than the new sections of trail. In the initial stage, it would be possible to include these sections of road as part of the walkway/cycleway route between Snells beach and Warkworth with little more than signage warning motorists that this is a shared use route and that cyclists may be encountered. If use levels increase and if traffic numbers rise, then there would be merit in considering provision of a separated walkway/cycleway on the road verge.

## 7.0 Consent Issues

Construction of walking trails on land managed by the Department of Conservation as conservation land does not require a resource consent under clause 4(3) of the RMA, however given the proposed trail is intended for cycle use as well as walking, and because parts of the trail cross Auckland Council Reserve land and private land, most of the new sections of trail construction are likely to require Resource Consent.

Application for consent will require a detailed assessment of effects and in the case of the sections along the Duck Creek and Mahurangi River edge; is likely to require specialist ecological, arborcultural, archaeological and geotechnical assessment. It is also likely that extensive consultation will be necessary. Given the resources that will be necessary for this consenting process, it is recommended that Resource Consent for the whole trail from Duck Creek to Elizabeth St in Warkworth (H-K) be sought as a single consent application. This will enable efficiencies to be obtained in the assessment and consent processing.

Any boardwalks, gantry structures and bridges that have a fall height greater than 1.5m will require a Building Consent. It will be necessary to ensure such structures are properly designed in compliance with the Building Code, and are certified by a structural engineer. Building Consent for each bridge structure can be obtained immediately prior to construction of each structure. There is merit in adopting a common theme in the design of such structures to achieve design and construction efficiencies as well as aesthetic consistency.

## 8.0 Cost Estimates

Costs for construction of each section of walkway/cycleway and walking track covered by this feasibility have been estimated and are shown in Table 4. These estimates are based on current typical contractor construction rates for similar types of walkway and cycleway trail construction. The estimates are inclusive of all materials, plant and labour but do not include provision for a contingency. The figures shown in Table 4 are exclusive of GST. Table 5 shows the unit rates and detail of these estimates.

The total estimated construction cost for the main route between Snells Beach and Warkworth, allowing a 15% contingency on the direct cost estimates is \$1.92M. The largest portion of this cost arises from section H-K, ie the section along Duck Creek and the Mahurangi River bank. If the landowner at the end of Duck Creek does not give approval for the preferred route for section H-H1, then the total construction cost would increase to \$2.06M.



Table 5 - Cost Estimate Detail										
Link	Formed Track on level ground (including drains)	Formed Track on Slope < 50% (including drains)	Benched Track Slope >50% (including drains)	Surfacing	Retaining Wall	Boardwalks	Bridges	Barrier	Misc (signage, culverts, rock breaking, etc)	Total
<b>Rates (2m width)</b>	<b>25</b>	<b>55</b>	<b>120</b>	<b>60</b>	<b>750</b>	<b>1100</b>	<b>2800</b>	<b>250</b>	<b>1</b>	
C-C1 Hamatana Rd to Marginal Strip									200	<b>\$200</b>
C1-D Marginal Strip to end of Grange Street	60	227	100	387	6	8			300	<b>\$62,805</b>
D-E Grange St to Muncaster Rd		246	50	296		6	8		500	<b>\$66,790</b>
D-F Grange Street from #137 to #21		100		100					2000	<b>\$13,500</b>
F1-F Mahurangi East Road to Grange Street *	50*	350*	150*	550*		4			1500	<b>\$77,400</b>
F-G Grange Street #21 to Lawrie Rd/Hamilton Rd intersection.			100	100					5000	<b>\$23,000</b>
F-G Alternative direct route from Grange Rd to Lawrie Rd via private land.		150	100	250					5000	<b>\$40,250</b>
G-G1 Lawrie Rd/Hamilton Rd intersection to Mahurangi River Winery	200	350		550					6000	<b>\$63,250</b>
G1-H Mahurangi River Winery to #55 Duck Creek Rd	300	790	200	1290					8000	<b>\$160,350</b>
G-G2 Lawrie Rd/Hamilton Rd intersection to Duck Creek Rd/Hamilton Rd intersection		100		100					6000	<b>\$17,500</b>
G2-G3 Duck Creek Rd/Hamilton Rd intersection to bridge at #99 Hamilton Rd									2000	<b>\$2,000</b>
G2-H Hamilton Rd/Duck Creek Rd intersection to #55 Duck Creek Rd									2000	<b>\$2,000</b>
G3-H Alternative route from bridge at #99 Hamilton Rd to end of Duck Creek Rd *			305*	405*		100*			2000	<b>\$172,900</b>
H-H1 End of Duck Creek Rd to tide limit of Duck creek via Private Land	200	47		247			8	12	4000	<b>\$51,805</b>
H-H1 End of Duck Creek Rd to tide limit of Duck creek via Duck Creek Reserve			300	300	30	40	15	25	3000	<b>\$171,750</b>
H1-I Tide limit of Duck creek to opposite Cement Works Ruins			1560	1560	200	100		200	2000	<b>\$592,800</b>
H1-I Tide limit of Duck creek to opposite Cement Works Ruins			1900	1900	200	100	23	30	3000	<b>\$676,900</b>
J-K Mahurangi River Bank from opposite Percy St to Elizabeth St bridge.			550	550	30	35	20	35	4000	<b>\$228,750</b>

Note: Quantities for Walking track links shown with \* have been factored to account for narrower track width

In addition to the construction cost, allowance should be made for design, consenting and project/contract management. Hence the total estimated cost for a walkway/cycleway between Snells Beach and Warkworth is as follows:

Estimated Construction cost:	\$1,920,000
Design (allow 10% of construction cost)	\$192,000
Consenting costs (allow 12% of construction cost)	\$215,000
Project Management / Contract Mgmt (15%)	\$220,000
<b>Total Project Cost.</b>	<b>\$2,574,000</b>

Development of the walkway/cycleway could be staged as several sub-projects, however until such time as the full section from Duck Creek to Warkworth (H-K) is in place, a viable Snells Beach to Warkworth route would not be available.

The total cost of development would be reduced if the standard for the Snells Beach to Warkworth trail was reduced from a Grade 2 cycleway to a standard that met the Walking Track standard only. Such a track could be used by intermediate to advanced Grade 4 cyclists (Mountain Bikers), but it is unlikely such a trail would be used for commuting. The use would be limited to walkers, and the more adventurous mountain bikers. We have not evaluated the total cost for a Walking Track only option for the whole route, but it is likely to be between \$1.5M and \$2.0M.

We strongly advise against any temptation to consider initial development of the route as a Walking Track only, with the intent of upgrading it to a Grade 2 cycleway in the future. The gradients and structures provided for a Walking Track standard trail would be unsuitable for a Grade 2 cycleway, hence at the time of upgrade, it is likely that significant re-construction and re-routing of the original trail would be necessary. If compromise must be made to fit the budget, a reduction in trail width to 1.5m or 1.2m may achieve some savings.

9.0 Maintenance

Once established, the off road portions of the walkway/cycleway will require regular maintenance. This typically consists of:

- Vegetation clearance including trimming of encroaching branches as trees grow; cutting or spraying of encroaching grasses,
- Clearance of vegetation and sediment from of cross culverts (where necessary),

- Replenishment and compaction of the walking surfacing material. This will be necessary at between three year and six year intervals, depending on the level of track use, and the occurrence of extreme storm events that may cause scouring of the surface,
- Repairs to worn boardwalk and bridge deck mesh, and replacement of any damaged or detreated structure components,
- Repairs to any damage caused by severe weather events (flood damage, landslide, treefall).

Some maintenance work could be carried out by local volunteers; however tasks such as re-surfacing are likely to require specialist equipment for aggregate cartage and compaction and would be best carried out by a contractor.

Typically, the annual allowance for maintenance cost of a track ranges from 1% to 1.5% of the original construction cost. Hence the likely annual maintenance cost for the Snells Beach to Warkworth trail is likely to be \$20,000 to \$30,000. This expenditure is unlikely to be uniform and will be less than this for most years, but will be higher in the years that re-surfacing is required, or if significant storm damage occurs.

10.0 Next Steps

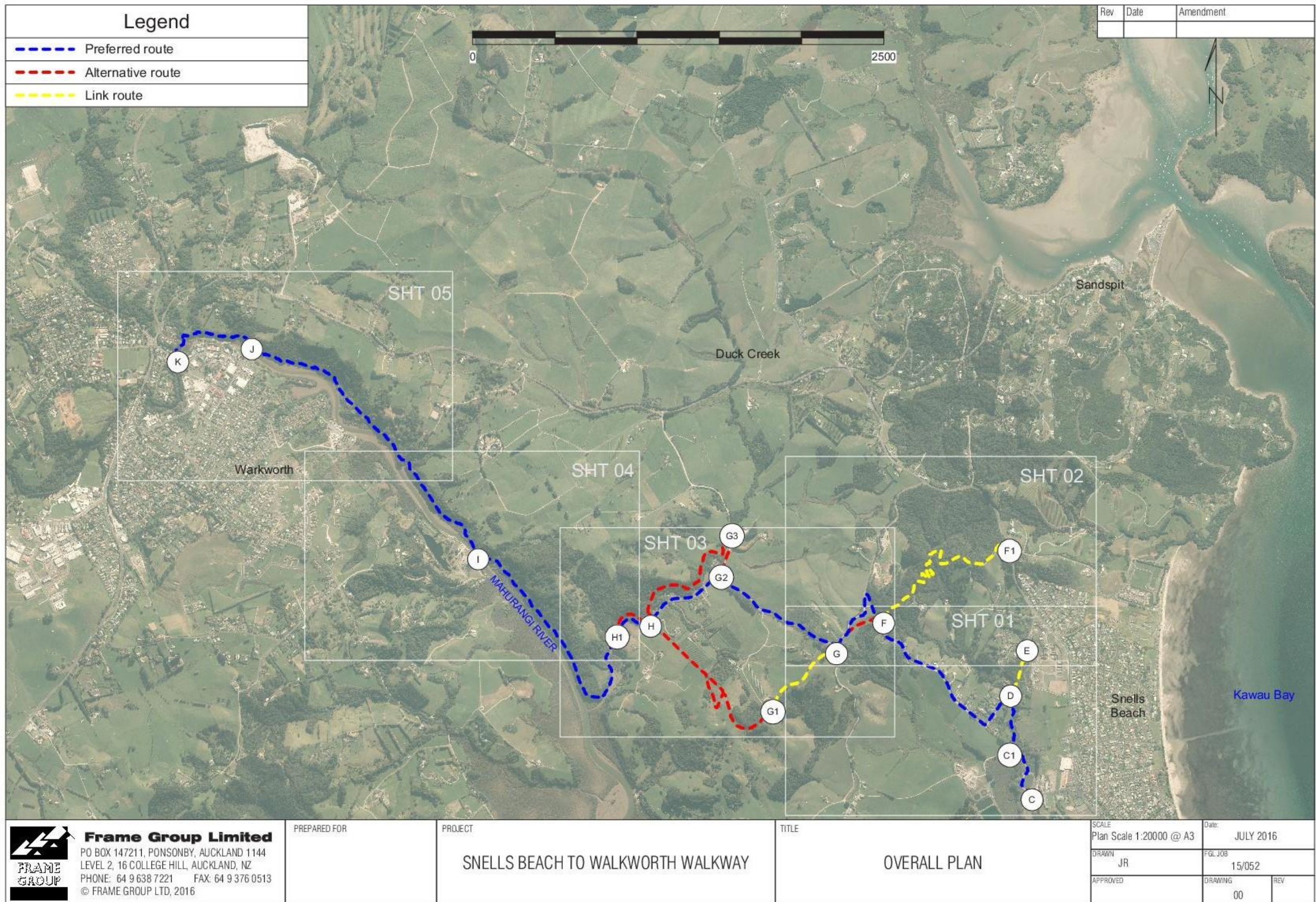
The next stages of the project are:

- Confirm the proposed route and standards for the various links.
- Seek landowner approvals where necessary
- Raise the necessary funds (possibly staged over two or more years)
- Prepare concept design
- Apply for and obtain the necessary Resource Consents
- Prepare detailed design
- Engage construction resource and manage construction

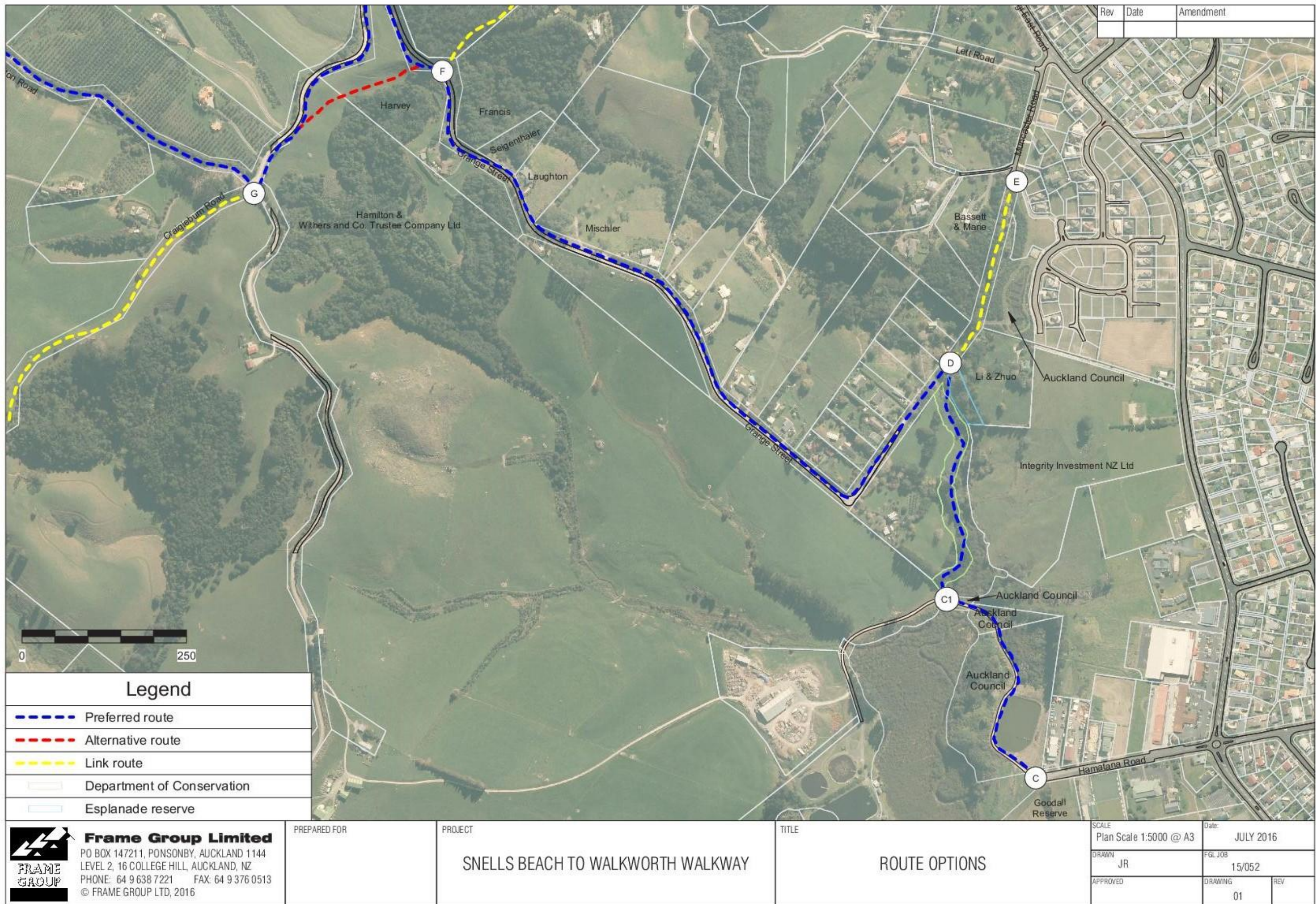
11.0 Appendices

- 10.1 Drawings 15/062 sht 00-05 showing proposed links
- 10.2 Example photos

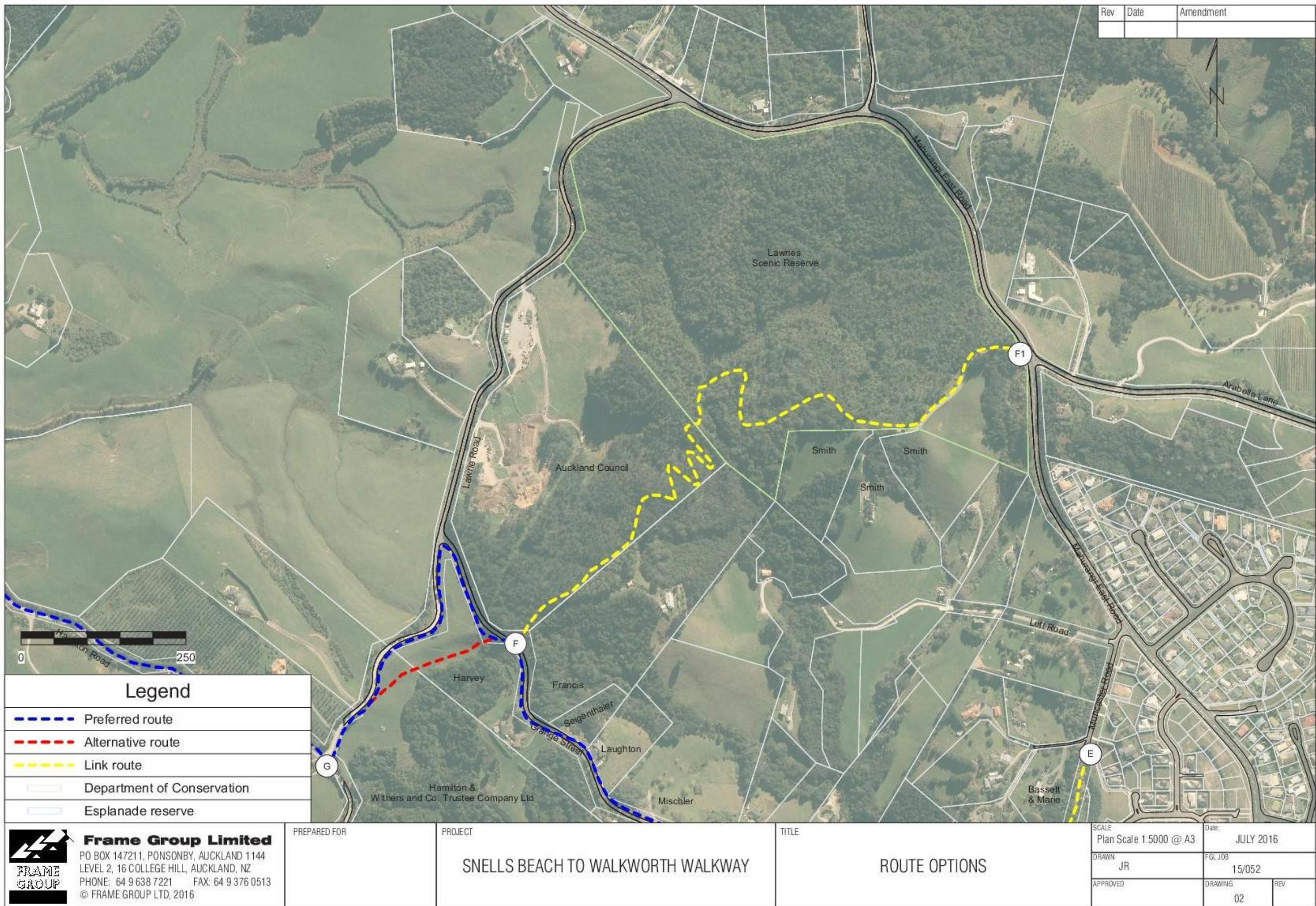




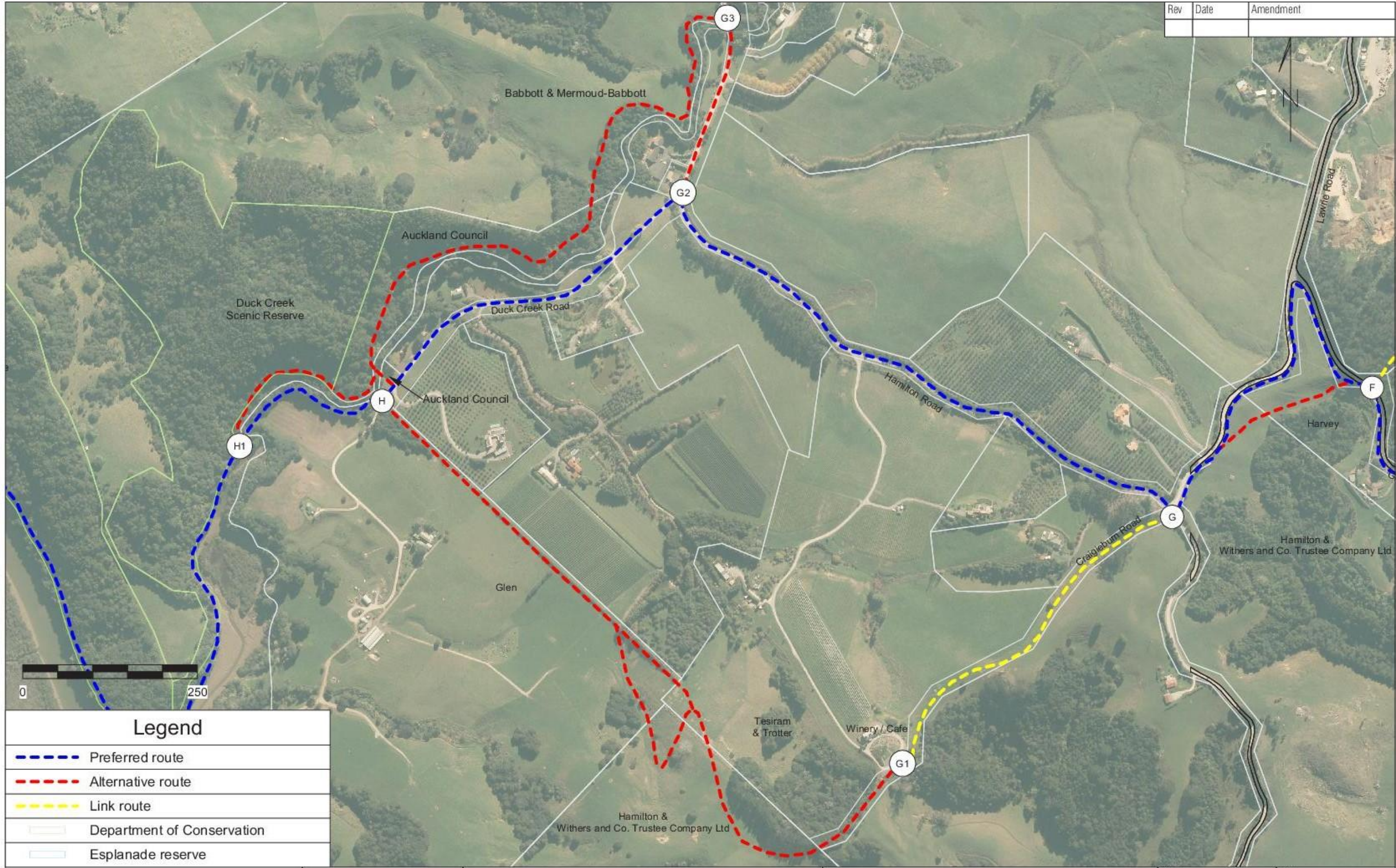












Rev	Date	Amendment

Legend	
	Preferred route
	Alternative route
	Link route
	Department of Conservation
	Esplanade reserve



**Frame Group Limited**  
PO BOX 147211, PONSONBY, AUCKLAND 1144  
LEVEL 2, 16 COLLEGE HILL, AUCKLAND, NZ  
PHONE: 64 9 638 7221 FAX: 64 9 376 0513  
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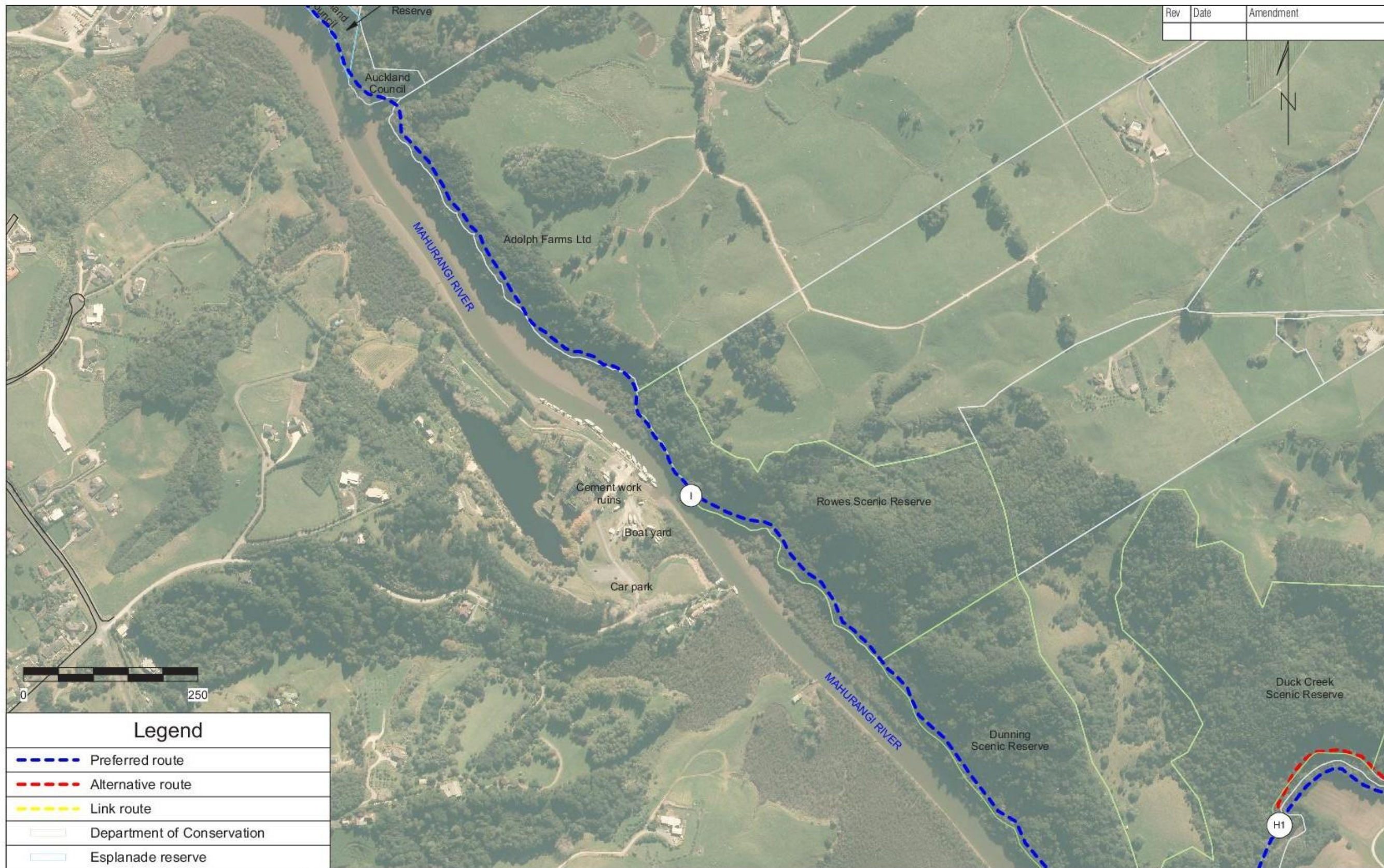
PREPARED FOR

PROJECT  
**SNELLS BEACH TO WALKWORTH WALKWAY**

TITLE  
**ROUTE OPTIONS**

SCALE Plan Scale 1:5000 @ A3	Date: JULY 2016	
DRAWN JR	FGL JOB 15/052	
APPROVED	DRAWING 03	REV






Rev	Date	Amendment

Legend	
<span style="color: blue;">---</span>	Preferred route
<span style="color: red;">---</span>	Alternative route
<span style="color: yellow;">---</span>	Link route
<span style="border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>	Department of Conservation
<span style="border: 1px solid blue; display: inline-block; width: 20px; height: 10px;"></span>	Esplanade reserve

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		SNELLS BEACH TO WALKWORTH WALKWAY	ROUTE OPTIONS	Plan Scale 1:5000 @ A3	JULY 2016	
				DRAWN	FGL JOB	
				JR	15/052	
				APPROVED	DRAWING	REV
					04	





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		SNELLS BEACH TO WALKWORTH WALKWAY	ROUTE OPTIONS	DRAWN JR	FGL JOB 15/052
				APPROVED	DRAWING 05
					REV



### 10.3 Example Photos



Typical cut and fill formation walkway/cycleway. (Sections C1-D & D-E formation will be similar to this)



Benched formation on steeper slopes



Boardwalk and trail with retained edge on sloping ground



Gantry and retained formation on steep forested slopes (May be necessary for some locations beside Duck Creek and Mahurangi River)



Indicative bridge design for Duck Creek and other stream crossings



Typical Walking Track with sections of boxed steps (Standard recommended for F-F1)