Restoration of the Rimutaka Incline Railway

Development Proposal and Environment Management Plan: Maymorn to Summit

Executive Summary

Rimutaka Incline Railway Heritage Trust

November 2011.

Photo: S class locomotive and train at Summit circa 1880. William Williams, Alexander Turnbull Library
Preface

This document is an Executive Summary form of the Development Proposal and Assessment of Environmental Effects, which canvasses the issues which are considered to be important in relation to deciding whether approval should be given to reinstating the Rimutaka Incline Railway.

This document provides a summary, via answers to key questions, concerning elements of the proposal and the main environmental, planning, design and construction issues.

Information shown on maps and plans in this document are indicative only. Reference should be made to detailed maps and plans where referenced.
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Background to the railway and the proposal

.1 What is the history of the Rimutaka Incline Railway?

The construction of the original Wellington to Masterton railway was authorised by the New Zealand Government in 1871, one of a number of key railway schemes built during the term of Julius Vogel, Colonial Treasurer. The extension of the Wellington to Upper Hutt line to Kaitoke and Summit involved three tunnels, extensive earthworks and three sections of steep gradients – conforming to conventional railway standards of the time. The section of line from Upper Hutt to Summit was built by the Public Works Department and also under a number of private contracts commencing in 1874. The line from Upper Hutt to Kaitoke was opened in 1877, and from Kaitoke to Featherston, via Summit, in 1878.

Figure: Railway routes between Upper Hutt and Featherston, showing the old route that included the Fell Incline, and the current KiwiRail line through the Rimutaka Tunnel.

The most challenging part of the railway was locating a route to descend from Summit to the Wairarapa plains, due to the steep and rugged topography on the eastern side of the Rimutaka Ranges. A steep three-mile (4.8km) incline of average 1 in 15 gradient was located between Summit and Cross Creek, worked by Fell locomotives. A centre-rail was used for both adhesion of ascending trains, and for braking for descending trains. The Fell locomotives were equipped with a centre engine, with horizontally-mounted driving wheels that made contact with running surfaces either side of the centre rail. It was the third and last Fell system built, and the longest-lasting out of the systems at Mont Cenis in France, and the Cantagalo railway in Brazil.

A replacement tunnel under the Rimutaka Ranges was mooted as early as 1900, deferred due to cost, and proposals were revisited in 1921-22 and in 1936-1939, the latter project deferred due to the onset of World War II. The maintenance costs associated with the Incline and aging Fell
locomotives continued to increase. In 1945 the project was revisited, plans finalised and approved. The Public Works Department and Morrison Knudsen Inc. and Downer and Company constructed the Rimutaka and Maymorn tunnels and associated deviation from 1951-1955.

The old line over the Rimutaka Incline was closed on 29 October 1955, the new line opening a few days later on 3 November 1955. The railway and structures on the old route were dismantled, demolished and sold shortly after the line closed. Bridges were retained to provide continued road access into the area, land to the west of Summit passing into water works and Greater Wellington Regional Council ownership, land to the east to the Department of Conservation.

.2 How did the restoration proposal originate?

The project originated at a ceremony that was held at Summit in July 2001. Two events were being celebrated: Historic Places Trust registration of the railway formation between Kaitoke and Cross Creek; and the Rail Heritage Trust of New Zealand award for restoration of two bridges on the route. Bob Stott, Editor of Rails magazine, commented that the formation was like ‘a well-tended grave’ and suggested that a railway of some shape or form ought to be reinstated.

The Wellington Regional Council's Landcare Committee invited rail heritage groups to explore how a tourist heritage railway might be reinstated on the historic Rimutaka Incline railway formation. The Rimutaka Incline Railway Steering Committee was formed in August 2002 to coordinate the project, drawing members from established rail heritage groups and the Upper Hutt City Council.

On 8 August 2003 the Rimutaka Incline Railway Heritage Trust was incorporated as a Charitable Trust, the culmination of months of planning and consultation by the Steering Committee. The Trust formally came into existence on 16 July 2003.

The Rimutaka Incline Railway Heritage Trust was registered with the Charities Commission as a charitable entity under the Charities Act 2005 on 27 February 2007, Registration number: CC10029.

.3 What progress has the Rimutaka Incline Railway Heritage Trust made?

- July 2005: Licence to occupy secured for much of the Maymorn railway station yards
- April 2008: Resource Consent gained for a full range of railway and tourist activities at the Maymorn site
- June 2009: Rail licence issued to the Trust from NZ Transport Agency as a railway operator and rail network access provider.
• 2008-2011: Construction of an 80m x 10m rail vehicle shed at Maymorn, providing storage, maintenance and workshop facilities. External shell completed in 2011. Funded by NZ Lottery Grants Board, Rimutaka Charitable Trust, The Community Trust of Wellington, Pelorus Trust and other grants and donations, designed, project managed and majority of the build undertaken by skilled volunteers.

• 2009-2011: Track formation excavated for the length of the Maymorn yard, mainline track built

• 2005-2011: Rail vehicle fleet of 8 carriages, 20 wagons, 3 steam locomotives and 1 diesel shunt locomotive on site at Maymorn.

• 2003-2011: Assets to capital value of $472,000 – buildings and facilities at Maymorn will be valued once completed, anticipated value in excess of $1 million.
.4 What other approvals are necessary before construction can proceed past Maymorn?

Applications will be submitted to the following organisations before construction can start:

- **Upper Hutt City Council**, which has planning control over the railway route. A fully notified resource consent will be required for earthworks, cultural heritage and tourism facilities, educational institutions, cafes, restaurants, retail premises, possible building dimensions, carparking, signs and other proposed departures from the District Plan.

- **Greater Wellington Regional Council**, which also has planning control over the railway route with respect to earthworks, works associated with water courses and other proposed departures from the Regional Plan.

- Department of Conservation / Greater Wellington Regional Council with respect reoccupation of the railway formation as it passes into the **Tunnel Gully Scenic Reserve**

- **New Zealand Transport Agency** – a variation to the current RIRHT rail licence will be required, as the nature and scope of rail activities intensify and change with the extension of the Trust’s current rail network and operation of additional rail vehicles.

.5 What is the application seeking?

This application is seeking approval in principle to rebuild the railway from Maymorn to Summit, subject to completion of an agreed timetabled programme of investigation, analysis, consultation and fundraising. The Trust seeks to work in partnership with Greater Wellington Regional Council to carry out this programme of work to meet GWRC requirements.

.6 What is the cultural significance of the Rimutaka Incline Railway?

The route of the railway today has historic, aesthetic, engineering and social heritage significance.

- It has historic significance as it formed the original government railway link between Wellington, the Wairarapa, Hawkes Bay, Taranaki and points further north.

- It has aesthetic importance because of the rugged Rimutaka Range through which it passes.

- It has engineering importance as it was the only instance of railway line where the Fell centre-rail was used for adhesion as well as braking, which saw the use of up to five Fell locomotives spaced through trains ascending the steep 1 in 15 gradient between Cross Creek and Summit.
- The line also used many technically innovative techniques not seen before in New Zealand, including first use of the Fell centre-rail system, what is believed to be the first concrete-block structure in the country – the Pakuratahi Tunnel.

- It has social importance as it opened up and connected Wairarapa communities with the port in Wellington. There is a long-lasting community connection with the Rimutaka Incline, due to the important transport service the railway provided along with the significant number of people employed to operate the Incline over the years.

.7 What is the International significance of the Rimutaka Incline Railway?

The railway has international significance as the Rimutaka Incline was the longest-lasting line in the world that used a Fell centre-rail for adhesion as well as braking – from 1878 to 1955, and was the only fully-working example of the Fell system remaining in the world after 1883. Most other instances of Fell railways were short-lived affairs, including the original Mont Cenis railway in France.

.8 What is the significance of the Rimutaka region?

The Rimutaka Region is characterised by the steep and rugged Rimutaka Range, which still presents an obstacle to the transport needs of the Wairarapa region. The Ranges contain and define the topography and the population centres.

The railway offers the opportunity for a commissionable tourist attraction consisting of an authentic heritage experience for Upper Hutt and the entire Wellington region.

.9 Have railway reinstatements been successful elsewhere?

New Zealand

In New Zealand a number of railway reinstatements have been successfully achieved, including:

- **Denniston Incline**, Department of Conservation – the former skip-road portion past Top Brake is being rebuilt, with trains operating through to former mine tunnels.

- **Glenbrook Vintage Railway** – 4km of the route from Pukeoware to Waiuku in South Auckland has been rebuilt on abandoned railway formation and the last kilometre on completely new formation – opened in 2010.

- **Rotorua branch** – the line from Putaruru to Rotorua has been rebuilt from derelict condition, where long stretches of line had been stripped of sleepers and rail and vegetation majorly overgrowing the route. Establishing with tourist self-drive “rail cruisers” by the Rotorua Ngongotaha Rail Trust, with plans for the return of freight and passenger rail services in the medium term.
Overseas

Notable railway reinstatements of similar nature to the Rimutaka Incline Railway include:

- West Coast Wilderness Railway – Tasmania.
- Welsh Highland Railway – Wales.
- Lynton and Barnstaple Railway – Devon, UK.

**West Coast Wilderness Railway – Tasmania.**

35km line from Queenstown to Regatta Point, including a steep section of Abt rack system cog railway. A committed group of local people campaigned for the restoration of the Abt Railway as an iconic heritage tourist attraction. The proposal was met with Federal Government support, and reconstruction began in the late 1990’s, the railway reopening in December 2002. Operated by Federal Hotels, the tourist operation is one of the key attractions in Tasmania, supplementing the scenic Gordon River Cruises and other sights in the World Heritage Wilderness area around Strahan. Fares range from $119 - $336 for a return journey. www.westcoastwildernessrailway.com.au/
Welsh Highland Railway – Wales.

40km line from Caernarfon to Porthmadog, passing through scenic Beddgelert and Aberglaslyn Pass. Reinstatement of historic 2-foot gauge railway, opened in 1923 and closed in 1943. The line was rebuilt by the Festiniog Railway Company after years of planning and negotiation – with some complicated legal arrangements to work through.

The line was reopened in four phases, commencing from Caernarfon to Dinas in 1997, the final section to Porthmadog opening in 2011. Railway lines, sleepers and garratt steam locomotives were imported from South Africa for the line, with new carriages built.

Civil engineering of the new line was undertaken by local contractors, with volunteers rebuilding the railway line itself. Whilst the investment in the line was substantial, a recent study undertaken on the railway indicates that the benefit to the local economy has exceeded the grant expenditure from the Millenium Commission and the European Regional Development Fund, and at least 350 local jobs have resulted from the reinstated railway in addition to the railway’s employees.

http://en.wikipedia.org/wiki/Welsh_Highland_Railway_restoration

Welsh Highland Railway garratt in the Welsh countryside.. Photo - Andy Roberts
http://www.flickr.com/photos/aroberts/
New walkway bridge provided alongside the Bryn-y-felin bridge, with the “Fisherman’s Path” extended through the Abergaslyn Pass. Photo: Matt Buck,

www.flickr.com/photos/mattbuck007/4031847987
Lynton and Barnstaple Railway – Devon, UK.

The Lynton & Barnstaple Railway is being rebuilt in stages in North Devon, UK. The original 2-foot gauge Lynton & Barnstaple Railway opened between the two towns in 1898 and closed in 1935.

The Lynton & Barnstaple Railway Association have purchased two stations on the former route at Chelfham and Woody Bay and opened 1.4km of the line towards Parracombe in 2004. One replica locomotive has been built and two more are currently being constructed.

A major 13km expansion of the line to is under way that will see trains operate from Lynton through Woody Bay to the Westlandpound reservoir. The scheme is predicted to generate well over twice its expected construction cost in benefits to the local economy. “Given the continuing support of the public, landowners and local authorities it is possible that the entire railway between Lynton & Barnstaple could one day be reopened, with the potential of becoming one of the most famous heritage railways in the world”.

www.lynton-rail.co.uk

Replica L&B Railway locomotive Lyd arrives at Woody Bay station in 2010

www.lyntonbarnstaple-world.cd2.com/revival.htm
Plans for reinstating the railway

.1 What community consultation has taken place?

- Public, via:
  - Website
  - Displays at RailEx in Wellington, Porirua many times over the years. Märklin Club – Silverstream.
  - Display in Main Street Upper Hutt September – November 2010
  - Display at Upper Hutt 40th anniversary, Main Street, Upper Hutt Summer carnivals, Jousting at Harcourt Park, Mangaroa School, Plateau Road School
  - Probus clubs – Upper Hutt, Heretaunga, Johnsonville
  - Rotary Upper Hutt, Silverstream, Lower Hutt
  - Lions Club of Rimutaka
- Department of Conservation – Allan Ross, Richard Nester, Paul Mahoney
- Historic Places Trust
- Upper Hutt City Council, general, and Maymorn Structure Plan. Project was a business partnership with UHCC under LTCCP c.2006-2008
- South Wairarapa District Council
- Wellington City Council
• Greater Wellington regional Council – e.g. Transport Division, Reservoir exploration with MWH
• Transit – Kaitoke SH2 Upgrade
• KiwiRail
• Rail Heritage Trust
• Steam Incorporated, Mainline Steam, Silver Stream Railway, Friends of the Fell, Federation of Rail Organisations of New Zealand.
• Landowners in Maymorn and Kaitoke areas, adjacent to and in vicinity of stations and connecting route, as well as Upper Valley Gliding Club and approach to Go Kart Club, Kaitoke.
• Forest and Bird- Upper Hutt Branch

2 Where in broad terms will the railway go?

• From the Trust’s base at Maymorn the railway will require a connecting route of 1.2km to connect with the historic railway formation.
• Emerging from Mangaroa tunnel the railway will head through Tunnel Gully and up to Kaitoke.
• At Kaitoke a new route and station site has been identified to avoid the dwellings on the old Kaitoke site. The new route re-joins the old formation in the vicinity of the current rail trail car park.
• From the new Kaitoke station the railway will head travel along the former railway alignment to the historic Summit station site.
Railway route proposal
.3 Will any private properties be affected?

One private property is affected at Maymorn, and extensive consultation has been undertaken. A railway corridor has been included in the Maymorn Structure Plan, currently (October 2011) under consideration by Upper Hutt City Council. The connecting railway route has been developed to minimise impacts on private properties at Maymorn. It incorporates a cycle and walking path as well as an adjacent urban carriageway. The railway will be highlighted and made prominent in the urban landscape, so that residents and visitors might be able to view and appreciate the heritage railway operations.
At Kaitoke in order to avoid crossing private properties a new route has been planned with a new station site located to the south and east of the Go Kart track and lease area.
4 Where will the main station and operational base be located?

The main station will be at Maymorn, 6km northeast of Upper Hutt, co-located on the KiwiRail Wairarapa Line. This location was chosen after an objective analysis of a number of options.

Maymorn offers connection with existing Tranz Metro Wairarapa train services, which will allow passengers to travel from Wellington to the heritage railway by train.

A Licence to Occupy has been secured from New Zealand Railways Corporation, Resource Consent granted for establishment of the heritage railway precinct for use as a heritage, tourism and educational facility, construction of required buildings and structures, earthworks and plantings.

Construction of the operational base has already commenced. A substantial 80m x 10.5m Rail Vehicle Shed has been constructed by Trust volunteers, a number of carriages, wagons and locomotives purchased, and mainline track built through the station area. A pedestrian crossing has been formed at Maymorn to connect the heritage railway with the Tranz Metro station for transfer between services.
How will Maymorn be connected with the heritage railway formation?

Maymorn and the heritage railway formation will be connected by the Low Flank route. The Trust has carried out extensive work to determine a suitable route from Maymorn and this has involved surveys and extensive consultation. The Low Flank route features 100m radius curves and an uncompensated gradient of 1:35. This is in keeping with the character of the rest of the route to Kaitoke. As with most of the railway proposal the Low Flank route incorporates a cycle and walking path.
.6 What is the plan for Kaitoke?

The Trust proposes to replicate the Kaitoke station yard and buildings on a new alignment, 600m to the east of the original.

Key railway heritage features required for a reinstated Kaitoke station include:

- Station building with refreshment rooms
- Water vats
- Signal box
- Semaphore signaling

These structures would be faithfully replicated as far as is practicable. Passengers will be able to take refreshments in the refreshment rooms, look through the interactive displays in the station building and explore some of the heritage features within the station complex.
.7 How will vehicles access Mount Climie?

Road access for Mount Climie will remain in its current location. The existing road on the formation will be slewed to allow the railway to be reinstated alongside. There is a requirement for one level crossing to allow the road to cross the railway and this will be required to meet the current NZTA standards.

.8 What access changes will there be for Greater Wellington Regional Council forest activities?

Forest roads are provided in much of the park. The railway formation may be used in some areas, and the extent of use would be relative to the crop rotation. Some forest roads may only be required at harvest time.

GWRC Forestry will be consulted for their access and transport requirements, which roads are used for each forest block, and whether portions of the new walkway might be adapted to serve dual walkway/forest access.

.9 How will current walking and cycling activities be catered for?

The former railway formation is currently used as a recreational walkway, walking, running and cycling permitted for its entire length, with the exception of the length in private ownership through the former Kaitoke station precinct. Horse riding is also permitted between Maymorn and Tunnel Gully.

The former railway formation presents an excellent walkway, being well surfaced and drained, wide, with gentle curvature and relatively easy gradients for most of its length.

A new walkway is included in the railway proposal, providing for current cycling and walking activities in the Pakuratahi Forest. The walkway would commence from Maymorn railway station, following the new connection route to the park boundary, heading over the Mangaroa Tunnel, then following the railway line on a contour route to Kaitoke and up the Pakuratahi Valley to Summit.
Development Proposal and Environment Management Plan v2

NOTES:
1) WALKWAYS/CYCLEWAYS IS 4m-WIDE
2) TRAIN SHOWN FOR SCALE
3) FORMATION DETAILS FROM THE ORIGINAL NZR MANGAIDA CONTRACT PLANS
4) ALL CROSS SECTIONS ARE REPRESENTATIVE ONLY
5) WALKWAYS LOCATED TO AVOID DAMAGE TO HISTORIC EARTHWORKS

PROPOSED
RAILWAY INSTANTION
EXAMPLE CROSS SECTIONS

This drawing is provided for general information purposes only. The information contained in this drawing should only be used as a representative or indicative representation of the railway assets referred to herein. No warranty or liability is accepted by the responsible party or any associated organizations. It is the responsibility of the person receiving this drawing to ensure that all relevant documentation is up to date and to verify the correctness of the information contained herein.

Revised By: Inser: Rev: Date: Description: Draft: D. Rev: Appro: D. Mark:

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10  What will the standard of the new walkway be?


However, the former railway formation, having been converted to alternative use as a forest and catchment access road, presents recreational users with a high standard of walkway. A similarly high standard replacement walkway will be required.

A Walkway Specification has been developed, detailing relevant codes of practice, expected standards for the route, and maps showing proposed location of the walkway for the entire route at a high level of detail.

The specification includes the following key parameters:

A well-formed access with durable surface, e.g. compacted gravel, with 4.0 metre width over the entire length of the path, with no steps or walk-over styles. Gradient of the contour route: 0-5% and 10m minimum visibility maintained on corners. New access structures to have a minimum width of 1.2m, with bridges provided over all watercourses and barriers or guardrails used where significant hazards exist.

Some lengths of the walkway may serve a dual purpose of providing access to lease holdings, access to some forest locations, and must be suitable for maintenance and provide appropriate GWRC access. Accordingly, changes to the specification may be required in specific locations to cater for these additional purposes.
Figure: portion of walkway map showing location of new walkway (orange) and railway (black) in the Kaitoke area.
.11 When will the new walkway be constructed?
The new walkway will be constructed in stages ahead of the corresponding railway reinstatement to ensure continuity of walking and cycling activities for park users.

.12 How much will the walkway cost?
The capital cost of the new walkway between Maymorn and Summit has been budgeted at $3.4M.

.13 What about the tunnels?
The new walkway will be located to keep walkers and cyclists away from the railway tunnels in order to ensure public safety. The railway must have absolute occupancy of the tunnels in order to be operated safely. Signage, fencing and other control measures will be put in place accordingly.

Where practicable, viewing areas may be provided so that walkers and cyclists can see the railway tunnels in operation and appreciate them from a safe distance.

.14 How will heritage features of the route be protected?
The Rimutaka railway is of international historical significance and several detailed accounts of the railway have been written and published.

Detailed reports of the remaining heritage features will be developed and published. Conservation and management plans for each significant heritage feature will be developed and reconstruction works will be required to avoid damage to these features.

.15 Are the tunnels safe to use?
The tunnels were built about the same time as the tunnels currently in use on the Johnsonville line. As part of the reinstatement a full engineering assessment will be undertaken. The scope of works will likely include drainage work inside and outside the tunnels, repointing of block-work and other minor restorative work. The Trust will develop a Heritage Conservation Management Plan for the tunnels to ensure that intrinsic fabric is maintained wherever practicable.
.16  Will the old timber bridges on the line be used?

The old timber bridges are a significant feature of the line. Replacement spans will be built where an original span is missing or no longer fit for purpose. The Trust has secured several steel bridge spans for use on the line where replacement of a wooden span is not economical or possible.

The Trust is currently arranging to have structural inspections on the bridges between Maymorn and Summit. This is the first stage of determining bridge repair and reconstruction requirements.
17 How will the line be constructed?

In broad terms, it is envisaged that the portions of route requiring major earthworks will be tackled first, including the Maymorn connection route and the Kaitoke deviation. Site access will be formed along with construction camps, with the operational base for contractors established at Maymorn.

As the Maymorn connection route and Kaitoke deviation earthworks near completion, work would commence on progressive stages of new walkway and forest road connections, commencing from the Maymorn end of the route. As each stage of walkway and forest road connection is completed and commissioned, the respective length of railway formation would be occupied and the railway built.
.18 **How will the railway formation be restored?**

As each stage of railway formation is released for railway the following works would be done:

- vegetation clearance – limited
- sediment control measures
- cutting and embankment restoration
- restoration of formation grade and cross-section
- restoration of drainage systems: cess, cross, cut-off drains
- repairs and restoration of bridges
- repairs to tunnels.

These works would require road access along the railway formation, and would access the route from Maymorn, Kaitoke (Station Road), Kaitoke (Incline Road), Ladle Bend via forest road from SH2, Summit via forest road from SH2.

Work on the heritage railway formation will be covered by a Heritage Conservation Management Plan, which will outline policies, practices and methods of treatment of heritage items, intrinsic fabric, actions to be taken should new heritage items be discovered and other protocols. The steep cuttings, tall embankments, timber bridges with masonry abutments, tunnels and railway alignment are key heritage features that will be respected, protected and showcased.

Once completed, the railway track construction phase would commence, including:

- survey marks
- laying of bottom ballast
- laying out sleepers and rail
- assembly of track
- spreading of top ballast
- tamping and lining operations to bring track to line, top and level.

.19 **What will the reinstated railway track look like?**

The railway track will be constructed in conformance with the railway’s Safety Case and Track Code, makes provision for the shallow and narrow ballast sections that were used on the old route.
.20 Who will construct the railway?

Construction is anticipated to be undertaken by a mix of contractors and skilled volunteers. This mix has already been successfully used at the Maymorn site, where the track formation was prepared by a contractor, and volunteers have built the track and turnouts. A similar mix has been used with success on other heritage and tourist railways in New Zealand, and significantly, on the rebuilding of the Welsh Highland Railway in Wales. Other charitable organisations in New Zealand also benefit from the work of skilled volunteers.

Timelines will dictate the extent of volunteer labour that can effectively contribute to the construction of the railway, but given appropriate lead-times, resourcing and leadership volunteers will be able to make a significant contribution.

As the railway proposal proceeds it is anticipated that a Request for Proposal process will be called for various significant parts of the project, many of which have already been outlined in this document. Where projects are well-defined, such as the building of the Maymorn station building (which has resource consent, and a complete set of plans ready for building consent) a tender process would most likely be carried out.

.21 What locomotives will be used to build and operate the line?

There are a number of options for locomotives to assist in building the line. The Trust has purchased a diesel shunting locomotive, which is currently undergoing repair, and is expected to be operational in 2012. Negotiations to lease a larger diesel-electric locomotive for both construction and operation are continuing, and should be successfully concluded by early 2012.

The railway initially requires operational locomotives that are capable of hauling 6-car trains on the route at a reasonable speed. The lease of operational locomotives will enable the railway to operate as soon as the rail infrastructure is commissioned, and to avoid the expenses of purchase and depreciation. Further approaches will be made to owning and leasing rail heritage organisations and individuals with a view to securing future steam and diesel-electric lease arrangements.
.22 What about the Fell locomotives?
Stage 3 involves the operation of the Fell-worked incline between Summit and Cross Creek. This operation was typified by trains operated with multiple Fell locomotives, placed at various positions throughout the train.

At least two Fell locomotives will be required, which will necessitate the design and construction of new items. The design of the Fell locomotives must be faithful to the original design but must also meet modern safety and certification requirements. The design and construction of new locomotives is a considerable project in its own right.

However, conventional locomotives operated the former route from Upper Hutt to Summit, and there is no requirement for Fell locomotives for the initial stages of the railway.

.23 What carriages will be used?
Conventional carriage types were hauled over the Rimutaka Incline, ranging from 4 and 6-wheel carriages used in the early years, to clerestory and gallery carriages, and the widely used 47.5’ and 50’ Scarlett and turtleback wooden carriages. 50’ and 56’ steel carriages were also used over the incline on the occasion of diverted Main Trunk expresses and the 1954 Royal Tour.

The Trust has acquired 8 carriages of types that were used on the route, which are stored at Maymorn. Work required to restore to operational service range from complete rebuild through to heavy overhaul.

The railway initially requires operational carriages. This will enable the railway to operate as soon as the rail infrastructure is commissioned, and to avoid the expenses of purchase and depreciation. Further approaches will be made to owning and leasing rail heritage organisations and individuals with a view to securing future carriage lease arrangements.

.24 Who will operate the line?
The Rimutaka Incline Railway Heritage Trust is a licenced rail operator and network access provider, and will operate the line. Initial construction and later operational requirements may necessitate paid staff in order to meet timelines and achieve desired outcomes when working with contractors.

.25 What is the broad construction timeline?
Assuming all approvals are issued and there are no appeals lodged, and that sufficient investment capital can be sourced and sufficient materials/services in-kind are available, construction could start as early as 2014.
## How much will the railway cost to build?

<table>
<thead>
<tr>
<th>Stage 1, Phase A Maymorn to Kaitoke</th>
<th>Start date</th>
<th>Total</th>
<th>Land</th>
<th>Walkway</th>
<th>Track</th>
<th>Station facilities</th>
<th>Venues</th>
<th>Locomotives / Carriages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>October 2014</td>
<td>$5,873,564</td>
<td>0</td>
<td>1,150,000</td>
<td>3,407,875</td>
<td>1,155,689</td>
<td>0</td>
<td>160,000</td>
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<tr>
<td>Stage 1, Phase B - Build Kaitoke to Summit, operate Maymorn to Summit</td>
<td>October 2015</td>
<td>$6,259,979</td>
<td>0</td>
<td>2,250,000</td>
<td>3,702,125</td>
<td>307,854</td>
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<tr>
<td>Stage 2, Extend operations by mainline operator to Wellington</td>
<td>October 2016</td>
<td>$320,000</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>October 2017</td>
<td>$9,994,403</td>
<td>0</td>
<td>935,000</td>
<td>2,889,475</td>
<td>589,928</td>
<td>1,040,000</td>
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<td>Stage 3, Summit to Cross Creek to Featherston</td>
<td>October 2018</td>
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<td>0</td>
<td>1,928,025</td>
<td>276,385</td>
<td>200,000</td>
<td>3,780,000</td>
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<tr>
<td>Project Total</td>
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<td>$0</td>
<td>$4,335,000</td>
<td>$11,927,500</td>
<td>$2,329,857</td>
<td>$1,240,000</td>
<td>$8,800,000</td>
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</tbody>
</table>
.27 How will the railway construction be funded?

It is envisaged that the railway will be funded from a variety of sources, with a mix of donations, grants, donations of materials and services, loans and investment capital. An anticipated mix is illustrated below for the Maymorn – Summit portion of the project:

![Funding Diagram]

.28 What communication systems will be needed?

There are 4 types of communication system needed for safe operation of the railway to Summit:

- Safe working – this is a system that is used to ensure that no more than one train is on a section of line at any one time.

- Train to train and train to base – The trust already has access to a UHF simplex channel to provide train to train and train to base communication.

- Visitor information – Trains will be equipped with on board train announcement systems to inform visitors of key features and safety information.
• Emergency communication – This will be provided by a phone carried in the guards compartment on each train.

.29 What emergency management procedures will be in place?

The Trust currently manages a variety of risks, including emergencies, as outlined in its Safety Case. Risks and hazards are identified and managed through a control programme, including hazard notification procedures, investigation and review of all incidents and accidents, an annual review of a hazard register.

A specific code incorporated by reference into the Safety Case – "CODE OF PRACTICE 2: EMERGENCY RESPONSE PLAN: Information for Emergency Services, Train Staff, Operations & Office Staff", identifies emergencies which may occur on the Rimutaka Incline Railway, and specifies procedures for their management. The code details emergency scene management procedures, what actions must take place, what agencies are notified and collaborated with, and lists a range of emergency scenarios and suggests a likely action plan for each case. The code is modelled on industry best-practise, and codes of this nature are approved and used by mainline rail operators to ensure risks and hazards are appropriately managed for trainloads of people heading through remote areas of the country.

The code will be reviewed and extended as part of the variation to the railway’s safety case, to include additional risks and hazards that are presented to the railway operation as it extends its scope past the Maymorn site.
Environmental impacts

.1 How will the railway affect tourism in Upper Hutt and the Wellington region?

Reports on other railway reinstatements, visitation figures and reputation of similar railway operations elsewhere in the country suggest that the Rimutaka Incline Railway will add considerably to the appeal of the Wellington region as a tourist destination. The railway will increase access to a subalpine wilderness area within close proximity to the nation’s capital, and present a significant opportunity for an authentic cultural heritage experience of international significance.

The railway is likely to be a significant tourist destination for both domestic and international tourists, with the potential to extend the stay of tourists in the Wellington region, with the obvious flow-on effects.

Additionally, there is considerable scope for collaboration and joint-packages with operators of other attractions in the Wellington and Upper Hutt area, all of whom would likely benefit from the additional visitation. The Trust will also pursue opportunities to collaborate with parties wishing to develop tourist facilities and businesses associated with active recreation and other commercial ventures on the Rail Trail, with a view to developing a range of complimentary attractions along the route and at the Summit, and later, Cross Creek destinations. The railway proposal incorporates a visitor centre at Summit, along with the possibility of guided bush walks, and guided walks to Cross Creek down the former Fell-worked incline.

Transport connection to the Wairarapa via the forest road to State Highway 2 near the Rimutaka Hill Road summit is another essential plank to the railway proposal so that tourists might experience one leg of the railway journey, then continue on by road to experience attractions in the Wairarapa.

.2 What employment opportunities will be created by the railway?

The Rimutaka Incline Railway is likely to initially generate between six and ten full-time positions for the operation of the railway between Maymorn and Summit. The flow-on effects from the construction and operation of the railway will be welcomed in Upper Hutt and the Wellington region, with additional opportunities for tourism. The construction will bring in additional persons working on the project, which will have spin-off effects for hire companies, construction, transport and crane hire, engineers, architects and the wider construction industry.

Effects noted at similar attractions once in operation show an increased demand for accommodation, restaurants, souvenir shops and both passive and adventure tourism, activities.
.3 What is the likely effect on flora?

It will be necessary to remove all vegetation from the railway formation, including cess drains, and to provide access to cut-off drains and culverts. Much of this vegetation is regrowth and has emerged since the line was closed in 1955. It will also be necessary to remove and trim some trees where they overhang the railway line, or are destabilizing cuttings or embankments or blocking drainage.

Vegetation clearance should be restricted to flail mowing and spot-removal of dead branches once the railway is in operation.

.4 What is the likely effect on fauna?

There is no known potential for major effects on native fauna in the construction or operation of the line.

.5 What effects will there be for Tunnel Gully Scenic Reserve?

Effects for Tunnel Gully Scenic Reserve are no more than minor, as the railway formation is already in use as road access to a car park, for commercial access to Mount Climie, and for forest access. The railway formation skirts the northern limit of the Scenic Reserve.

Changes that will be made include:

- Location of road, walkway and railway on the railway embankment
- Widening of a 1m diameter spun concrete culvert and rebuilding of the embankment to its former level
- Minor redirection of Tane’s track so that a safe level crossing can be provided for the public away from the Mangaroa Tunnel
- A short distance of road construction will also be required in order to safely locate a level crossing – to provide reasonable approaches and sight-lines.
- A new contour route walkway is proposed to provide direct, easily graded walking and cycling access from Tunnel Gully car park to existing forest roads above the Mangaroa Tunnel.
Figure: proposed relocation of walkway through Tunnel Gully
.6 What is the likely effect on registered heritage items?

A detailed historical account of the railway will be prepared, which will highlight the importance of the line to New Zealand, and the Wellington and Wairarapa regions.

The route from Tunnel Gully to Kaitoke, through to Summit and Cross Creek is registered with the Historic Places Trust – with the exception of the portion of railway route that passes through private land at Kaitoke.

A portion of the former route at Kaitoke has been removed for State Highway realignment works, after appropriate examination of features and documentation.

The Trust proposes that the re-establishment of a railway on the railway formation is an appropriate method of interpretation and use of the heritage site, which will involve the operation of railway locomotives, carriages and wagons of types that saw service on the original line. The original alignment of curves and gradients are important aspects of the railway that will be carefully and meticulously re-established, so that the engineering heritage present in the route can be fully appreciated. Use of heritage items for their original purpose is a mechanism by which the heritage can be self-sustaining. Other important aspects of heritage railway operation will enhance the interpretation and experience of the old railway route, and provide a high-quality visitor experience.

.7 What effects will there be for tangata whenua?

Further consultation will be undertaken to determine effects of the railway project for tangata whenua.
Mitigation of environmental impacts

.1 How will the heritage character and intrinsic fabric of the railway be retained?

As detailed earlier, the engineering heritage and intrinsic fabric present in the former railway route is critically important to the railway project, and every effort will be made to rebuild the railway so that it exhibits the appropriate heritage character.

The original route will be used wherever practicable, and the few deviations required will be built to the same alignment specifications as the original. The tunnels are in remarkably good condition, and appear to require only minor drainage works and repointing in order to be returned to railway service. Most of the railway bridges between Kaitoke and Summit have already had significant restorative and replication work done, and additional work will most likely concentrate on the Pakuratahi Truss bridge. Between Maymorn and Kaitoke two bridges require full assessment to determine the nature and scope of work required. It is important to retain of key features of these bridges – and concealed methods of underpinning, strengthening or supporting the structures will be employed should they be necessary.

Intrinsic fabric removed from the structures will be assessed for retention and display to provide additional interpretation.

The heritage railway will see the return to service of many steam and diesel-electric locomotives and railcars of types that were used on the route. This will present a similar “look and feel” in the heritage railway to the old operation.

Additionally, authentic water vats have been sourced for station areas, and original designs of station buildings and structures will form the basis of the new buildings. A heritage station design has been prepared for the Maymorn station, which provides a link to other similar designs produced by Sir George Troup in the Wellington region.

.2 How will items of intrinsic heritage fabric be protected?

Intrinsic heritage items discovered during the construction works will be photographed and recorded, and protocols already established by GWRC, HPT and other agencies will be observed.

Heritage items that may be placed at risk during the construction phase will be identified and protective measures put in place, which may involve special protective measures on site, or removal, safe storage and return once construction has finished.
.3 Will original cuttings and embankments be retained?

Original civil engineering features of the railway will be retained wherever practicable. All cuttings and embankments will be assessed for cultural and engineering significance, aesthetic values and need for disturbance.

Criteria for disturbance will include such factors as safe operation of the railway, reinstatement of original alignment and grade, and potential of the features to slip or subside. In some cases vegetation may be a key factor to the stability of a feature, in others it may be contributing to its instability. Vegetation may also be masking key engineering features along the line, such as the stone-faced embankment upstream of the Ladle Bend bridge.

Construction sites will be located away from the heritage formation, as will borrow-pits, should any be required for providing fill to reinstate formation.

New works will be distinguished from the old – which will especially apply to the Maymorn connection route and Kaitoke deviation.

.4 How will the risk of fire be managed?

A Fire Risk Management Plan will be developed to mitigate the risk of fire to the satisfaction of GWRC and regulatory authorities.

It will take into account all developments on the railway and requires detailed logistical information for the railway operation.

Considerations that may be brought into the Fire Risk Management Plan include:

- Management factors, such as integration with other fire management plans that relate to the area; and coordination with emergency services. Operational changes might also be identified as appropriate responses to increasing fire risk levels that are issued by agencies during the warmer months of the year.

- Railway line factors, such as the planting of species that maintain damper soil conditions and minimise dry fuel loads that might otherwise be present along the line; identification of different areas according to fire risk and developing specific treatments accordingly; retaining and encouraging regrowth of wet forest and rainforest closer to the line to keep soil conditions damper; removing slashed vegetation when undertaking clearance works; and professional assessment of overhanging trees for potential fire risk.

- Rolling stock and equipment factors, such as the code-compliance and efficiency of spark arrestors, firehole doors, dampers and ashpans – being the fuel, ash and exhaust openings associated with locomotive boilers; maintenance of wheelset bearings and brake equipment to avoid generating heat sources or sparks from running gear; equipping all locomotives and carriages with fire extinguishers; consideration of employing a follow-along rail inspection vehicle during high fire risk to travel a suitable distance behind each train to check for an extinguish fires that may result from locomotive emissions, rail
vehicles or rubbish/cigarette butts thrown from carriages; and having adequate communication systems in place so that emergency services can be called out in the event of a fire.

- **Access factors** – provision of sufficient road access to the railway route, which will enable emergency services to access in the event of a fire (or to deal with other emergencies). Helicopter landing sites will be identified, constructed and maintained, in similar fashion to those located on the Rimutaka Hill Road, and preferably close to a river or other water source.

- **Visitor and railway personnel factors** – a non-smoking policy will be in place on RIRHT trains, and will be notified during passenger briefings and rigorously enforced. The briefing will also detail what actions passengers can take should they discover a fire. Crew will be trained to operate rail vehicles in a manner that minimises the risk of fire through efficient and effective firing techniques and maintenance procedures, and techniques of safely and swiftly extinguishing fires at first detection.

.5 How will weeds be controlled?

The area the railway passes through varies from strongly regenerating native bush to exotic pine plantations to scrub and open pastures. Weed / pest plant transfer mechanisms will be assessed and managed through both construction and operational phases of the project, with a focus on minimising potential transfer to areas of high value.

Construction sites will be rehabilitated after use to ensure that appropriate plant species are regenerated.

.6 What will be done to protect significant vegetation?

An assessment of the route will be undertaken by appropriately qualified / experienced persons, as well as a review of surveys that may have already been completed to identify areas of significant vegetation – such as that located in Tunnel Gully Scenic Reserve, and in the steep terrain close to Summit.

Contractors will be required to avoid the removal of vegetation from significant areas and minimise disturbance at all times. An arboiculturist will be employed where pruning of significant tree specimens is required.

.7 What will be done if significant flora, fauna or cultural artefacts are discovered?

Established protocols for the discovery of cultural artefacts will be followed. The discovery of significant flora or fauna implies that suitably experienced personnel would be on hand to check for such items. Areas of significant vegetation would be the most likely locations for such
discoveries – and a schedule of inspection by a suitably experienced person might assist with this aspect of the construction project.

.8 What will be done to minimise environmental impacts during construction, and how will construction works be rehabilitated?

An Assessment of Environmental Effects will be prepared as part of the applications for Resource Consents for the railway construction. Rail formation preparation work, sediment control programmes, removal, storage and replacement of top soil from construction sites in suitable condition for plat establishment and planting programmes will be likely control programmes to minimise impact to a suitable level.

.9 How will traffic and parking demands at Maymorn and Kaitoke be managed?

Traffic and parking demands at Maymorn have already been subject to scrutiny during the assessment of a Resource Consent application for railway and tourist activities at that site. Private motor vehicle demands have been mitigated by locating the operational base of the railway on the KiwiRail Wairarapa Line. Passengers and visitors will be able to travel to Maymorn by scheduled passenger services. Some personnel involved in current construction work at the Maymorn site already take advantage of the Tranz Metro train services.

An initial assessment of the Kaitoke station location options indicates that a new station site to the east of the original site will minimise effects of traffic on local residents. Improvements to the Incline Road may be required to better provide for two-directional traffic, and the proposed use of a short length of GWRC forest will require a similar upgrade. The new Kaitoke site has the potential for a sizable car parking area.

Traffic demands can also be minimised operationally, by starting rail journey at Maymorn (or Upper Hutt or Wellington); by providing coach transfers for passengers to reduce the number of private cars, and by reinstating the full length of railway past Kaitoke to Summit.

.10 How will current walking, cycling and other recreational activities along the rail trail be catered for?

As presented elsewhere in this executive summary, in the Walkway Specification submitted with the application, the current walking, cycling and other recreational activities associated with the Rail Trail will be provided for with a new walkway located close to the railway formation.

The business plan includes reinstatement of the walkway as a key item for each stage. The new walkway will be constructed in stages ahead of the corresponding railway reinstatement to ensure continuity of walking and cycling activities for park users.

Provision for new routes that complete current gaps in the walkway have been included in the civil engineering investigations and preliminary route designs for the Low Flank Connection
Route at Maymorn, and the Kaitoke deviation. The latter will provide an off-road, easily graded walkway alongside the heritage railway, connecting the Maymorn – Kaitoke station road portion of rail trail with the Kaitoke – Summit – Cross Creek section. Together with the proposed walkway along the former railway route included in the Maymorn Structure Plan, this presents a significant addition to the Rail Trail offering between Upper Hutt and the Wairarapa.

The stations at Maymorn, Kaitoke and Summit will also offer significant additional visitor facilities for walkers and cyclists, enhancing their experience of the Rail Trail and providing additional emergency and medical support in the remote mountainous route. Opportunities for collaboration with other tourist operators could be explored, including the possibility of train ride plus cycle hire, adventure tourism based at Summit, café and operation of the visitor and discovery centres. The railway operation will significantly widen the base of visitors to the Rail Trail and the Kaitoke and Summit areas, which may assist in the establishment and on-going viability of such ventures. The railway operation will also be relatively weather-independent, filling gaps in visitation that might otherwise occur when wet and windy weather dissuades the fair-weather walker or cyclist.

.11 How are effects at Maymorn being managed?

Effects at Maymorn are being managed through the conditions laid out in the Resource Consent granted by the Upper Hutt City Council. Most of these conditions were volunteered by the Trust in its submitted Assessment of Environmental Effects, and were extended through consultation and negotiation with affected parties. This includes noise, smoke, lighting mitigation measures, placement of buildings, restrictions on operations and establishment of policies and procedures to mitigate effects. Effects of a heritage railway can be effectively managed, and the operation will add a significant tourist attraction and a number of associated opportunities for Upper Hutt and the broader Wellington region.

.12 How will effects at Kaitoke be managed?

An Assessment of Environmental Effects will be carried out for the Kaitoke station area, including extensive consultation with affected parties (in addition to that which has been carried out to date). This will inform changes or reinforce methods and approaches that have been drafted for the Kaitoke station, and will be submitted as part of the Resource Consent application for this part of the development.

.13 How will the railway be operated safely?

The railway will be operated in accordance with its approved Safety Case, which will be extended by variation as the risk profile changes and the route in operation is extended. Variations to the Safety Case are assessed and approved by the NZ Transport Agency. Continued safe operation is the responsibility of the Trust, and is subject to internal safety assessment, annual external safety assessment and other assessments as deemed necessary by NZTA.
.14 What impact will additional visitors make to the area?

Additional visitors brought to the area by the rail operations will be accommodated on train services, which will largely provide a new segment of visitation to the Pakuratahi Forest that might not otherwise be able to visit. This visitation will not directly affect the current pattern of Rail Trail use (as they will travel in and out by train), but it is anticipated that the number of walkers and cyclists on the Rail Trail will increase with the addition of the railway operation – even in the construction phase.

.15 Who will be responsible for the on-going viability of the railway?

The Trust will be responsible for the on-going viability of the railway. A sizable proportion of the operational budget has been set aside for marketing activities, to widen and sustain the visitor base required to support the on-going operation. As discussed elsewhere in this document and the associated application, a widening of the scope of attractions, linkages and connection with existing attractions will be essential for the on-going sustainability of the railway.

The ultimate goal of the Trust is to reinstate the internationally-significant Fell-worked Incline, and this, it is believed, will be the ultimate draw-card to the operation of the heritage railway between Upper Hutt and the Wairarapa. Negotiations will commence with the Department of Conservation for the extension of the railway past Summit to Cross Creek once the Maymorn – Summit stage has been approved.

.16 Can steam locomotives be sustainably operated?

Steam traction is unique in its capability to burn almost any solid or liquid form of bio-fuel. Steam locomotives in the past have successfully burned carbon-neutral fuels such as wood, biomass, coconut fibre, sugar-cane waste and the only limit to these sort of fuels is the calorific value available (Newman, 2008 Feasibility of steam traction for coal transportation in developing countries). The Grand Canyon Railway in the United States has successfully fuelled its 1923-built steam locomotive on recycled vegetable oil, one of many actions undertaken in the process of gaining ISO-14001 certification of its environmental management system. The vegetable oil is filtered and centrifuged to remove particulates and remove water introduced by cooking processes – which is a very low level of refinement. [www.thetrain.com/Steam-Event-7275.html]

Provided that sustainable sources of biofuel are available at required calorific value, it is highly probable that the Rimutaka Incline Railway operation can become carbon-neutral.

Conclusion

This application is seeking approval in principle to rebuild the railway from Maymorn to Summit, subject to completion of an agreed timetabled programme of investigation, analysis, consultation and fundraising. The Trust seeks to work in partnership with Greater Wellington Regional Council to carry out this programme of work to meet GWRC requirements.