As illustrated in Figure 18, the sharp dip in the autumn and the sluggish growth through spring – the shoulder seasons – are obvious opportunities to capitalise upon, with the right sort of offering and marketing. It is likely that mountain bike opportunities will not only extend the summer peak, but will also extend the shoulder seasons, particularly in the autumn when the weather is more reliable.
Interestingly Figure 19 illustrates that Manawatū-Whanganui has a less volatile seasonable pattern than New Zealand generally and the extensions to the offering could help to flatten this volatility even more.

**Growth of Cycling**

Cycling is a world-wide phenomenon. New Zealanders of all ages now ride, with over 75,000 taking part in events in 2014. Tourism New Zealand research information shows a positive 47% trend in growth from international cycling tourism from 2008 to 2012. The largest part of that growth is in mountain biking. Comparative growth rates are evident in Australia and North America, which are significant sources of tourists to New Zealand.

Major marketing initiatives are attracting an increasing number of mountain bikers to the Whakarewarewa Forest near Rotorua and similar efforts are unfolding in partnership with the Taupo Regional Tourism Organisation (RTO). There is no reason why the Ruapehu area should not leverage these initiatives. Its offerings are compatible and sit well with the mountain biking traveller wanting to stitch one trail ride into a sequence with others in neighbouring regions.

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18 From Cycling New Zealand
19 Refer to Tourism New Zealand 2013 Study into International Cycling Tourism
20 See for example the central North Island mountain bike marketing network. An overview is provided at http://www.bayofconnections.com/sector-strategy/sport-and-recreation/
There is also scope to link into the parallel interest in road cycling. There are two premium ‘Great Ride’ New Zealand Cycle trails in the region\(^1\) - the ‘Mountains to Sea’ ride and the ‘Timber Trail’. The ‘Mountains to the Sea’ (M2C) ride, although only just recently sealed, is gaining an increasing reputation for its character and beauty. The opportunity is to maintain and improve the quality of these trails (and supporting services) as part of the national cycle trail brand - in much the same manner as has been achieved for Great Walks like the Tongariro Crossing and the Tongariro Northern Circuit.

A 2012/13 report evaluating the benefit of the Great Rides provides a case study of the benefits to the local economy of the Mountains to Sea cycle trail. It identified numerous benefits to the region and the estimated spend arising from trail use. It also records the results of discussions with Ohakune businesses who, among other things, noted the support for creating year round opportunities for businesses and thereby allowing full time staff to be employed on skiing activities over winter and mountain biking over summer. This has flow on benefits for school roles and the general dynamic of communities.

**Strong support from four Regional Tourism Organisations (RTOs) and the Department of Conservation**

The region is well served by three Regional Tourism Organisations\(^2\) (RTOs) all of whom also work closely with Destination Lake Taupo and the Department of Conservation (DOC). The Whanganui Māori Regional Tourism Organisation Trust Board is also active. A ‘can do’ and ‘willingness to collaborate’ attitude is more than evident.

Visit Ruapehu, one of the RTOs in the region, is a small but impactful player. They have enjoyed some success in working to build customer friendly packages tailored for the convenience of visitors and aligned to the area’s attractions and providers e.g. packages involving ski hire, lift pass, transport, bike hire and accommodation. This is part of a concept known as ‘Grab One’ deals. There is scope to do similar packaging for international travel wholesalers and individual consumers. Visit Ruapehu has also been marketing mountain biking since fledging trails first opened in the area and has been working with other RTOs in Taupo and Rotorua to collectively promote the wider region as a cycling destination. This includes involvement in a collective marketing network called ‘Explore Central North Island’\(^3\).

Rail tourism also has an important role to play in the growth of regional tourism in the Central North. Kiwi Rail’s ‘Northern Explorer’ carried 32,144 passengers during the financial year 2013-2014. It had a successful summer season with 21% growth in February 2015 compared to one year earlier, with stops at National Park and Ohakune.

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\(^1\) The Timber Trail is more suited to mountain bikers and it too is gaining a reputation as being ideal for riders of all ages and skills.


\(^3\) These are Visit Whanganui, Destination Ruapehu and Destination Manawatu


\(^5\) Ruapehu District Council: Scenic rail in the central North Island. REV1: 30th April 2015.
An important additional development could be an integrated shuttle/coach/rail connection between Rotorua, Taupo and National Park each day to meet the train.

DOC, as the manager of many of the region’s outdoor assets, is an important partner in continuing to build and market the area as a premium destination.

The Tongariro Crossing

The Tongariro Alpine Crossing in Tongariro National Park is among the most popular day hikes in the country\(^{26}\) and is rated as one of the world’s best one day walks. The Tongariro National Park is also a World Heritage site known for both its natural and cultural significance. It will continue to be a focal point for domestic and international travellers.

Diversity of visitor offerings beyond the Ruapehu area

The focus of the opportunity discussed in this part of the report is on the Ruapehu and Whanganui Districts but the objective of increasing tourism was something that was discussed at meetings with informants from all parts of the region. They identified opportunities covering an area separate from and much wider than Ruapehu. These opportunities could all benefit from better packaging and marketing on a bigger scale. They include the following attractions:

- **Tararua:** An opportunity exists to promote and grow visitors to the mountain biking and walking tracks at the Eastern End of the Manawatū Gorge. Visitor interest in the Tararua wind generation farms was also noted. In general it was felt that uncrowded hunting, fishing and trekking opportunities in the northern Ruahine and Tararua ranges were an under-recognised asset of the District. Informants supported the ‘leveraging’ opportunities referenced above. They wanted to give further attention to establishing links to promotional efforts and programmes established for attractions in neighbouring districts and regions such as Hawke’s Bay and further afield. Norsewood would be a particular beneficiary of such attention.

- **Rangitikei:** The beauty of the Rangitikei River gorge, particularly in the headwater regions, and the associated farm stay, rafting, hunting and trekking opportunities in this area are viewed by informants as a forgotten treasure. These attractions have sometimes been overshadowed by the attention directed toward the Whanganui and Tongariro National Parks and would benefit from ‘joined up’ promotion.

- **Whanganui:** There is growth occurring in the Whanganui Journey Great Walk and M2C cycle trails - both recognised nationally for their recreational values. There has also been observed growth in the Whanganui Journey over several years and there are opportunities to extend tourism packages further down the Whanganui River to the township. Connections with Taranaki involving the Forgotten Highway and the Matemategonga Track are reference elsewhere.

\(^{26}\) NZ Herald, August 19th, 2014, Mike Smith, Ruapehu Trust General Manager says ‘100,000 walked the crossing last summer’. The Tongariro Crossing is rated best 1 day walk in New Zealand and in the ‘Top 10’ one day walks in the world by National Geographic.
Not all tourist opportunities involve adventure recreation. Whanganui is known as a provider of facilities suited to high performance sports. New opportunities include:

- Marketing Whanganui Collegiate as a summer school for Indian cricketers (catering for the growing Indian middle class).
- Convening an international event, perhaps to be known as the ‘Iron Wakara Māori’ Race over a distance of 100 km race from Pipiriki to Whanganui.
- Growing cultural tourism experiences which connect marae of the Whanganui River to the growing interest in the tourism, educational and recreational experiences to be had in the Whanganui National Park.

**TABLE 5: EMPLOYMENT IN TOURISM RELATED INDUSTRIES**

<table>
<thead>
<tr>
<th>Element:*</th>
<th>Employment (***)</th>
<th>% of total</th>
<th>% growth, 2004-2014</th>
<th>Specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>160850</td>
<td>8</td>
<td>10</td>
<td>..</td>
</tr>
<tr>
<td>Manawatū-Whanganui Region</td>
<td>6510</td>
<td>7</td>
<td>-6</td>
<td>Low</td>
</tr>
<tr>
<td>Territories</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruapehu</td>
<td>623</td>
<td>13</td>
<td>-5</td>
<td>High</td>
</tr>
<tr>
<td>Whanganui</td>
<td>1079</td>
<td>7</td>
<td>-10</td>
<td>Low</td>
</tr>
<tr>
<td>Rangitikei</td>
<td>465</td>
<td>8</td>
<td>-3</td>
<td>Medium</td>
</tr>
<tr>
<td>Manawatū</td>
<td>439</td>
<td>5</td>
<td>5</td>
<td>Low</td>
</tr>
<tr>
<td>Palmerston North</td>
<td>3000</td>
<td>6</td>
<td>-7</td>
<td>Low</td>
</tr>
<tr>
<td>Tararua</td>
<td>350</td>
<td>6</td>
<td>-0</td>
<td>Low</td>
</tr>
<tr>
<td>Horowhenua</td>
<td>565</td>
<td>7</td>
<td>3</td>
<td>Low</td>
</tr>
</tbody>
</table>

* Specialisation is calculated as revealed comparative advantage. We summarise the results as High, Medium and Low where high is RCA score of more than 1.15, medium is below 1.15 but greater than zero, and low is less than zero.

** Filled jobs. The sector is defined for this purpose as:
- G40 Fuel Retailing
- H44 Accommodation
- H45 Food and Beverage Services
- I49 Air and Space Transport
- I50 Other Transport

The tourism sector cannot be neatly defined, because it is made up of the collection of sectors that service it. Table 5 illustrates that tourism related sectors account for around 7% of regional jobs, slightly below the national share. Ruapehu stands out as specialising in tourism. While employment in tourism related sectors is growing nationally, it is shrinking in the region, except in the smaller tourism centres of Manawatū and Horowhenua.
Unlocking Māori cultural and spiritual dimensions

A part of the tourism opportunity would involve either the expanded use of Māori land or expanded participation of Māori enterprise, particularly where cultural and spiritual dimensions are sought. The marae based experiences on the Whanganui River mentioned earlier and the addition of a cultural dimension to a trip across the Tongariro crossing are just two of the many examples which could contribute revenue to Māori enterprise.

Māori have operated very successful outdoor experiences on the Whanganui River and around the Ruapehu district for a number of years but some ventures did not thrive as the GFC hit the tourism sector. Collaboration between the Māori RTO, other RTOs and Economic Development Agencies in the area could see a rejuvenation of the outdoor Māori experiences.

AN OPPORTUNITY FOR RUAPEHU DISTRICT

- Currently the Ruapehu District is a major winter sports destination. The district’s tourism sector contributed 6.2% to district GDP. This is double the contribution which tourism makes to the national economy.
- Around 13% of local employment is in the tourism sector. The sector accounts for 546 FTEs, 161 business units and $29 million in GDP.
- There were 376,000 guest nights spent in the district in the year ending March 2013. The district has a daily accommodation capacity of 2,450 beds. The spending of tourists flows to cafes and restaurants, the hospitality sector, supermarkets and grocery stores and sports and recreation providers.
- Figures just released by MBIE show that December 2014 was the most popular month for tourists ever experienced in the Ruapehu District. Visitor nights for that month hit 40,000 for the first time, exceeding the previous highest month of 36,000, recorded in January 2013. And 2014 in general was a great year for the district’s tourism, with visitor nights overall topping 427,000 - well above the previous high, set in 2009, of 412,000.
- The research and conversations undertaken as part of this Study have indicated that growth and employment opportunities in the Ruapehu area will be achieved by expanding and making better use of existing attractions including:
  - Adding depth and variety to the Tongariro Crossing experience by expanding the number of concessions provided by those providing guided walks – particularly those from Tu Wharetoa, covering the many cultural, landscape, volcanic and other educational elements of the area.
  - Further developing and marketing additional partner walks to sit alongside the Tongariro Crossing and Northern circuit – as a means of taking some of the pressure off this area and also to encourage visitors to increase the number of nights they spend in the district (for example: expanded marketing of the Tama Saddle Track; more promotion of the Whakapapa village as the base for the Tongariro Crossing walk; further investment in the Round the Mountain track; and on-going investment in tracks around the Park’s Southern Gateway between Ohukune and Waiouru.
  - Packaging and marketing visitor attractions around Mt Ruapehu and the Whanganui River in a way that provides a comprehensive multi day experience, for example, by combining Hobbiton with the Forgotten Highway with Whanganui River and ‘Bridge to Nowhere’ experiences, with Waiouru WW1 experiences and with mountain biking, trekking and other outdoor adventure activities etc.
  - Completing and fully integrating the growing range of mountain biking tracks and
road riding opportunities in the district and making this a key reason to visit the district.

- Enabling the 365 day use of the uphill lift capacity offered by Ruapehu Alpine Lifts – particularly on the Tūroa side of the mountain where iwi have informed us they are cautiously supportive.
- Combining the above two opportunities with that arising from a fully developed multi-level mountain biking track located adjacent to the Tūroa road, noting the additional benefit of increasing the safety for cyclists who currently use this Road.

- Related research has identified the following examples of the benefits of mountain biking investments for local economies:
  - The Whistler Ski Field in Vancouver, Canada now receives more visitor nights and higher daily use in the summer mountain biking season than it does in winter.
  - At levels of annual visit growth of 10% and 20% pa, a potential net increase in economic impact of between $31.2 million and $74.5 million respectively is expected in the Rotorua area from mountain biking expenditure in the period 2013 to 2025.27
  - Gondola uplift of mountain bikers at Queenstown has made a significant, but as yet un-quantified, contribution to the ‘year round’ Queenstown economy. It has also contributed significantly to the viability of the Queenstown gondola.
  - There is an investment of $3 million into the Christchurch Port Hills project to make that facility an attraction for mountain bikers.
  - The Cardrona Alpine Resort near Wanaka operated one of their chairlifts for mountain biking enthusiasts over the summer holidays of 2014/15. The new offering combines accommodation and food/beverage options and special events for guests and has made a positive contribution to the economies of Wanaka and Queenstown.

- The above examples support the existence of flow on benefits of an increased number of mountain bikers to other non-mountain biking activities and facilities. They also indicate a number of other matters:
  - The need for a marketing approach which is integrated with that developed for and by other locations e.g. Rotorua, Taupo or Queenstown
  - The need to see Mt Ruapehu and the Whanganui and Rangitikei Rivers as the critical point of difference for the region i.e. the focus and connector of related attractions.

**WHY?**

*Summary of the rationale*

- The good returns for capital and labour that can be derived from this sector.
- The physical, environmental and spiritual assets of the mountains of Tongariro National Park and the Whanganui and Rangitikei Rivers.
- The close proximity of the region to other attractions such as those located in Rotorua and Taupo, for example, mountain bike trails, thermal pools and geothermal attractions.

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27 See Rotorua Ten-Year Cycle Tourism Growth Strategy, APR Consultants, 26 February 2014
The diversity of the offerings, though many aspects are still under-developed.

The cultural dimension of the area’s outdoor experience with its strong Māori overlay.

The rapidly growing market interest in adventure and nature based tourism, particularly mountain biking and the potential of this market to drive repeat visits to the area.

The existing infrastructure that is in place in the form of existing services – ski lifts, kayaks, recreation equipment, tracks, accommodation, restaurants that can be leveraged for year round use.

The potential to develop inaccessible Māori land and produce jobs for the large local Māori community.

In summary, Manawatū-Whanganui’s potentially strong performance in domestic and international tourism reflects its location and amenities and will improve with greater connectivity.

**WHY NOT?**

Current and proposed regional tourism offerings are potentially a good quality package. It will be important to use and protect the quality of the experiences available although because of the size of the region and the diversity of the opportunity it is unlikely to feel over-used or crowded.

*Fragmentation*

Capturing the opportunities described above is not straightforward. Some operators are very isolated and small scale. Some may not want to be part of something larger. An integrated marketing package would be essential which requires all parties to visualise the scale of the opportunity and agree on the fundamentals. “Patch protection” may be a problem.

*Permissioning*

The whole question of whether mountain biking can be operated on the mountain is likely to be a sensitive one with both iwi and the Taupo-Tongariro Conservation Board.

*Who captures the benefit?*

Where mountain bike tracks are developed around the country they have used a high level of volunteer labour contributions. Volunteerism as a mechanism for developing recreational assets has its limits. A mountain bike park similar to that proposed for Turoa is being developed in the Port Hills of Christchurch on a largely commercial model.

In addition, in projects like this, there can be a separation of capital for investment in the mountain bike trail asset development from those who reap the rewards of this investment such as motel owners, hospitality owners and food suppliers. A strong community ethos is required otherwise some parties can be seen as free-loaders by others.

The essence of the opportunity for the hospitality industry is that it will extend usage of other infrastructure and services without requiring significant extra provision. The Manawatū-Whanganui region has an excess supply of accommodation, relative to current
demand. The occupancy rate of the region’s accommodation stock (excluding holiday parks) is typically below 35% which is well below the national norm (Figure 19). This means that there is capacity to potentially double visitor numbers within existing infrastructure.

The question of the standard of accommodation would need to be addressed and would require close examination to ensure it matched the expectations of new tourists. Public infrastructure might also not fare so well with a capacity review required of waste water treatment systems to ensure they can meet needs.

The matter of broadband connections needs attention. Some of the outdoor experiences that would be valuable in the proposed package are in remote areas. Adequate connection is essential for the efficient conduct of this business. Expansion of the Government’s existing broadband initiatives and the new Mobile Black Spot Fund may deliver new opportunities, particularly in the tourism sector.

The regional tourism offering has already demonstrated its potential with domestic exposure, but the connection to the international market is weak. At the core of this problem is the packaging rather than the quality of the offering. A stronger international exposure will help to diversify not only the region’s offering but the national offering.

FILTERS SUMMARY

Our summary of how the filters identified in the earlier ‘analytical framework’ part of this report are reflected in the scale of the ‘tourism growth’ opportunity provided in table 6 below. In brief:

**Impact:** the tourism sector is already a significant portion of the regional economy, but it is under-represented in overseas visitors. Increased visitor spending by 10% would boost regional GDP by $63m a year and add 70 new jobs directly and indirectly.

**Trend:** the global tourism market is growing and New Zealand is benefitting. Overseas visitor spending has been growing at 2% a year and holidaymakers spent some $4.6b across New Zealand in 2014. While this tourism growth rate is not spectacular, it is maturing and growth projections are steady. Future demand looks assured with increasing travel in markets like India and China, as the middle class in these countries grows.

**Competitive advantage:** the tourism product is sufficiently strong to support major growth. The fact that it is relatively undeveloped is an opportunity but also a challenge. The tourism sector also has large indirect spill-overs, generating high levels of economic activity and new jobs.

**Employment intensity:** the tourism sector is moderately labour intensive with a 26% share of output being wages. There are already around 6,510 tourism-related jobs in the region, accounting for around 7% of regional employment. While the bulk of jobs tend to be low skill and low pay, the alternative for unskilled labour may be no jobs at all. The types of experiences available lend themselves to other labour-intensive activity such as guiding and interpretation.

Like most service sectors, visitor service operators are intricately enmeshed with other businesses. A lift in tourism spending is 2.5 times more powerful than a generalised uplift in economic activity of the same magnitude.
Exporting: the tourism opportunity in the Manawatū-Whanganui region has significant potential for a mixed age demographic and has the potential for strong growth in the international market.

**TABLE 6: OVERALL METRICS FOR TOURISM**

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Current size (filled jobs)</th>
<th>Employment intensity</th>
<th>Linkages to other sectors</th>
<th>Stage of lifecycle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,510</td>
<td>Medium</td>
<td>High</td>
<td>Growth/Maturing</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact</th>
<th>GDP adding</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Job adding</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trend</th>
<th>Domestic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Export</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competitive advantage</th>
<th>Domestic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Export</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Summary</th>
<th>Current size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Employment intensity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Linkages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stage of lifecycle</td>
<td></td>
</tr>
</tbody>
</table>

*Source: NZIER*

**HOW?**

**Objective - to grow the region as a destination for adventure, natural, cultural and outdoor tourism experiences.**

**Strategic interventions - these are twofold:**

- First: to extend the mountain biking trails already being developed by introducing an additional trail on the Turoa side of Mt Ruapehu and marketing this in association with other mountain biking marketing initiatives in the greater area.
- Second: to use interest in mountain biking to accelerate interest in general regional adventure, outdoor, cultural and nature-based tourism opportunities.

The key to success with this twofold strategy is to adopt a comprehensive multi-activity and multi-dimensional regional package (accommodation, transit, rental etc.) approach with integrated marketing. In other words, to better coordinate the marketing of diverse offerings and to incrementally add other additional attractions to the package as the concept grows.

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The response to each of the two lines of strategic intervention is somewhat different. Taking the first one first, we believe it requires an action team comprised of the key players, that is Ruapehu District Council, Ruapehu Alpine Lifts, iwi, DOC, Visit Ruapehu (and other RTOs) and MBIE and possibly Tourism New Zealand, together with local operators – to get the momentum going. Detailed feasibility studies on the risk/reward of investment would be required.

More particularly:

- **Give priority to revisions to the Tongariro National Park Management Plan**: These changes should be designed to enable expanded use of Ruapehu Alpine Lifts (RAL) Ltd facilities for year-round tourist uplift, mountain bike trails on the Tūroa Ski-field area and a mountain biking trail running parallel to the current Tūroa Road\(^{29}\). This requires collaborative activity between RAL, DOC, iwi and related stakeholders with the council as an enabler. These parties should also plan for the development of a second Great Walk within the National Park.

- **Complete bike trails in the area**: Further infrastructure work is required such as establishing easy connections between the various trails in the area, completion of the trail from Ohakune to National Park ($1 million required) and the further packaging/marketing of multiple biking trails into a single cohesive package: Timber Trail; Taupo Trails; the 42 Traverse and Whanganui River experiences\(^{30}\) together with related opportunities in the Taupo and Rotorua areas. This will require financial and volunteer contribution and will need to be progressed as a series of projects led by Ruapehu District Council.

- **Complete and further promote the Mountain to Sea Great Ride**: The cycle trail from Ohakune to Whanganui via the Whanganui River has received significant investment, including the completing of road sealing. Further work is required to achieve the ‘rider-friendly’ road design guidelines on the section from where the ride joins state highway 4 through to Whanganui (from River Road through to the North Mole at the Whanganui river mouth).

The second intervention (leveraging off the extension of mountain biking) relates to the packaging of all local tourism opportunities in the Ruapehu, Whanganui and Rangitikei area. This is a developmental task requiring care and skill. It will be enabled with:

- **Good iwi/hapū engagement and governance**: Co-governance will be the key to ongoing iwi/hapū engagement – particularly with projects to fulfil the tourism/recreation potential of the Whanganui River. All the parties will need to examine the best form of governance for the whole project and for each of the elements of it. This should be an early priority because it will build the cohesion the project will require.

- **Inclusion of the Waiouru WW1 and related attractions**: Additional tourism experiences are expected to be major attractions. They include: opening up the

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\(^{29}\) The proposal for a separated cycle and walkway located adjacent to the Ohakune Mountain Road has been supported by the Tongariro Taupo Conservation Board. The Board has recommended to DOC’s planning team that a partial plan change to the Tongariro National Park Management Plan be pursued. Whanganui Chronicle. 10 March 2015

\(^{30}\) Some work has already commenced e.g. the production of an attractive integrated trail map information pamphlet. This initial work needs to be significantly leveraged.
Waiouru area for a wide range of experiential/outdoor recreation opportunities as an adjunct to the current focus on army training and the development of a Waiouru WW1 experience. These are projects in their own right and while they should eventually become part of the overall approach, they should be managed separately and considered in a priority order of achievability, cost and alignment with the total package. The biggest gain will come from packaging these new experiences with other similar experiences such as the Forgotten World/Whangamomona rail experience. There is also opportunity to link these attractions to the current ‘Hobbiton’ international draw card located in Waikato which continues to attract high levels of international tourists as part of the Tourism New Zealand ‘100% Middle earth, 100% Pure New Zealand’ marketing campaign.

- **Ultra-fast broad band**: This is a key enabler for both elements of the twofold approach. Tourists interested in mountain biking (and adventure tourism generally) tend to be younger and more independent and therefore more comfortable with using the internet for booking and arrangements. In particular, expansion of the speed and the area (into rural areas) of high speed service would help generate the facility to work from home and help contain costs; otherwise businesses would be dependent on expensive office accommodation. It may also provide more opportunity to generate dual family incomes as employment for spouses in remote areas is an increasing concern. Most importantly, high speed broadband development must keep up with the tourism development programme in the region otherwise it will act as a drag on progress.

- **Targeting of international tourists**: While there is scope to grow the domestic market, the big gains are in the international market. Obvious markets are English-speaking countries such Australia and the US, but there is significant potential in markets such as China and India. The cultural connection is a potential factor to weave into this marketing. Targeted marketing may be required for example, aligning fishing and hunting with particular international tourist markets. The task is for the RTOs, in collaboration with tourism operators and significant accommodation providers like ‘The Chateau’, to align, leverage and influence Tourism New Zealand’s international campaigns, all of whom together could assist with campaigns which match particularly markets to the particular attractions of the area.

- **Targeting campervan travellers**: The numbers of individual experiences available in the area particularly lend themselves to campervan travellers. The same organisations as those mentioned above should target campervan providers with a well packaged selection of central North Island experiences for them to enjoy. This also raises the question of the adequacy of campervan facilities in the region. This is a consideration for all district councils in the region.

- **Picking the best of what has gone before**: Te Kahui Tupua was a $3 million project completed in 2010 and funded by the Ministry of Tourism and NZTE as part of its Major Regional Initiative [MRI] programme. The project involved was a tourism sector capability building and branding aimed at raising the performance of the tourism sector in the Ruapehu, Rangitikei and Whanganui area. The project was the result of a five year collaboration of 11 iwi, three local authorities and over 100 tourism operators. Key informants suggested the project was overly ambitious and follow up action did not receive enough resource to enable it to deliver on its ambitions. Notwithstanding, consideration could now be given to dusting off the initiatives championed in the original programme to rejuvenate a joined up approach to area marketing.
As will be seen with many of the opportunities referenced in subsequent sections of this report, significant public and private sector investment will be required to make progress on the above two pronged strategy.

**Relevant current central government initiatives:**

- National cycle trails – Mountains to Sea Trail and The Timber Trail.
- Tourism New Zealand promotion and marketing.
- Rural broadband initiative, the Mobile Black Spot Fund and further roll out of ultra-fast broadband in Manawatū-Whanganui - creating a platform for adoption of technology for tourism industry.
- Wellington Northern Corridor Roads of National Significance.
- Upgrades and maintenance of state highways and regional roads.

**INTERVENTIONS SUMMARY**

Ruapehu District Council

- Provide energetic and committed leadership across all of the interventions discussed above as means to achieve the two pronged strategic approach and search out additional partners to sustain momentum.
- Build on work undertaken in Rotorua to confirm the economic potential of mountain biking tourism.
- Review the capacity of water and waste water systems in the district to accommodate the additional load arising from a growth in the number of visitors, (including that from campervans) and develop a plan for overcoming any shortfall.

Whanganui District Council

- Complete the Mountains to Sea Great Ride to the standard required as part of Nga Haerenga, the New Zealand Cycle Trail project.
- Undertake cross RTO / council marketing of the trail as part of a broader tourism package.

All councils, RTOs and tourism operators

- Work collectively with other regional RTOs – especially in Bay of Plenty, Hawke’s Bay and Waikato to strengthen and raise the profile of existing initiatives such as the ‘Explore Central North Island’ to package and brand regional tourism offerings and work with Tourism New Zealand to market these packages.
- Review and refresh Te Kahui Tupua and grow those elements which still have merit.
- Seek out and secure investment from all possible sources to increase the size and therefore impact of marketing efforts.
- Work with New Zealand Cycle Trail Inc. and Tourism New Zealand to further promote regional trails as part of Nga Haerenga.
• Submit a proposal for consideration by Government as part of the second tranche of rural and ultra-fast broadband roll out.

Central Government

• Assess whether the Tongariro National Park Management Plan should be amended to accommodate mountain biking and other visitor attractions (DOC).
• Support international marketing of Ruapehu, Whanganui and Rangitikei attractions (Tourism New Zealand).
• Work with Whanganui District Council to complete the Mountains to Sea Cycle Trail (NZTA and MBIE).
• Examine the outdoor experiences which could be accommodated on Defence land near Waiouru (Ministry of Defence).
• Work with local councils to commission a survey to develop a better understanding of the motivation and intentions of international travellers heading south from the Ruapehu area on state highway 1.

Iwi

• Work in partnership with the parties leading this initiative to grow, package and brand Māori cultural awareness tourism offerings including those related to marae experiences on the Whanganui River, the proposed Wakarama event from Pipiriki to Whanganui and other experiences within the Tongariro National Park etc.
• Seek options for support which could be provided to grow the effectiveness of the Whanganui Māori Regional Tourism Organisation Trust Board.
• Actively engage with DOC, Ruapehu Alpine Lifts, the Tongariro Taupo Conservation Board and others to explore and bring to fruition opportunities to provide additional visitor experiences within Tongariro National Park.
TOURISM AND VISITOR SERVICES

THE OPPORTUNITY AT A GLANCE

Create an international scale destination:
• Adventure tourism.
• Cultural/spiritual experience.
• Major regional tourism asset.
• Add substantial new dimension to economy.

Overcome:
• Fragmentation.
• Small scale thinking.
• Limitations of the Tongariro National Park Management Plan.
• The need for capital to realise the opportunity.

Leverage off:
• Huge natural assets
• Existing capacity – 365 days.
• Strong growth of mountain biking.
• Iwi and the spiritual ambience of the region.
• Energy of Ruapehu District Council.
• High speed internet access.

Act to:
• Empower Ruapehu District.
• Engage key players to modify Park Plan.
• Undertake feasibility study for expanded mountain bike uplift at Turoa skifield.
• Identify investors.
• Package experiences.
• Build a brand.

What? – the opportunity

Why? – will it succeed

Why not? – obstacles

How? – interventions, actions and arrangements
OPPORTUNITY:
SHEEP AND BEEF FARMING AND PROCESSING

WHAT? – THE OPPORTUNITY

There are two opportunities – in farming it is improvement in on-farm productivity performance; in processing it is value-added processing geared to international market niches.

The red meat (sheep, beef and venison meat) production is a large component of the farming sector in the region. It represents a large portion of agriculture revenue because of the extensive area of hill country. It is a very significant employer (8,343) and source of GDP and could be more significant in terms of GDP.

Many of the productivity and practice issues that hold back the industry across the country and have been identified in the Red Meat Strategy are evident in this region. Progress is being made by the Red Meat Strategy but it is slow. The question is what are the unique regional levers that can be used to fast-track the national effort in the region?

An opportunity lies in the Horizons Regional Council’s Sustainable Land Use Initiative (SLUI) programme. Through this programme, hill country farmers have begun to make significant progress in reducing erosion on erosion-prone hard hill country. In so doing farmers are required to consider, in depth, the nature of their practice. A modest extension of this programme could achieve significant rewards.

For Horizons, SLUI is an intervention to minimise erosion but could also be seen as something of a Trojan Horse for farm practice improvement. Work done so far has enabled quantification of the latent additional productive potential of this land (up to $26m of additional gross farm revenue per annum and the opportunity for land owners to increase their productivity). This is a worthy prize.

While improved productivity is important, the region’s long term prosperity requires added-value processing and this is the second but challenging opportunity. The red meat sector is gradually spawning value-added products and processes, many for niche international markets. The opportunity is to identify and accelerate such initiatives.

Farming commentators strongly advocate an enhanced relationship between education, research and science establishments in the region to improve business practice, encourage technology development and uptake, and supply highly trained people.

The size of the potential prize in farming productivity is in the vicinity of $26m. The size of the prize in processing is the securing of valuable off-shore markets to provide longevity to the industry in the region.
6. OPPORTUNITIES AND ENABLERS

CURRENT POSITION - BEEF AND SHEEP FARMING

We define the sheep and beef sector broadly to include sheep and beef farming, processing and selling (meat, leather and wool). A total of 1.2m hectares (55% of the region’s total land) is used for sheep, beef and deer farming. About 50% of class 1 and 50% of class 2 farm and forest land in the region is used for sheep and beef farming, however most (77%) of sheep and beef farming is on class 6, 7 and 8 land.

The region has the largest sheep flock and beef herds of any region in the country\textsuperscript{31}. In 2012 the region accounted for 18% of the nation’s sheep flock and 15.5% of the beef cattle herd. Some 40% of New Zealand lamb production and 50% of New Zealand lamb exports come from within two hours driving time from Feilding\textsuperscript{32}.

Employment

The sheep and beef sector in the Manawatū-Whanganui region has performed better than other parts of New Zealand in terms of employment. While national sheep and beef employment fell by 9% over the past decade, it only fell 1% in Manawatū-Whanganui. This is partly attributed to the labour-intensive requirement of hill country and because the sector has not declined in size as much as in other regions.

The region employs 11% of the nation’s sheep, beef and related workforce. This is 8,343 workers (Table 7). A significant share of jobs are in services to agriculture and food manufacturing (6,064 persons are employed in the food products manufacturing sector\textsuperscript{33}). At the broader primary sector level, the region currently contributes nearly $1.9 billion per year to the nation’s primary sector export earnings (12% of total primary sector earnings\textsuperscript{34}).

\textsuperscript{31} The data in this section of the report was derived from Statistics NZ and was interpreted with the assistance of MPI
\textsuperscript{32} Pers.comm. Andrew Watters (a member of the Study’s Technical Advisory Group)
\textsuperscript{33} Data drawn from the 2013 census by Statistics NZ
\textsuperscript{34} NZIER regional database.
TABLE 7: EMPLOYMENT PATTERNS IN THE SHEEP, BEEF AND RELATED SECTOR

<table>
<thead>
<tr>
<th>Element:*</th>
<th>Employment (**)</th>
<th>% of total</th>
<th>% growth, 2004-2014</th>
<th>Specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Broad areas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>76,733</td>
<td>4</td>
<td>-1</td>
<td>..</td>
</tr>
<tr>
<td>Manawatū-Whanganui Region</td>
<td>8,343</td>
<td>9</td>
<td>-3</td>
<td>High</td>
</tr>
<tr>
<td><strong>Territories</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruapehu</td>
<td>862</td>
<td>17</td>
<td>-25</td>
<td>High</td>
</tr>
<tr>
<td>Whanganui</td>
<td>1,548</td>
<td>9</td>
<td>1</td>
<td>High</td>
</tr>
<tr>
<td>Rangitikei</td>
<td>2,056</td>
<td>37</td>
<td>40</td>
<td>High</td>
</tr>
<tr>
<td>Manawatū</td>
<td>1,495</td>
<td>18</td>
<td>23</td>
<td>High</td>
</tr>
<tr>
<td>Palmerston North</td>
<td>186</td>
<td>0</td>
<td>-10</td>
<td>Low</td>
</tr>
<tr>
<td>Tararua</td>
<td>1,579</td>
<td>25</td>
<td>-28</td>
<td>High</td>
</tr>
<tr>
<td>Horowhenua</td>
<td>493</td>
<td>6</td>
<td>-27</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: Statistics NZ, NZIER

Notes:
.. Not available or applicable
* Specialisation is calculated as revealed comparative advantage. We summarise the results as High, Medium and Low, where high is RCA score of more than 1.15, medium is below 1.15 but greater than zero, and low is less than zero.
** Filled jobs. The sector is defined for this purpose as:
A014100 Sheep Farming (Specialised)
A014200 Beef Cattle Farming (Specialised)
A014300 Beef Cattle Feedlots (Specialised)
A014400 Sheep-Beef Cattle Farming
A014500 Grain-Sheep or Grain-Beef Cattle Farming
A052200 Shearing Services
A052900 Other Agriculture and Fishing Support Services
C111100 Meat Processing
C111300 Cured Meat and Smallgoods Manufacturing
C131100 Wool Scouring
C132000 Leather Tanning, Fur Dressing and Leather Product Manufacturing
C133100 Textile Floor Covering Manufacturing
F331100 Wool Wholesaling
F331900 Other Agricultural Product Wholesaling

The sheep, beef and related sectors account for 14% of jobs in the region – a large employer and much larger than nationally (4%). Even though it is a large employer, only 11% of the sector’s revenue goes towards local wages – although the sector has spill-over benefits to other industries in the region. The sector is losing jobs, although there is growth in some sub-regions, particularly in Rangitikei and Manawatū. The region is highly specialised in sheep and beef related sectors.

Farmer performance

If a comparable region like Hawke’s Bay was chosen as a yardstick by which to measure the performance in Manawatū-Whanganui, then sheep and beef farmers in Manawatū-Whanganui would have a lot of catching up to do. This represents a regional opportunity - to increase the size and scale of sheep and beef production, as well as increasing processing and mixed use grain farming (see Figure 20, below).

Performance improvement in farming industries is not an easy task, but the gap between this region and Hawke’s Bay is sufficient to make the effort worthwhile and would appear
to be attainable. The Areas of Opportunity column in Figure 20 illustrates the areas where Manawatū-Whanganui is not as specialised as Hawke’s Bay and thus are sectors that are likely to have the most potential growth in them.

FIGURE 20: KEY INDUSTRY COMPARATIVE STATISTICS

*Revealed comparative advantage in employment (>1 has comparative advantage)*

<table>
<thead>
<tr>
<th>Area of Opportunity</th>
<th>Manawatū-Whanganui</th>
<th>Hawke’s Bay</th>
<th>Areas of Opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A014400 Sheep-Beef Cattle Farming</td>
<td>3.8</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>C111300 Cured Meat and Smallgoods Manufacturing</td>
<td>1.2</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>A014100 Sheep Farming (Specialised)</td>
<td>3.0</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>C111100 Meat Processing</td>
<td>2.4</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>F360200 Meat, Poultry and Smallgoods Wholesaling</td>
<td>0.4</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>A014200 Beef Cattle Farming (Specialised)</td>
<td>2.1</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>A014500 Grain-Sheep or Grain-Beef Cattle Farming</td>
<td>1.9</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>Meat related</td>
<td>2.6</td>
<td>3.0</td>
<td></td>
</tr>
</tbody>
</table>

*Source: NZIER calculations from Statistics New Zealand data*

Despite the scale of the industry there are real concerns about farming performance within the sector. The Red Meat Strategy presents survey results from a sample heavily weighted towards North Island Hill Country farms (representing much of the Manawatū-Whanganui region), and concludes:

- 27% of beef and lamb suppliers did not understand their costs.
- Opportunities to operate a land use ‘portfolio approach’ that optimises land use to take full advantage of the capability of each part of a farm are not fully utilised.
- Top on-farm performers are, not surprisingly, making more money than farmers on similar land but with lesser on-farm performance.
- The number of farmers losing money is increasing (from 17% in 2003 to 23% in 2011).
- The costs incurred by the top 20% of performers are 32.5% less per hectare than the bottom 20% of farms.
- Information about how to improve animal health, pasture management, environmental management, soil composition and protein production is available now but not fully used.

It is recognised in sector organisations that the sector’s top performers are not defined by their land class, their age, their stock units per hectare or the size of their farm – rather it is their behaviour and willingness to invest in their business that defines them, alongside their focus on optimising kg per hectare of market-ready product.

The net result of the above features is that there is a large gap between potential capacity to produce meat and actual capacity. When similar farms are compared, this is reflected - despite the region’s comparative benign climate until recently - in a wide range of production volumes per hectare i.e. the bell curve of performance is broad. The point was made to us that farmer attitude may currently be a little defensive as the region suffered
the worst drought in 70 years in 2012/13 and has had two drier than normal summers since.

One informant to the Study has confirmed there is no question that with more and better fertiliser application, productivity will be unlocked. Fertiliser is typically applied in the autumn and the amount is determined by how much money the farmer has at the time. With some challenging seasons, lack of good budgeting, and too much financial resource being used up on fixed costs or regulatory costs, the fertiliser spend tends to get rationalised. It is easy for a farmer to say ‘they will put more on next year’, or ‘reducing the amount applied won’t reduce production too much’. When a farm that has been ‘mined’ changes ownership, it takes time and a lot of money to build up fertility again.

In terms of infrastructure, fences and tools the opportunity cost of doing a task incrementally is sometimes not taken into account. For example, with better and more subdivision, a longer rotation and better stock grazing may emerge. This can increase carrying capacity, improve animal nutrition, and improve pasture quality. Downstream animal production benefits will result. (Note – subdivision is often limited by stock water. Comment is made on this challenge in a later section of the report).

A lot of progress is being made to improve forages or crops but this may be viewed as a costly and risky enterprise by many farmers despite the potential being large. Currently farmers learn from mouth to mouth conversations, or by following a few key farmers in the region. Opportunities for information exchange are limited.

In summary, the potential gains from improved performance are significant but the rate of uptake is slow and the national vehicle, the Red Meat Strategy, is achieving results, but slowly.

Industry and regional initiatives

Over $350 million of Government and primary sector funding is currently committed to a Primary Growth Partnership (PGP) programme aimed at achieving improvements to the productivity and profitability of the red meat sector. One of the objectives of a partner programme to the Red Meat Strategy - the Red Meat Profit Partnership is to explore different outreach education options and apply the best option through which the above objectives can be delivered.

Similar issues and opportunities to those identified in the Red Meat Sector Strategy have been identified by Horizons Regional Council as part of their Sustainable Land Use Initiative (SLUI) programme. Typically these SLUI hill country farms include sheep, beef and deer production of 6-13 stock units/hectare.

The SLUI programme:

- Maps the resources of the farm.
- Identifies areas of strength and vulnerability.
- Develops erosion control programmes.

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35 Red Meat Profit Partnership: A $64 million programme funded by a consortium of agribusinesses and the government to drive sustainable, long-terms profits for New Zealand’s red meat sector. The programme focuses on supporting farmers in the adoption of best practice behind the farm gate and between the farm and processor.
6. OPPORTUNITIES AND ENABLERS

- Offers the opportunity to farmers to initiate “works programmes” designed to prevent erosion/sediment entering watercourses.
- Involves the preparation of Whole Farm Plans (WFPs).

**Gains from the SLUI Programme**

As at July 2014, Horizons have completed farm plans and farm scale mapping on 540 hill country properties covering 412,912 hectares (41%) of the hill country of the region. The SLUI programme has been successful in implementing over 20,000 hectares of erosion control works. These works, when mature, will result in 12% less sediment entering the region’s streams and rivers. This, in turn, will result in improved water quality, improved longevity of flood protection schemes and the protection of on-farm, local and national infrastructure (roads, rail, bridges, power supply etc.).

Analysis of 540 hill country farms to date shows that there is an unrealised potential dry matter production per property of 752kg. This could represent enough feed for an additional 203,357 stock units. At $68-$89 GFR/su \(^{36}\) this is an extra $13.8m-$18.1m gross farm revenue for the SLUI farms completed to date pa.

Over the 1,000,000 hectares of hill country in the region this figure becomes an overall potential increase of $20.1m-$26.3m of revenue per annum, according to estimates supplied by Horizons Regional Council. In addition to the above, further production opportunities may arise from better use of the 82,000 hectares of class 1-3 land located in the hill country. All other things being equal, this land has potential to be cropped. Only around 500ha of this land is currently cropped.

A further option is the helicopter sowing of plantain as an additional stock feed source. The more strategic use of fertiliser, as referenced earlier, is also important and there is a current Government-funded Primary Growth Partnership programme \(^{37}\) addressing this issue.

We believe that the SLUI programme is demonstrating that engagement with farmers is a key way to effect practice change and in lieu of anyone else doing it, engagement on broader practice issues as an extension of the SLUI programme appears to be a genuine option.

**CURRENT POSITION - BEEF AND SHEEP MEAT PROCESSING**

The region is well represented by the meat processing industry located in the various districts of the region are listed below:

**Whanganui District**

- **AFFCO Imlay** (Owned by Talley’s Group) – Whanganui City – Sheep and beef processing.
- **Land Meats** (owned by AFFCO) – local trade including processing of lambs for ‘Coastal Spring Lambs’ Ltd.

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\(^{36}\) Beef and Lamb NZ. GFR is ‘gross farm revenue’ and ‘su’ is stock unit.

\(^{37}\) Pioneering precision application of fertiliser in hill country PGP
**Rangitikei District**
- ANZCO Foods Manawatū – near Bulls (previously Riverlands) – Cattle.

**Manawatū District**
- AFFCO Manawatū, situated in the outskirts of Feilding (Beef).
- Venison Packers Feilding.
- Ovation Feilding (Sheep and cattle) Owned by Hawke’s Bay Meat Company Limited—(Ovation product is also processed and packaged at Progressive Meats Limited and by an affiliate Company Te Kuiti Meat Processors Limited).

**Tararua District**
- Alliance Dannevirke (Sheep and Cattle).

**Horowhenua**
- Alliance Levin (Sheep and Cattle).

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**CASE STUDY: VALUE-ADD PROCESSING**

Over the last few years, a number of agribusiness facilities have been established in the region to generate value-added products for export markets. For example:

- ProLiant near Feilding transforms cattle blood into plasma products for medical tests and pharmaceutical manufacturing.
- Prepack Ltd located in Palmerton North prepares standardised ration packs for the Australian military as well as emergency preparedness kits.
- Coastal Spring Lamb\(^{38}\) processes premium brand lamb. The model applied to the development of this product has proven successful and may prove valuable if replicated elsewhere. The essential features are: the quality control of product (triple grading approach with taste and tenderness the key); traceability; provenance – part of a coherent story; co-branding with Food Stuffs and mutual endorsement. The target posted by the Company is to crack the international market by the end of 2015. The Company currently sells 30,000 lambs domestically.

ANZCO Foods Manawatū – near Bulls (previously Riverlands) with a focus on cattle and ANZCO Foods Rangitikei – near Marton (formally Canterbury Meat Packers [CMP]) with a focus on sheep-meat, procure the best beef and lamb they can get their hands on and market it in chef and kitchen-ready cuts. They have state-of-the-art, accredited facilities and pride themselves on creating sophisticated food and healthcare solutions.

Nestle Purina Petcare Ltd near Marton and Mars Pet Foods in Whanganui are two further examples of value add producers located in the region.

Each of these examples are testament to the fact that improvements are possible in both farming and processing. What is required is breadth and scale of improvement.

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\(^{38}\) Coastal Spring Lamb is a company established to capitalise on the price advantage of producing lamb products from lambs grown on coastally located farms and processed with particular attention to quality.
The agribusiness sector in the Manawatū-Whanganui Region is growing. The region is home to a diverse range of agricultural producers looking to stand out from the crowd by creating a unique point of difference. Key informants from the Manawatū District viewed their area as the hub for the region of intensive agriculture, agri-business technology, agricultural servicing, innovation, precision agriculture and primary sector processing.

Salient examples of this were quoted as being:

- **The Building Clever Companies (BCC) group** who are developing plans for setting up an agri-tech accelerator which would have national reach into the regions.

- **Figured Agri-Business** who provide a complete cloud-based livestock tracking, farm budgeting and forecasting tool that works hand-in-hand with Xero to help farmers improve farm performance and profits is a leader in the trend toward ICT based precision agriculture and information rich farm decision making.

- **Interpine Forest Consulting and Data Management Company** specialising in information technology and optimal decision making across the forest industry.

It is clear that agricultural production and processing in the region is developed, business savvy and sophisticated. Many of the products coming out of the region have value-add components, strong marketing plans, and clearly reflect elements of agribusiness research and development.

The question is - can gains in processing, particularly those which add value to the product, ‘kick on’ to produce more enterprise, revenue and ultimately jobs? There is no question that there is a base of capability already evident in the region from which to build.

**WHY?**

**SUMMARY OF THE RATIONALE**

- There is a significant productivity dividend to be captured for land and capital owners (i.e. farmers) and to an extent for employed labour.

- There is existing investment by the industry in the region and the body of knowledge and experience is already established.

- The region has extensive hill country that supports this land use.

- The sheer scale of hill country farming in the region means that small changes multiply out to major benefits.

- Significant advances have already been made and the positive can-do attitude shown by stakeholders provides a good basis for expansion.

- The resource of knowledge and experience that exists in Horizons Regional Council can be capitalised on.

- The close proximity of expertise in Massey University and other research and enabling institutions provides the region with ‘first mover’ opportunities.
• Value-added products and processing have long term potential to contribute to GDP and jobs.
• The potential of the industry to expand and intensify the use of freehold Māori land is clearly apparent.

WHY NOT?

Productivity improvements in the meat industry have a long history of under-achievement. The two fundamental and related problems of the processing industry – excessive procurement costs and over-capacity – remain. Similarly, on-farm productivity has been a difficult nut to crack and yet some have succeeded and improvements in the last decade in the lamb industry are testament to this.

Publicly or industry funded farm advisory services were dismantled years ago as the industry struggled for profitability, as they were seen as a cost rather than a benefit.

The Red Meat Strategy is well-conceived and is making progress but an added intervention is required regionally if it is to really bite and this is the case in Manawatū-Whanganui as much as anywhere else.

Factors such as passivity, lack of vision, lack of role models hold the industry back.

We met a new generation of young farmers willing to address these issues and they, like us, believe it requires a human intervention with farmers to give them the incentive to change. A cadre of private sector farm advisors is ready to step in. It requires the initial breakthrough with farmers who can then activate this group of talented advisors to assist farmers.

It also needs to be acknowledged that the sector is losing jobs and that will continue. The speed of loss will be reduced if practice improvements are achieved and the contribution to GDP will be significant, but the returns are generally greater for capital and land than labour.

FILTERS SUMMARY

Impact: the scale of the industry is such that small improvements can have significant impacts. The farm productivity opportunity is relatively immediate compared to those in the processing sector that are either out of the hands of the region or long term. If set in motion the rewards are potentially significant.

Trend: the global market for meat is growing strongly, led by increasing demand from emerging markets. Over the past decade meat exports have increased by an average of $135m per year, the third fastest growing commodity in New Zealand, behind dairy and forestry.

39 Wool was in the order of 60% of a hill country farmer’s gross income in the 1980s. This has fallen to as low as 10-15% in recent years
**Competitive/comparative advantage:** the region already has a large sheep and beef sector. The quality of the land, access to transport networks and processing are all hallmarks of specialisation in the sector. It employs over 8,000 people when processing and wholesaling is included.

**Employment intensity:** the sector is losing jobs, albeit only modestly (only 3% in the last decade). The sector is also not very labour intensive, being much more reliant on capital and the spill-overs to the regional economy are slow to come through.

**Māori landlocked land:** this is an area of particular opportunity and which could improve job prospects. Much of the poor productivity of Māori land is attributed to poor farming practice. This initiative provides an opportunity to intervene and assist.

**TABLE 8: OVERALL METRICS FOR SHEEP AND BEEF**

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Current size (filled jobs)</th>
<th>Employment intensity</th>
<th>Linkages to other sectors</th>
<th>Stage of lifecycle</th>
<th>Impact</th>
<th>Trend</th>
<th>Competitive advantage</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>Low</td>
<td>Growth</td>
<td>GDP adding</td>
<td>Domestic</td>
<td>Domestic</td>
<td>Domestic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Job adding</td>
<td>Export</td>
<td>Export</td>
<td></td>
</tr>
</tbody>
</table>

While opportunities in this sector are not particularly job-rich, consideration also has to be given to protecting existing jobs. We have recommended this opportunity with the future in mind. It is designed to protect jobs and incomes, to maintain community resilience and get the best out of the resource the region has in abundance. It is the most efficient use of those resources the region has at this point in time.

Greater consciousness of farming practice could lead farmers to diversify into Mānuka honey. Improved practice could boost the use of undeveloped Māori land and this is considered in the section of the report titled Productivity of Māori Land.
HOW?

Objective – improved on-farm productivity; identification of value-added opportunities.

Key strategic intervention - we are recommending an association with the SLUI programme. There are, however, a range of other lesser interventions that can also be contemplated and they are outlined below. With regard to processing opportunities we are recommending a focus of attention in this area to identify and qualify opportunities in a systematic way.

SHEEP AND BEEF FARMING

The purpose of the Red Meat Profit Partnership and Red Meat Strategy is to lift farmer performance. What’s required is an extension programme. There is also a need to better connect farmers with scientists. Both measures would require growth in the number of farm consultants in the sheep and beef sector in the region. This gap is currently filled by industry representatives, vet services, and the sharing of ideas that happens at beef and lamb field-days.

The priority of such programmes should be on sharing information about:

- Improving finishing capability on hill pastures.
- Improving sheep genetic stock.
- Developing pathways for new talent to enter the sector.
- Providing clearer succession pathways.
- Renewing pastures, tailoring and targeting fertiliser use and improving stocking mix.
- Improving business practices and the use of technology to measure and manage pasture production.
- Developing new forages for hill country farms.
- Adopting an integrated farming approach in association with other primary sectors including taking advantage of finishing opportunities on better class land located on river flats or closer to the coast.
- Developing and applying an equity/sharing model, for example separating land ownership from land management and sharing the returns from the application of good decisions.
- Improving access to science, technology and expanding access to information – preferably cloud based, to enable benchmarking and active comparison of ‘like for like’ farmer performance.
The above list provides great tools to have in the tool belt to make positive change, but farmers also need:

- The confidence, skill, and knowledge to make changes.
- The desire to do things differently.
- Time to put things into place toward change.

With the SLUI initiative, Horizons Regional Council is the natural leader in the realisation of this opportunity. Horizons could play a more active role as a channel in providing information and advice about the sustainable production which is achievable by individual farmers. While not a core activity of Horizons, it is a natural addition. SLUI advisors could act as a motivator and connector with other advisors to assist farmers. We appreciate that involves a shift in their role, but at present the ‘in your face’ approach which is so badly needed is not available.

Irrigation and rural water reticulation schemes will also increase productivity. Water projects either small or large scale, can unlock a lot of potential. In the past decade there has been a focus on large scale irrigation projects on high quality land. The benefits of small scale water projects focusing more on stock water can unlock just as much, if not more potential. At present these initiatives are progressing to a degree through the MPI Irrigation Acceleration Fund. Irrigation is dealt with in more detail in the section on Land Use Intensification.

The importance of high speed internet access should not be underestimated. There are growing opportunities to encourage farmer behaviour change through internet-based programmes and support channels. This is a strong argument in support of the need to achieve the current targets for the availability of rural internet and not letting them slip back.

### SHEEP AND BEEF PROCESSING

The focus of industry processing improvement is a double-edged sword for Manawatū-Whanganui. The ‘Pathways to Long Term Sustainability’ report released in March 2015 by Meat Industry Excellence (MIE) Chairman John McCarthy says $1 billion could be saved in five years if New Zealand’s biggest four processors merged into one. The report estimates returns would increase $5.75 per lamb and $39.24 for each head of cattle processed.

Given that the Manawatū-Whanganui region has in the order of 18% of the nation’s sheep flock and 15.5% of the beef cattle herd, these savings (if achievable) will significantly improve returns and reduce costs for farmers.

The report also suggests that 53% of existing lamb processing capacity and 41% of the existing beef processing capacity are under-utilised and that 13 of the current 34 sheep plants and 6 of the current 21 beef plants should be closed affecting plants at Levin (sheep and cattle, Alliance), Feilding (sheep, Ovation) and Whanganui (beef, AFFCO). This would
have a significant negative impact on the region and particularly the specific districts in terms of jobs\textsuperscript{40}.

These dynamics will play out at a national level over the coming years and the outcome is uncertain.

The regional focus needs to be different. Science and innovation are the keys to developing new products suitable for the international markets. Informants assured us that New Zealand’s trade negotiators have the ability to open markets if we have the ability to produce for them. The product range of the industry has increased enormously in recent years with well over 300 separate products coming off these animals. Every part of the animal is now used.

The Manawatū district is recognised as THE agri-business capital of New Zealand. The potential is there to apply science and technology to further enhancing this wide range of products including their presentation and packaging. Informants also told us that this capability is not benefitting the region to the extent it could. Federated Farmers, for example, believes there needs to be much better connection between education, industry institutions and businesses to improve practice and encourage technology development and uptake.

Our view is that this area of potential development requires a vehicle through which dedicated examination of the opportunities can take place. It remains a challenge often discussed but yet to be properly addressed. We believe a task force approach is required to surface regional opportunities. We believe it should be led by the farming community together with Massey University. Federated Farmers seems an obvious candidate for leadership in this area.

Relevant current central government initiatives:

- Primary Growth Partnership (PGP) and Sustainable Farming Fund (SFF):
  - The Pioneering to Precision programme – Application of Fertiliser to Hill Country - improvement of hill country sheep and beef farm productivity through the precision application of fertiliser.
  - The Red Meat Profit Partnership - adoption of best practice behind the farm gate and between the farm and processor.
  - Farm IQ – increase of the proportion of livestock produced to premium market specifications.
  - FoodPlus – generating more value from the red meat carcase.
  - Marble grass-fed beef – developing an integrated value chain for high-value, marbled beef that is internationally recognised for its superior eating qualities.
  - Pasture development programmes focused on improved pasture renewal, pasture improvement through utilising forages and improved weed control (Californian thistle, field horsetail and tutsan). (SFF)
  - Sheep Internal Parasite Anthelmintic Trial. (SFF)
  - Sustainable Innovation for Lower North Island Sheep and Beef Farmers – upsampling new extension models. (SFF)
  - Farming with the environment for customers – develop new market opportunities

\textsuperscript{40} See page 21 of the ‘Pathways to Long Term Sustainability’ report released in March 2015 by Meat Industry Excellence (MIE)
seeking to provide year-round supply of consistent quality chilled and branded beef and lamb. (SFF)

- Hill Country Erosion Fund (HCEF): the Horizons SLUI programme is partially funded by HCEF.
- Enhancing New Zealand’s market access: implementing the Government’s Free Trade Agreement agenda; addressing behind the border barriers in key markets; implementing NZ Inc. Strategies; increasing NZ’s representation in emerging markets.
- The Food Innovation Network.
- Te Pūnaha Hiringa: Māori Innovation Fund.
- Treaty Settlements in the region which are currently in progress.
- Rural broadband initiative and further roll out of ultra-fast broadband in Manawatū-Whanganui - creating a platform for adoption of technology for the red meat sector.

INTERVENTIONS SUMMARY

Red meat sector - Beef and Lamb NZ, Meat Industry Association, MPI:

- Continue to pursue the Red Meat Strategy and Profit Partnership.

Horizons Regional Council:

- Continue and expand the SLUI programme as outlined in the report.
- Work with land owners on increased irrigation options (see the Land Use Intensification section for more detail).
- Consider internet-accessed programmes for driving farmer behaviour change.

Business leaders, Federated Farmers and Massey University:

- Lead engagement between parties on the question of value-added processing.

Iwi:

- Mount a programme of focused attention on the issues that obstruct development of Māori land in the context of opportunities for improved practice in sheep and beef farming
SHEEP AND BEEF FARMING AND PROCESSING

THE OPPORTUNITY AT A GLANCE

**What? – the opportunity**

- **Improve performance:**
  - Incremental productivity improvements on-farm.
  - Focus on value-added product capacity.
  - Utilisation of Māori land.
  - Land use diversified.

**Why? – will it succeed**

- **Leverage off:**
  - Red Meat strategy.
  - Established industry.
  - Interventions such as SLUI.
  - Regional science and technology capability.
  - Desire in the sector for improvement.
  - High speed internet access.

**Overcome:**

- Complacency.
- Fragmentation.
- Conservatism.
- Passivity.
- Lack of vision.

**Act to:**

- Augment the SLUI effort with industry support.
- Support Horizons to change practice.
- Form a vehicle – task force – to expedite science and business connection in processing.

**Why not? – obstacles**

- - obstacles

**How? – interventions, actions and arrangements**

Why not? - obstacles

How? – interventions, actions and arrangements
OPPORTUNITY:
LAND USE INTENSIFICATION

WHAT? – THE OPPORTUNITY

There is an opportunity to intensify land use within the water quality limits established by the One Plan\textsuperscript{41}.

There are three ways this can be achieved:

- Increase production from existing dairy farms - particularly by increasing productivity per cow.
- Use a greater portion of classes 1, 2 and 3 land for dairying, as well as for other more intensive land uses such as vegetables and grain growing.
- Apply irrigation to a larger area of land.

The capability lies within the industry (Dairy NZ, Fonterra and other processors) to achieve the first of these intensification opportunities. The Manawatū-Whanganui region should be a key focus for them. Opportunities also lie in horticulture and arable farming to benefit from irrigation. Shifts in commodity prices may well favour those land uses over the next few years.

The second and third methods of intensification are particularly amenable to regional interventions.

The use of irrigation and the reticulation of stock water has been developing in the region for several decades. The region has significant unallocated and under-used water in the following categories: run of river extraction; extraction for storage during higher river flows; allocated but underutilised water; and groundwater extraction.

The greatest potential is in the use of small-scale water storage and irrigation arrangements – perhaps serving 100 farms, to improve the productive capacity of land and to moderate the risks of more variable weather patterns.

There is clear evidence that substantial production improvements, in the order of 20%, can be achieved from dairying with the use of irrigation. This would represent a substantial increase in revenue to the region and jobs to meet servicing requirements.

In areas not suited to irrigation, the prize lies in more land owners with class 1, 2 and 3 land capitalising on the returns from dairy farming (putting aside the current year) and all by dairy farmers increasing the returns from their investment by producing at the levels of leading producers. A 1% increase in production would add $6 million to the regional economy and generate 33 jobs.

As the experience in Canterbury towns like Ashburton has shown, increases in dairy production expand the rural population and contribute to community resilience because servicing its needs is more labour intensive than some other forms of farming.

\textsuperscript{41} The One Plan is the integrated natural resource regulatory instrument promulgated by Horizons Regional Council under the RMA.
Note that the total area identified within the table embedded in Figure 1 does not match the total area in the Manawatū-Whanganui region because the total land area held in Conservation Estate is not included.
6. OPPORTUNITIES AND ENABLERS

DAIRY FARMING – GROWTH POTENTIAL

Demand for dairy products has surged over the past decade driven by burgeoning interest in newly industrialising countries like China, India and others. All indications are this will continue. The fastest economic shift has come in China, but India, Indonesia, Vietnam and Thailand are just some of the countries that will follow similar patterns of development and product demand.

Until recently, the global dairy market was balanced in favour of producers. Dairy prices were exceptionally strong and demand robust. In 2014, demand growth slowed and supply increased. This has reduced prices sharply but the long term trend is positive.

Dairying is already a major contributor to the regional economy. It’s a mature land use in the region with advanced supply chain arrangements for processing.

In regulatory terms it is also a mature region. The One Plan has been in place for several years and is becoming well understood by farmers.

Growth

Dairy farming has grown strongly in recent years throughout New Zealand. The Manawatū-Whanganui region has participated in this growth, but not to the extent possible given the availability of good quality land, the availability of water and the logistic connections available in the region.

While it has a tendency towards dry summers, Manawatū-Whanganui’s reasonably mild climate suits dairy operations and there are distinct irrigation opportunities.

Current dairy herds are on par with or exceed North Island productivity metrics (milk solids per cow for example, Figure 23).

The dairy sector employs around 3,300 people in the region (see table 9) or around 3% of regional jobs and is growing at a healthy pace. The dairy sector in the region generated around $685m of revenue and $338m of GDP in the March 2014 year. Employment has increased by 11% in the past decade (see table 9, over page). The share of wages in output is 11% which is modest and comparable with sheep and beef.

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TABLE 9: KEY DAIRY SECTOR STATISTICS

<table>
<thead>
<tr>
<th>Element:*</th>
<th>Employment (**)</th>
<th>% of total</th>
<th>% growth, 2004-2014</th>
<th>Specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Broad areas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>44,700</td>
<td>2</td>
<td>28</td>
<td>..</td>
</tr>
<tr>
<td>Manawatū-Whanganui Region</td>
<td>3,300</td>
<td>3</td>
<td>11</td>
<td>High</td>
</tr>
<tr>
<td><strong>Territories</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruapehu</td>
<td>135</td>
<td>3</td>
<td>26</td>
<td>High</td>
</tr>
<tr>
<td>Whanganui</td>
<td>185</td>
<td>1</td>
<td>76</td>
<td>Low</td>
</tr>
<tr>
<td>Rangitikei</td>
<td>305</td>
<td>5</td>
<td>-45</td>
<td>High</td>
</tr>
<tr>
<td>Manawatū</td>
<td>655</td>
<td>8</td>
<td>36</td>
<td>High</td>
</tr>
<tr>
<td>Palmerston North</td>
<td>675</td>
<td>1</td>
<td>16</td>
<td>Low</td>
</tr>
<tr>
<td>Tararua</td>
<td>840</td>
<td>13</td>
<td>14</td>
<td>High</td>
</tr>
<tr>
<td>Horowhenua</td>
<td>505</td>
<td>6</td>
<td>28</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: Statistics NZ, NZIER

Notes:
.. Not available or applicable
* Specialisation is calculated as revealed comparative advantage. We summarise the results as High, Medium and Low.
** Filled jobs. The sector is defined for this purpose as:
A016 Dairy Cattle Farming
C113 Dairy Product Manufacturing
F331 Agricultural Product Wholesaling

The dairy sector accounts for 3% of jobs in the Manawatū-Whanganui region, slightly more than the national average. Employment growth in the region, while strong, has not kept pace with growth in other parts of the country. Most of the sub-regions are specialised in dairy and employment is growing.

Productivity

The Manawatū-Whanganui region has a modest comparative advantage in dairy, but not like dairy powerhouse Waikato (Figure 22). Compared to Waikato, the region has the opportunity to increase scale by increasing dairy cattle farming.

There are also opportunities for gain in dairy processing and wholesaling as Figure 22 below indicates but these opportunities are less accessible to the region as a large portion of Manawatū-Whanganui’s dairy milk is processed outside the region. However, looking forward, most milk from Eastern Manawatū/Tararua is likely to be processed in Fonterra’s expanded Pahiatua processing facilities rather than it being transported by rail to Hawera.
FIGURE 22: KEY COMPARATIVE STATISTICS

*Revealed comparative advantage (>1 has advantage)*

<table>
<thead>
<tr>
<th></th>
<th>Manawatū-Whanganui</th>
<th>Waikato</th>
<th>Areas of opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>F360300 Dairy Produce Wholesaling</td>
<td>0.4</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>A016000 Dairy Cattle Farming</td>
<td>1.6</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>C113300 Cheese and Other Dairy Product Manufacturing</td>
<td>0.6</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>C113200 Ice Cream Manufacturing</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>C113100 Milk and Cream Processing</td>
<td>6.9</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Dairy related</td>
<td>1.4</td>
<td>3.1</td>
<td></td>
</tr>
</tbody>
</table>

Source: Statistics New Zealand, NZIER

Figure 22 shows that the Manawatū-Whanganui region has expertise in various aspects of the broader dairy sector, but not to the same extent as Waikato. The column labelled *Areas of Opportunity* identifies the extent of improvements possible in Manawatū-Whanganui if the Waikato yardstick was used.

There are significant variations in dairy productivity within the region. These variations cannot solely be explained by geography and soil, indicating the potential for significant productivity improvement (see Figure 23, over page).
Figure 23 shows that there are significant variations in dairy productivity (measured as output per cow in this instance) within the Manawatū-Whanganui region. Catching up to the top producing areas, within natural limits, can unlock significant production, revenue and job growth.

Dairy production grew by 11% in the region in the period 1997 to 2007 but it still occupies only 33% of class one soils. DairyNZ describe the growth potential of the dairy sector in the region from 2014 to 2025 as likely to be characterised by a smaller number of herds with a larger number of cows each occupying a larger area per farm with increased production per cow.

The right conditions for such growth are said by DairyNZ to include:

- Certainty about environmental limits and a commitment by dairy farmers to work within them by, for example, increasing production in association with the use of feed pads, wetland water treatment options and other measures to mitigate nutrient losses.
- A general shift in the bell curve of production towards leading edge performance by all farmers.

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44 We note that one of the consequences of a change in land use to dairy is that the area available for sheep and beef finishing would be reduced. This may affect the profitability and integrated nature of sheep and beef farming generally.

DairyNZ do not expect the area used for dairying to increase greatly over the next ten years. We are of the view that DairyNZ’s prediction of a relatively constant area in dairying may be conservative, perhaps reflecting the dampening influence of the One Plan and current dairy prices. We comment on how additional dairying areas and production may be unlocked later in this section of the report. Irrigation will be decisive in this respect.

**FIGURE 24: REGIONAL LAND USE AND POTENTIAL LAND USE FOR DAIRY PRODUCTION**

![Dairy Land Use by Region](image)

*Source: Current Dairy Area - "New Zealand Dairy Statistics 2013-14 (LIC/DairyNZ)*

LUC = Land Use Capability (Landcare Research 2008). Descriptions of the classes can be found at [http://www.landcareresearch.co.nz/publications/books/luc](http://www.landcareresearch.co.nz/publications/books/luc)

Figure 24 shows that in the Manawatū-Whanganui region there is just over 550,000 hectares of class 1, 2, 3 and 4 land and less than a quarter of this is currently used for dairying.

The region is also a hub for academic, scientific and technical institutions with strong focus on, or relevance to, the agricultural sector including Massey University, Fonterra Research Centre, UCOL and Food HQ, as well as a number of top schools including Feilding (Agricultural) High School and Palmerston North Boys High School.

This hub of institutions represents a comparative advantage for the region, which is not currently taken full account of. There is an opportunity to attract, secure and integrate the
talent who may attend these institutions for short periods into the regional economy and to weave them more fully into dairying and other intensive land use enterprises.

As with dairy farming, dairy processing is also mature with large export plants either in the region or nearby. For processing there are also opportunities in the region’s emerging agri-food-tech skills area. This is a similar opportunity to that identified in the Sheep and Beef section of this report.

IRRIGATION

Potential

Irrigation has the potential to significantly increase the productivity of the region’s land resource and improve its utilisation.

The area of greatest potential is the Rangitikei catchment. Although not the only area with potential, Rangitikei has been the subject of detailed research.

Demand for surface water abstraction in the Rangitikei reflects that experienced elsewhere in the region. It doubled between 2000 and 2004 and has increased by a further 33% in the last ten years.

Nearly 200,000 m$^3$ / day is available in coastal Rangitikei zone and just over 50,000 m$^3$ / day is available for allocation in the lower Rangitikei zone on a non-stored, run-of-river basis.

Current groundwater use is viewed by Horizons Regional Council as sustainable. Demand throughout much of the region is very low relative to the rate of ground water re-charge.

Improved consent conditions may free up both the ground and surface water resource for greater utilisation or alternatively, a programme to facilitate the easy transfer of unallocated water may be called for.

Farmer attitudes

The Rangitikei study noted that the particular drivers for landowners contemplating and installing irrigation in the Rangitikei were:

- The financial, stock welfare and psychological impact of the recent series of dry summers.
- The significant productivity gains that are possible - in the sand country in particular, via irrigation (in conjunction with land contouring and increased inputs).

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46 See the Rangitikei District Strategic Water Assessment carried out by the Catalyst Consulting Group for Rangitikei District Council with funding assistance from the MPI Irrigation Acceleration Fund
6. OPPORTUNITIES AND ENABLERS

• The opportunity to better manage their farms in terms of inputs, production levels and profitability.

The study suggested that sheep/beef farmers, particularly those in the middle and northern parts of the region, would also be interested in investigating stock-water supply schemes at a property or community scale. Stock-water security and the area of coverage is still a major limitation on sheep/beef farmers in the district during droughts. This is because the foraging range of livestock is significantly constrained if stock water is not widely dispersed. With the increased use of foraging crops and the expanded use of the key parts of the area as lamb-finishing country, reliable access to stock water will become an increasing limiting factor.

Interest is already being expressed in the potential of the Rangitikei area. For example:

• Shanghai Pengxin and Landcorp have acquired a property near Ferry/Scott’s Landing near Bulls with irrigation being one of the options they may use for intensification.

• A Dalrymple/Ngati Apa/Atihau Whanganui partnership investment has occurred and there is potential on their recently acquired Flock House Station to establish irrigation.

• The Santoft forests are in the process of being developed for agricultural purposes. There is a high probability that landowners will consider dairying as an alternative land use on this sand country. Irrigation will assist to accelerate the process of building soil organic matter and will be a valuable mechanism for achieving the level of production currently being experienced by neighbouring dairy farms.

The key conclusion is that there is a documented lift in production and profitability with irrigation and the region, particularly the Rangitikei district, is comparatively water rich.

Capitalising on this opportunity is dependent not only on harvesting water but also upon what is grown and the need to have the right farming systems in place to optimise the potential for increased production. For instance:

• Irrigation in dairying and coastal sand country generally provides good returns.

• Large-scale cropping and horticulture in the sand country has good and less good years depending on the weather – these variances would be overcome with irrigation.

• Land use capability limits are such that irrigation in the middle/upper parts of the Rangitikei district are likely to be focused around lamb finishing using high value fodder crops rather than dairying.

Non-dairy potential

Non-dairy irrigated land uses may be more challenging to get to viability, as the study prepared for the Rangitikei catchments shows, but these should not be put aside as they may have as much net benefit to the Rangitikei community overall.

Farms in the sand country require around 5mm/day to 7mm/day for irrigation. If it is assumed that the lower and coastal Rangitikei has $110,000m^3$/day available at peak, there
is currently enough water to irrigate about 1,570 to 2,200 hectares from run-of-river surface water alone without storage.

This is not a particularly large area but additional water is available from ground water. Considerable additional irrigation potential exists if storage is included in system design.

**Overall potential**

If all irrigated land is used for dairying and all other contingency measures and challenges are overcome, then conservatively, a 20% increase in production may be achievable with significant subsequent net additional contributions to the district and regional economies. This 20% increase prediction is on the basis of comparison with the one third increases achieved in Canterbury which is much drier than the Manawatū-Whanganui region.
FIGURE 25: WATER AVAILABILITY COMPARED TO LAND USE CAPABILITY

Source: Horizons Regional Council, 2015
Assuming surface and ground water is equally available and nutrient losses can be managed, similar conclusions to those drawn from the Rangitikei work could be drawn about the potential for irrigation-induced land use intensification over a large area to the south, and perhaps to a degree to the north of the Rangitikei, as well as the Rangitikei district itself – thereby encompassing an area extending from Levin to north of Whanganui.

The Regional Council has combined land use capability data with an assessment of water availability to identify all parts of the region which may have irrigation potential. This suggests that the potential (see the area marked as red and purple on Figure 25, above) is quite significant.

**WHY?**

*Summary of the rationale*

- Development of under-utilised land capacity will provide a higher contribution to GDP and employment opportunities.
- Growth in demand for protein products like dairy milk will continue for the foreseeable future.
- Investment in intensification of existing dairy areas and the expansion of dairy into new areas will capitalise on the forward prospects of the dairy sector.
- Growth in dairy will align with other opportunities such as those in grain growing and processing.

**WHY NOT?**

*One Plan*

The National Policy Statement for Fresh Water Management has been amended to require all regional councils to set limits for water quality. One of the core dimensions to be managed is nutrient losses from agricultural land in order to avoid eutrophication of rivers, lakes and ground water.

The Horizons Regional Council, to a degree, pre-empted this requirement by promulgating the One Plan. Among other things this set limits on the volume of nutrients which are permitted to be discharged from those regional catchments deemed to be under pressure.

The One Plan, which was initially seen by many farmers as a major obstacle to intensification and production, has now been in place for several years and is becoming well understood by farmers. A pragmatic approach has been adopted by the Horizons Regional Council and the region’s dairy farmers towards implementation of this Plan. This should provide some certainty to land users contemplating intensification and is now more an enabler than an obstacle.

*Social license*

The implementation of the Manawatū River Accord will continue to contribute to community-wide understanding of the objectives and responsibilities of all parties to improve water quality.
The Rangitikei coastal zones encompass the coastal sand dune complexes which support a number of significant lakes, wetlands and lagoons and a network of valued small streams and drainage channels. Care will need to be exercised to ensure the quality of these surface waters is not compromised as a consequence of the more intensified land use possible with irrigation in this area.

The use of reticulated water for stock water purposes is also an important part of establishing a social licence.

*Dairy intensification*

Our informants indicated that dairying is generally, but not always, the first choice of land use for decision-makers contemplating intensification. The structural demand conditions for dairy are sound however there are cyclical risks from variations in economic conditions. The current price downturn may generate a conservative attitude by land owners toward investment in dairying intensification but, as noted earlier in this report, long term demand trends are positive.

From a supply perspective, dairy farming is capital intensive. It therefore takes time to increase production, as it requires investment in land, often conversion from another use, and the construction of milk collection and processing infrastructure.

The capital requirements of land use intensification accelerate if irrigation is added to the mix but the first question to address is water availability. Restrictions are required to be adhered to, or water storage accessed, when a river or ground water resource gets below minimum levels.

*Irrigation and dairying*

Under the existing regime, current Rangitikei irrigators have been required to restrict their use between three and eight days per year. On a ten year basis this means users may need to use off-line storage or alternative water sources to continue irrigation over around 24 – 59 days per year (depending on the location of the abstraction point).

In more general terms, farmers may not have an interest in irrigation if they are: receiving sufficient natural water already or operating a farming system which does not require or is unsuitable for irrigation.

Other barriers (as identified by Irrigation New Zealand\(^\text{47}\)) to interest in irrigation opportunities may include: lack of information on establishment and running costs and or; the profit margins may be too small / the pay-back period may be too long.

On top of these challenges, in the southern part of the Rangitikei District the electricity supply grid is able to support more users, whereas further north, much of the power is supplied via single dead-end lines. As such, even small irrigation proposals could overload the system, resulting in ‘brown outs’ for other users of the line.

Returning to the question of capital requirements, significant development costs and related challenges will need to be overcome in order to take advantage of irrigation opportunities.

\(^{47}\) NB this is a generic list which could be applied to anywhere in New Zealand.
These include:

- **Bore development** – costs are approximately $1000/metre. Recent bores in the coastal sand country have been extending to a depth of 350m, with some exploration bores extending to a depth of 600m.

- **Pumping costs** – in the middle/northern part of the Rangitikei district, the rivers and streams are deeply incised, requiring large volume pumps to lift water at least 50m vertically. The cost of such pumps and their associated infrastructure may be considered high if only relatively small areas of land are being considered for irrigation (i.e. 20-40ha). It is not unusual for large irrigators to have a $300,000-$400,000 annual power bill. Given most of the electricity consumption is associated with moving water (i.e. out of the bore/river and distribution on the farm), rather than operation of the irrigator, placement of the intake/bore relative to the irrigator can have a major and highly variable impact on power use.

- **Back up storage costs** – when minimum river flows or ground water levels are reached then irrigators are required to cease abstraction. This implies a need for storage to cover water needs during the period when irrigation is likely to be most important. Water storage liners are expensive and will be particularly necessary for storage of water in the sand country.

- **Advice** – easily accessible experts with practical irrigation, resource consent and related development advice may help to accelerate interest in irrigation in the Rangitikei area.

Even if there is a strong economic case for intensification in a particular area, farming operations may not seize that opportunity, or at least not immediately. Farmers, particularly family owned farms are often capital constrained and while the economics may stack up they may still take a cautious approach toward large capital expenditure for irrigation and other land use intensification options. Good information on the costs and benefits for farmers and good knowledge about the regulatory regime will help overcome this, but it will still take time.

In summary, any new irrigation will need to be considered in terms of water availability, reliability, summer storage cost and land owner attitudes as well as the nutrient implications arising from intensified land use.

Additionally most intensification will be at the expense of other land use, generally beef and lamb. The gains therefore have to be assessed in net rather than absolute terms. As outlined in the section on red meat, internet access will become a powerful tool for assisting to achieve practice and behaviour change. Intensification is a strong knowledge and science-based process and dispersal of vital information through the internet will become ever-more important.
FILTERS SUMMARY

Impact: The combination of irrigation and intensification has the capability of producing a significant one-off lift in productivity. The process of intensification is, however, gradual. From a regional perspective the gains of intensification are certainly worth having, but contributions to the broader growth objectives sought by this Study are not as strong from this sector as from other sectors.

The dairy and related processing sector accounted for around 7% of national dairy jobs, which equates to around $600m regional GDP in dairy related sectors in 2012 (assuming constant labour productivity across regions). A 20% increase in production would add $120m to the regional economy and add 660 jobs.

Trend: the global market for dairy products is growing despite the setback of the last year. Over the past decade dairy exports have increased by an average of $970m per year, the fastest growing commodity in New Zealand. Dairy prices have fallen in 2014, due to increasing supply in other parts of the World, and the use of previously accumulated stocks in China. However, the longer term structural demand for dairy remains very strong and there is not yet sufficient capacity to meet that demand. There are growing international markets for arable products.

Competitive/comparative advantage: the region already has some specialisation in dairying, with significant employment in the sector (over 3,300 jobs). The sector accounts for 3% of regional jobs, compared to 2% nationally. This illustrates the comparative advantage in the region. Similarly, there are other indicators of specialisation, like productivity per cow, which are higher than the North Island average for a number of the sub-regions. The region has a significant dairy capacity though not of the scale of Waikato, Canterbury and Southland. It also has significant arable production which is arguably below potential.

Employment intensity: the sector is growing and employing more people. Hiring increased by 5% in Manawatū-Whanganui, but it was slower than the national growth rate of 20%. The benefits of a growing dairy sector tend to go to the capital owners, as wages account for a relatively small part of total sector spending (11%). The spill-overs through linkages with other businesses also tend to be moderate, as the spending by farms tends to be intermittent and focussed toward large capital items.

While land intensification is generally capital-intensive the experience of Canterbury is that the combination of dairying, arable and irrigation land uses produces jobs and enhances communities through support and advisory services.

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48 This is the latest available detailed industry data and regional comparators.
TABLE 10: OVERALL METRICS FOR DAIRY

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Current size (filled jobs)</th>
<th>3,300</th>
<th>Employment intensity</th>
<th>Moderate</th>
<th>Linkages to other sectors</th>
<th>Moderate</th>
<th>Stage of lifecycle</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact</td>
<td>GDP adding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Job adding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trend</td>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive advantage</td>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Export</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td>Current size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employment intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Linkages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stage of lifecycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Statistics NZ, NZIER

HOW?

Objective: - greater productivity from good land.

Key strategic intervention - irrigation. This intervention has multiple effects, but to operate with irrigation, farmers have to be in tight control of their operation. This produces a halo effect where productivity gains are achieved not only from irrigation but from improved farm practice generally because they are focused on it. There are other interventions of lesser impact and these are outlined below.

DAIRY FARMING

DairyNZ and other dairy focused players have committed 10 full time equivalent consultants and officers to the region to assist dairy farmers to adopt best practice. The focus of these programmes is on ‘farming to limits’ which includes, among other things, advice to dairy farmers about how to manage nutrient losses.

If dairy growth opportunities are to be fully capitalised upon, consideration should be given to methods through which advice about leading edge production can be extended and accelerated.

Horizons Regional Council can also help. The task is to provide regulatory certainty and thereby make the challenge for those farmers with an interest in intensifying one step less complex than that experienced elsewhere. One way of doing this is to build on work already undertaken by DairyNZ to commission further research to more accurately define the link between dairy farm intensity, nutrient loss mitigation practice, the cost and benefit of different mitigation interventions, the relationship between phosphates and nitrates in terms of water quality outcomes and the impact of various sources of nutrients,
for example urban or farming, at various times of the year – particularly under summer low flow conditions.

In addition, Horizons Regional Council may wish to consider the following initiatives:

- **Headroom statement**: land use change and intensification decisions would be assisted if Horizons were to prepare a clear statement about the catchments which may have additional nutrient loss headroom.

- **Greater nutrient freedom in the sand country**: an argument could be mounted to suggest that farms located in the sand country between Levin and Whanganui drain to the sea and therefore these could be separated out from the land use capability based limit regime listed in the One Plan and thereby given more freedom to intensify because their nutrient losses would not have a significant impact on surface water.

More generally, there are a number of other strategic interventions which those with an interest in land use intensification may wish to consider:

- **Marketing initiatives**: one of the advantages of the region is its relatively benign climate – at least compared to the dry of Canterbury and the cold of Southland. This means that most farmers are less dependent on palm kernel (PKE) and other non-farm sources of feed than farmers located elsewhere. With a growing market interest in food produced from grass fed free-range animals, opportunity exists to establish groups of like-minded farmers and producers who are prepared to brand and sell their milk products accordingly.

- **Land-use analysis**: a critical analysis of existing land use capability, water availability, property size, and property price could be undertaken to identify those areas which are likely to provide the greatest return on investment if converted from sheep or bee or arable uses to dairying. This assessment would also need to consider how the region sits when compared to other regions. The hypothesis to be tested is that, for the capital cost required, the Manawatū-Whanganui region is capable of better returns from intensification than investors realise.

- **Youth pathways**: Federated Farmers met with representatives from UCOL, Feilding High School and Food HQ (March 2015) to discuss an initiative aimed at lifting expectations of students about the opportunities in the agricultural sector. The objective was to establish pathways to enable young people with an interest in agriculture to develop the skills needed to operate within, what is and will increasingly become, a large complex business using new technologies and systems. This ‘Youth Pathways’ initiative has the potential to help plug sector skills gaps in the region. Funding and full multi-party support is required to bring it into fruition.

- **Labour market enhancement**: Federated Farmers nationally is working on a Workplace Accord, with the aim of ensuring the industry is providing an attractive environment to attract and retain quality people. This initiative is to be applauded.

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49 Perhaps modelled on the Topoclimate Survey of Southland and South Otago.

50 Noting that to be future proofed, most dairy farms now carry around 600 cows.
IRRIGATION

The use of small-scale water storage and irrigation to improve the productive capacity of land and to moderate the risks of drier weather patterns was seen as necessary by key informants. We would like to see a pilot project undertaken to confirm the cost benefit of various options, the locations likely with most land owner interest, the areas likely to provide the best returns and the likely regulatory requirements to be met for businesses to invest in water storage and irrigation schemes.

Research

The Horizons Regional Council is considering a significant programme to better understand the availability and limits of groundwater abstraction. The Council’s intentions would be reinforced if demand was confirmed and cost-share partners could be secured. The proposed Council programme, among other things, would confirm the availability of ground water from deeper zones and also assess the risk of salt water intrusion.

There is good reason for the Horizons Regional Council to be encouraged to review the policy and rules it has established for minimum flows and allocation limits for surface water. This would increase the availability and surety of the supply of water for land use intensification and stock water reticulation. Groundwater limits could also be revisited as they appear to be currently set conservatively compared to some other regions.

The allocation framework in the One Plan enables transfer of water between users. This, alongside a refined reviewed approach to allocation/use consents may free up additional water for productive use.

In addition, water is still available in fully allocated catchments provided it is harvested at higher flows and then stored. The issue to be addressed is whether the costs of storage can be recovered through additional production gains. Further research is required to confirm this potential benefit.

Demand

Demand for an irrigation scheme in the Rangitikei is latent, not explicit. There are early gains to be made by individuals taking up irrigation by using unallocated ground and surface water and some of them may find it easier to get together in small groups to share infrastructure and storage costs rather than embarking upon grand schemes.

Advice and information is a pressing need. Experience in other parts of the country is that the advent of irrigation often reinvigorates farming practice as farmers look at all aspects of their operation in the light of a new cost structure.

There is also a pressing need to further explore the potential for redeveloped, redesigned and or expanded rural water supply schemes, including that located at Hunterville possibly incorporating opportunities for irrigation potential.

Obstacles

The key challenge to overcome is the limit posed at some locations by inferior electricity supply systems. As noted previously, in the north of Rangitikei much of the power is supplied via single dead-end lines which will not cope with irrigation pump power demands. The only options available to large irrigators to overcome these electricity supply issues are to: upgrade transmission lines and install transformers; or install diesel
generators, to supplement their electricity needs. Overcoming this issue could potentially be a key enabler to industry development and productivity increases.

The potential for irrigation may well need to be assessed on a catchment-by-catchment basis, or farm-by-farm. The decision for developing water storage/irrigation will be made by farmers on the basis of a whole host of factors, let alone annual rainfall - which can vary considerably within 5km of another farm. An initial broad spectrum approach is required to determine pockets of interest which could then become the focus of deeper work.

Relevant central government initiatives:

- Irrigation Acceleration Fund - includes the Rangitikei District Strategic Water Assessment.
  - Primary Growth Partnerships and Sustainable Farming Fund projects with the dairy industry including: Clearview Innovation - will develop a range of new products, which will improve nitrogen and phosphorus use efficiency and reduce losses to the environment.
  - Transforming the Dairy Value Chain – development of new premium products with health benefits; initiatives to improve on-farm productivity and reduce environmental impacts, and improve agricultural education.
  - Whai Hua – developing immune enhancing dairy milk products for Asian and New Zealand markets.
  - Pasture development programmes focussed on improved pasture renewal, management practices for intensive winter dairy grazing, plantain and tutsan weed control.
- Enhancing New Zealand’s market access: implementing the Government’s Free Trade Agreement agenda; addressing behind the border barriers in key markets; implementing NZ Inc Strategies; increasing NZ’s representation in emerging markets.
- Food Innovation Network.
- Rural broadband initiative and further roll-out of ultra-fast broadband roll out – creating a platform for adoption of technology in the dairy industry.
- Māori Agribusiness: Pathway to Increased Productivity programme.
- Te Pūnaha Hiringa: Māori Innovation Fund.
- Treaty Settlements currently being progressed.

INTERVENTIONS SUMMARY

Dairy sector:

- Extend and accelerate advice about methods to increase on-farm productivity within water quality limits.

Horizons Regional Council:

- Work with Government and DairyNZ to do more research to better understand land use and water quality relationships.
- Carry out more research to define catchments with nutrient loss headroom.
• Amend One Plan to allow more nutrient loss in coastal areas where there will be less effect on surface water quality.
• Work with primary sector to build image, brand and provenance of sustainably produced products from Manawatū-Whanganui.
• Work with MPI to document the potential returns for investors from land use intensification in the region when compared to other regions.
• Work with MPI (Irrigation Acceleration Fund) to document land owner interest in small scale water storage schemes, form farmer clubs and then pilot such schemes.
• Confirm the availability and risks associated with extraction from deep aquifers.
• Review the policy and rules for allocation limits for surface and ground water.
• Assess, determine and implement the best means of making allocated, but under used water available to other users.
• Work with Rangitikei District Council to explore rural stock water reticulation options including what may be done to add more security to the Hunterville Rural Water Supply Scheme and related electricity supply situation.
• Work with Massey University and other training institutions to keep talent in the region by channelling more of it into local job opportunities.
• Ensure rural internet access targets are met.

All parties:
• Continue to add detail to and support the ‘youth pathways’ programme
• Support and do further work to market the value of the Federated Farmers Workplace Accord.

MPI:
• Work with MPI (Irrigation Acceleration Fund) to document land owner interest in small water storage schemes, form farmer clubs and then pilot such schemes.

Iwi
• Engage iwi in these developments as they apply to the Māori land in the Class one and two categories.
• Engage iwi on the steps taken to manage and mitigate environmental impacts of intensification.
LAND USE INTENSIFICATION

THE OPPORTUNITY AT A GLANCE

Farm to capacity:
- Increased productivity from Class 1, 2 & 3 land.
- Increase productivity per cow in the dairy industry.
- Encourage diversity and resilience in farming enterprise.
- Increase productivity by 20% from irrigation.

Leverage off:
- Classes 1, 2 & 3 land.
- DairyNZ productivity initiatives.
- Available water.
- Available nutrient headroom.
- Certainty created by the One Plan.
- Improved rural internet access.

Overcome:
- Perceptions of nutrient loss/contamination
- Passivity around land use change.
- Electricity supply issues.
- Labour shortages.

Act to:
- Support and expand irrigation initiatives.
- Support national productivity initiatives.
- Encourage sector leaders - Federated Farmers, Dairy NZ, DCANZ – to act locally on intensification.

Why? – will it succeed

Why not? - obstacles

How? – interventions, actions and arrangements

What? – the opportunity
OPPORTUNITY: MĀNUKA HONEY

WHAT? – THE OPPORTUNITY

Manawatū-Whanganui has an extensive hill country hinterland ideal for Mānuka honey production, especially on Class 6 and 7 lands that are used for little else. The infrastructure of knowledge and practice is developing rapidly.

The regional advantage lies in the volume of land with Mānuka trees already in place and/or capable of being planted with high grade cultivars. Other advantages are the co-benefits associated with the industry such as erosion control and riparian planting which suggests the potential for a public/private development partnership. Add-on income for hill country farmers and use of landlocked Māori land are other attractions.

Whilst not a totally proven market, development is taking place very quickly with significant Government and industry investment.

Information provided with a PGP bid submitted by the Mānuka Research Partnership Ltd consortium suggests that the value of New Zealand’s honey industry could grow from an estimated $75m in 2010 towards $1.2b pa by 2028. Even if a fraction of this growth is realised, the scope for growth is significant. The region would be building the sector almost from scratch on land that has limited productive use currently, meaning any growth will be additional to the economy and jobs.

The prima facie case is very strong for Mānuka honey as a development opportunity for the region.

Current position and prospects

New Zealand honey exports are at present doing well internationally and New Zealand Mānuka honey is a premium honey product that demands particularly high prices compared to honey from other countries. At present it is unique to New Zealand and temperate parts of Australia. The Mānuka plant is hardy and able to grow in terrain that is not very productive for intensive agriculture. A current Primary Growth Partnership is investigating environmental and site factors and genetics that influence Mānuka establishment and growth, and related effects on honey yield and quality.

The Mānuka honey industry in New Zealand is currently in its infancy but is growing rapidly. The main area for growth would now seem to lie with plantation Mānuka as natural stands are rapidly approaching full use status. The number of persons employed in the industry in the Manawatū-Whanganui region has increased by 180% between 2004 and 2014 (see Table 11). The value of honey (not just Mānuka) exported from New Zealand grew by 793% over the last ten years. While the base was low, this clearly

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51 For Land class categories refer Figure 21
confirms there is a definite market and that New Zealand Mānuka honey has a growing world profile in both medicinal and ‘honey for food’ markets\textsuperscript{52}.

The global market for honey is growing strongly. New Zealand has a relatively high share of the global export market and has been increasing its global market share (see Figure 25). The largest demand is typically from the rich world, but New Zealand has patchy exposure to these markets (see Figure 26).

While significant infrastructure is required it is not on the scale of many other industries, reducing the risk of entry for farmers and investors.

Information provided with a PGP bid submitted by Mānuka Research Partnership (NZ) Ltd and Comvita Ltd suggests the value of New Zealand’s Mānuka honey industry could grow from an estimated $75 million in 2010 towards $1.2 billion pa by 2028\textsuperscript{53}. Research to date has shown that some of the Mānuka trial cultivars developed as part of the PGP programme are producing nectar with two-times the level of dihydroxyacetone (DHA) compared with general Mānuka growing in the same district.

No one country is large in this market and New Zealand is a significant player (See Figure 26). In addition, the markets for this product are quite diverse and involve many western countries. This will have the effect of adding diversity to New Zealand’s agricultural profile and reducing the risk of over-reliance on certain products (e.g. dairy) in certain markets (e.g. China). See Figure 26.

\textit{Health and beauty properties}

Mānuka honey is a desirable food product and has proven healing properties when applied to wounds\textsuperscript{54}. The honey is an ingredient in beauty products and is used in an increasing range of medical supplies. As a medicinal product, the active ingredients in Mānuka honey have a strengthening scientific basis as work is done on this. It’s efficacy as a topical treatment for wounds has been established.

\textsuperscript{52} For further information see ‘Investment opportunities in the New Zealand honey industry’ prepared as part of the Food & Beverage Information Project, May 2012 v1.01c, www.foodandbeverage.govt.nz

\textsuperscript{53} This is the aim/vision of the PGP and is reliant on the PGP being fully successful in delivering on the productivity gains being investigated and on successful uptake and market growth.

\textsuperscript{54} The health properties of Mānuka honey, when digested, have not been proven.
Employment

**TABLE 11: EMPLOYMENT IN THE HONEY INDUSTRY**

<table>
<thead>
<tr>
<th>Element:*</th>
<th>Employment (***)</th>
<th>% of total</th>
<th>% growth, 2004-2014</th>
<th>Specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>1180</td>
<td>0.1</td>
<td>119</td>
<td>..</td>
</tr>
<tr>
<td>Manawatū-Whanganui Region</td>
<td>70</td>
<td>0.1</td>
<td>180</td>
<td>Medium</td>
</tr>
<tr>
<td>Territories</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruapehu</td>
<td>0</td>
<td>0.0</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Whanganui</td>
<td>25</td>
<td>0.2</td>
<td>..</td>
<td>Medium</td>
</tr>
<tr>
<td>Rangitikei</td>
<td>35</td>
<td>0.6</td>
<td>..</td>
<td>Medium</td>
</tr>
<tr>
<td>Manawatū</td>
<td>3</td>
<td>0.0</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Palmerston North</td>
<td>0</td>
<td>0.0</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Tararua</td>
<td>0</td>
<td>0.0</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Horowhenua</td>
<td>6</td>
<td>0.1</td>
<td>..</td>
<td>..</td>
</tr>
</tbody>
</table>

*Source: Statistics NZ, NZIER

There are no detailed regional data for honey-related sectors, so we use beekeeping as a proxy. The sector is tiny, but is growing rapidly both in the Manawatū-Whanganui region and nationally. The region has some specialisation in honey related sectors, but the small size of the sector means that inferences should be drawn with caution[^55].

[^55]: Notably most of the large beekeeping operations in the North Island have hives in many areas, so beekeeper numbers by location can be very misleading as a proxy for actual beekeeping activity in an area. The American Foul Brood Pest Management Scheme register of apiary sites may provide additional data, noting that the data is not collected for this purpose and it has proven difficult for us to access.
FIGURE 26: EXPORTERS/PRODUCERS

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>US$b</th>
<th>Share</th>
<th>Growth, 1y</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>NZ</td>
<td>0.1</td>
<td>7%</td>
<td>793%</td>
</tr>
</tbody>
</table>

Top 5 exporters

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>US$b</th>
<th>Share</th>
<th>Growth, 1y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>0.2</td>
<td>12%</td>
<td>139%</td>
</tr>
<tr>
<td>2</td>
<td>Argentina</td>
<td>0.2</td>
<td>10%</td>
<td>33%</td>
</tr>
<tr>
<td>3</td>
<td>New Zealand</td>
<td>0.1</td>
<td>7%</td>
<td>793%</td>
</tr>
<tr>
<td>4</td>
<td>Germany</td>
<td>0.1</td>
<td>7%</td>
<td>69%</td>
</tr>
<tr>
<td>5</td>
<td>Mexico</td>
<td>0.1</td>
<td>6%</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>RoW</td>
<td>1.2</td>
<td>58%</td>
<td>128%</td>
</tr>
</tbody>
</table>

| World | 2.0 | ..  | 115% |

Source: UN Comtrade

FIGURE 27: IMPORTERS/CONSUMERS

<table>
<thead>
<tr>
<th>2013 imports</th>
<th>Growth, 2003-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>US$b</td>
<td>NZ share</td>
</tr>
<tr>
<td>USA</td>
<td>0.5</td>
</tr>
<tr>
<td>Germany</td>
<td>0.3</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.1</td>
</tr>
<tr>
<td>Japan</td>
<td>0.1</td>
</tr>
<tr>
<td>France</td>
<td>0.1</td>
</tr>
<tr>
<td>Italy</td>
<td>0.1</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.1</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>0.1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.1</td>
</tr>
<tr>
<td>Spain</td>
<td>0.1</td>
</tr>
<tr>
<td>World</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: UN Comtrade

Location and scope of industry activity and potential

Currently wild-harvest Mānuka honey is sold as a premium product based on the collection of Mānuka nectar in a number of hill country areas across the region particularly in the Whanganui, Rangitikei and Ruapehu Districts. The current exact location and volume produced in the region is not known and is likely to be seasonally variable.

There are some large blocks of Māori land within the Manawatū-Whanganui area which could potentially benefit from increasing Mānuka yield because of the nature of the
terrain and the affinity of honey production with the long term land management objectives of owners of this Māori freehold land.

Class 6 and 7 land is ideally suited to the growing of Mānuka. The arrangement suggested by experienced bee keepers is to allow the Mānuka to flower sequentially area by area to thereby optimise the length of the period over which honey is produced.

In the 2014/15 season 1,600 hectares of Mānuka species from various sources were established throughout New Zealand with 800 hectares of this managed by Comvita. The expectation of the PGP research consortium is that 30,000 hectares of specialist species will be planted over the next several years.

The key advantages of entry into Mānuka honey production are the:

- Low cost of entry and exit.
- Comparative low cost of the hill country land suited to Mānuka honey production.
- Availability of large tracts of land with regenerating Mānuka which is suited to honey production but unsuitable for most other farming purposes.
- Diversity that the industry may provide to current hill country farming ventures and therefore the contribution it may make to improve the resilience of these farming enterprises.
- Productive use of land which may not have any other productive value.
- Mānuka stands, while predominately on marginal land, could also be used in other contexts such as riparian situations or around lakes needing protection or even as shelter belts. All areas of unproductive land on a farm can be potentially used.
- Opportunity to use the native Mānuka which may be present on many hill country properties and then, if the land owner is willing and subject to local plan requirements, transition to planting with genetically improved cultivars which are capable of generating honey at the high end of the range of levels of dihydroxyacetone (DHA) and therefore capable of increased returns.
- Compatibility with Māori enterprise noting the:
  - Long term land ownership approach inherit in Māori land ownership.
  - Skill development opportunities and team-work required, particularly during the planting of specialist Mānuka cultivar plants.
  - General ease of integration into Māori farming enterprise.
  - Opportunity for bee keeping employment.

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56 This is being researched as part of the PGP. It is important because, without sequential Mānuka flowering the bees will search out other flowering plants with the risk of dilution of the sought after value-add properties. On the other hand they are a useful feed source when the bees are not on sequential Mānuka flowers so careful management is required.

57 Pers. comm, Neil Walker, Chair, Mānuka Research Partnership Ltd.
Informants provided examples of land owners receiving an average of 10-20% of the revenue produced by beekeepers from the sale of the Mānuka honey produced by the hive owners/managers operating on their properties. MPI have indicated that this can be as high as 30%.

The region is well served by the Tweeddale family of beekeepers who operate from a base near Taihape and support the production of honey across a large part of the adjacent hill country. The region is also well served by the sector leadership provided by the Chair of the Mānuka Research Partnership consortium, Neil Walker from Hawera.

Options are available to land owners and hive owners to determine how intensive they want their involvement in the honey industry to be. The scale and nature of the involvement usually depends on available investment, skills and interest. The options include:

- Rental from a land owner by a hive owner of an area of land owned with naturally occurring Mānuka owner.
- Hive owner profit share with that land owner.
- Purchase of land with Mānuka plants and establishment/management of hives and associated honey product.
- Employment by a land owner of a bee expert, with hives and honey production skills, as part of a farming enterprise.
- All of the above with associated arrangements for the planting of high value cultivars.
- Cooperative arrangements with neighbouring farms to share in the costs of employing a bee keeper and honey extractor.
- Storage of Mānuka honey by owners in barrels to allow it to mature and to take better advantage of market fluctuations.
- Supply of honey to a variety of suppliers for creaming/refining.
- Establishment of centres of excellence or of common interest to enable branding/provenance and scale opportunities to be capitalised on.
- Sale of honey to the highest bidder or production/sale of honey under contract to a major purchase such as Comvita.
- Export and sale of honey, at scale, to markets.

Newly established Mānuka stands may be eligible for credits within the carbon market. Over 100,000 hectares of land in the Manawatū-Whanganui region may be suited to Mānuka honey production but they have to be capable of growing to above five metres in height. Mānuka planting has benefits as an erosion control measure on steep land and has the added benefit of being a crop which may never need to be harvested.
**Costs and prices**

Areas covered in Mānuka plants may be capable of supporting two beehives per hectare. Hives cost approximately $300 each. Each hectare may be capable of producing 30-40 kg per hectare per annum of honey depending upon the density and variety of Mānuka flower production and the length of the flowering season.\(^{58}\)

The current price for Mānuka honey at the extractor’s gate may range from $30 per kg to $80 per kg depending on the market in any one year and the volume of supply offered by competitors. Price and value is also linked to DHA and monofloral quality because it is these which determine price premium. Returns from good quality Mānuka plants may be as high as $4,000 per hectare gross although $2,000 is probably a more realistic average figure.

Input costs will vary depending on the particulars of the arrangement adopted in any one area. If the hives and beekeeping are operated within the farm enterprise and the cost of land is not included, input cost may be in the order of $1000 per hectare pa.\(^{59}\)

Input costs will also vary considerably depending on whether the venture includes clearing, tracking, fencing and a planting regime for high value Mānuka plant cultivars and also depending on whether honey management is provided by independent bee keepers and or other parties who are external to the farm, or alternatively, provided as part of the farm venture.

**WHY?**

*Summary of the rationale*

- On the surface of it, current returns are very good though volumes are small.
- The product is rapidly gaining international interest.
- It has significant potential in the value-added nutraceutical market.
- There is extensive available land.
- It has enormous potential for Māori Freehold and landlocked land if farming skills can be developed and capital located.
- There is an information asymmetry problem at this time where information to support growers is running behind demand. This is a reasonably simple point of intervention.

**WHY NOT?**

The speed at which the industry is moving means that there is an information asymmetry problem – information supply is not keeping up with industry demand. This information is production and market-related. This problem has been lessened to some degree by the introduction of a PGP programme, but it only deals with some aspects of the production of Mānuka honey.

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\(^{59}\) Ibid. Neil Walker
6. OPPORTUNITIES AND ENABLERS

Market uncertainty

Additionally, the size of the Mānuka honey market is uncertain. Exports from Australia and other countries are also growing.

There are producers of other non-Mānuka honeys from New Zealand, Chile, Iceland and UK who claim that their honey has similar active ingredients to Mānuka honey. Some Australian producers have varieties of Mānuka honey which they claim have more active ingredients than Mānuka honey produced in New Zealand. It is becoming more difficult for consumers to compare the differences across the range of honey products and to judge the quality of the product relative to price. For example, some New Zealand Mānuka honey is being used as an ingredient in UK store-brand honeys. These products are blends which are advertised as Mānuka honey but sold at a much lower price point. There is a risk that this may diminish the value of the total brand.

There is a growing domestic and international consumer demand for Mānuka honey-based products for medical, culinary and other uses which is not being satisfied because of constraints in New Zealand Mānuka industry supply.

Growing season uncertainty

Variation in growing seasons impacts on the reliability of the supply of Mānuka honey, and on beekeeper profitability. Under current conditions in many Taranaki locations, good Mānuka honey years only occur in 1 in 4 years. Other years can either be too dry or too wet. While new research trials are seeking to greatly extend the flowering period, this is certainly not as yet a proven process.

There is a lack of a robust business case for retiring marginal land from pastoral grazing to enable Mānuka plantations. More work is required. This is being progressed as part of the PGP research programme.

Cultivars

The major current technical barrier is the difficulty in selecting the right cultivar for a particular part of a particular site so that it will establish, thrive, flower and offer abundant high-DHA nectar at exactly the same time as bees are flying.

Other risks

Other risks associated with the use and growth of Mānuka honey plants for honey includes:

- Incursion of the plant pest Myrtle Rust (though New Zealand’s biosecurity control and border control systems are robust).
- The inability to control where bees travel enables hives to be placed on the boundary of land with Mānuka plants owned by someone else – hence reducing the benefit the neighbouring landowner can gain from the Mānuka plants on their property (the planting of high shelter belts is one of the means used to limit this practice).
- No scientific evidence about the efficacy of ingested Mānuka honey for health purposes, compared to the well documented benefits from its use topically (surface wounds) and in lozenges etc.
- General lack of knowledge about many other matters which will have a bearing on the success of various aspects of the industry.
- The quantities of honey that are able to meet Mānuka honey labelling requirements, once determined, may be less than that currently claiming to be Mānuka honey.
• Bees may preferentially forage on plants other than Mānuka and may travel some distance to do so despite being surrounded by be Mānuka

Parties seeking to enter the market need to undertake thorough due diligence. There is also relatively limited R&D funding into medical uses at this stage. Despite these factors the opportunity has all the indications of a strong one.

FILTERS SUMMARY

Impact: the potential scale of the industry is difficult to assess but it is likely to create production where production did not formerly exist such as on Māori land and marginal land. The potential for Mānuka honey development to use either unutilised or poorly utilised land resource is very strong. In effect, it is bringing a formerly little used resource into play.

Trend: the global demand for honey is increasingly strongly. New Zealand exports grew from $28m in 2004 to $202m in 2014 – a whopping 612% increase. The export potential is also through nutraceuticals – particularly for Mānuka honey. The global honey market is small and New Zealand is a relatively large player, accounting for 7% of global honey exports.

Competitive/comparative advantage: the region does not currently have a significant specialisation but with current levels of activity this is beginning to emerge with land already in Mānuka plantings or able to be converted to this use. Beekeeping, a close proxy for the sector, is very small in the Manawatū-Whanganui region (70 jobs) and is concentrated in Rangitikei and Whanganui.

Employment intensity: the beekeeping sector is relatively small, but it is growing fast. The number of beekeepers increased by 180% nationally in the past decade. If the industry continues to grow at current rates, so will jobs, particularly in related processing and distribution sectors. The industry, in part because of the type of land used and its location, does not easily lend itself to mechanisation, so jobs are likely to continue to grow.

60 The relatively higher sugar content of nectars from some other common floral species is thought to be responsible for this behaviour. Management of competing floral sources may therefore need to be factored into viability studies.

61 Pers.comm. Neil Walker, ibid, noting that some of this increase is due to growth in the hobbyist. An assessment of the MPI Apiculture reports produced over the last ten years suggests that long term large operators are growing even larger.
FIGURE 28: OVERALL METRICS FOR THE MĀNUKA HONEY INDUSTRY

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Current size (filled jobs)</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment intensity</td>
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<td></td>
</tr>
<tr>
<td>Linkages to other sectors</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Stage of lifecycle</td>
<td>Growth</td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>GDP adding</td>
<td>▲</td>
</tr>
<tr>
<td></td>
<td>Job adding</td>
<td>▲</td>
</tr>
<tr>
<td>Trend</td>
<td>Domestic</td>
<td>▲</td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td>▲</td>
</tr>
<tr>
<td>Competitive advantage</td>
<td>Domestic</td>
<td>▼</td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td>▲</td>
</tr>
<tr>
<td>Summary</td>
<td>Current size</td>
<td>▼</td>
</tr>
<tr>
<td></td>
<td>Employment intensity</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Linkages</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Stage of lifecycle</td>
<td>▲</td>
</tr>
</tbody>
</table>

Source: Statistics NZ, NZIER

HOW?

**Objective** – expansion of Mānuka honey production on Class 6 and 7 land, including Māori landlocked land.

**Strategic intervention** – correct the information asymmetry with a strong information and education programme to hill country land owners and potential farmers. The industry is providing sufficient support for someone committed to the development of the practice for serious contenders to undertake due diligence.

The key challenge is one of information asymmetry. Many of the farmers are learning as they go. A large number of farmers who could benefit from developing the practice know nothing about it and harbour the usual apprehensions associated with new ideas.

The crucial task is to get conservative land owners from a position “that’s not me” to “this looks interesting”. The building of connection into current national and international networks is important.

The PGP programme with the objective of achieving a more productive and valuable Mānuka honey industry in New Zealand has an end purpose of supplying reliable and expanded volumes of monofloral Mānuka honey suitable for medical, culinary and other uses.

We have assessed from discussion with informants that the programme is comprehensive and well managed. The critical issue is whether the PGP programme will result in large scale availability commercially of suitable cultivars to plant with general availability and at reasonable cost. Given the opportunities identified earlier in this report, the PGP work deserves on-going support and all effort should be made to speed up the process of
generating information to better document both the benefits arising from Mānuka honey production and manage the risks associated with this honey production.

In addition, for Mānuka honey production wherever it occurs, continued research and development is required to:

- Confirm the size of the likely market and ensure expansion of the depth and breadth of the market for New Zealand Mānuka honey.
- Allow expansion and achievement of the economies of scale needed to tackle the export challenges faced by small primary producers.
- Achieve coordination, collaboration or consolidation among small producers to take advantage of scale and thereby assist these small producers to tap into new markets and fund their share of on-going research and development.

Knowledge about the costs and benefits of Mānuka honey production should be widely disseminated by both Government and leaders in the sector. This could be assisted by programmes to support the establishment of cooperatives and networks of interested individuals.

An interim labelling standard guideline was introduced by MPI to assist industry compliance with the joint Food Standards Code FSANZ (Food Standards Australia and New Zealand) after widespread mislabelling was reported from offshore markets. This need was identified by the industry. A final definition for both monofloral and multifloral Mānuka honey could be incorporated into the standards. Labelling and information is required but is currently hampered by the lack of available science. MPI is currently investing considerable operational research funding to rectify this. This is essential to protect the brand.

Consideration should be given to whether Government assistance could be justified to help with the cost of establishment (planting or sowing) in the manner of that applied to assist with the cost of planting of forestry under the Afforestation Grant Scheme.

Similarly, consideration could be given to establishing assistance programmes regionally to take advantage of the erosion control and riparian management benefits of Mānuka planting.

Policy needs to be developed by regional councils to provide clarity to land owners about the rules which may be applied to the clearing or spraying of class 6 and 7 lands to enable it to be replanted with high value Mānuka cultivar species.

There is an opportunity for a group of interested parties to grasp this whole opportunity in the Manawatū-Whanganui area. The potential for development is enormous and the argument for acceleration on all fronts including farmer education, science, market and production is very strong. Who should provide this leadership? We believe it needs to be a consortium of producers, marketers and local government. We are strongly of the view that a regional grouping is necessary to act in the regional interest in an industry that during its development phase is a little helter skelter.

Characterised by physically mobile small businesses and the need for active communication with elements of the supply chain, this industry will benefit enormously from the rural internet capability being currently developed.
6. OPPORTUNITIES AND ENABLERS

Relevant current central government initiatives:

- The High Performance Mānuka Plantations - a seven year Primary Growth Partnership programme aimed at increasing the yield and reliability of supply of medical-grade Mānuka honey and increasing Mānuka honey exports to $1.2 billion annually by 2028.
- Scientific research underway for the definition of monofloral and multifloral Mānuka honey to update MPI’s Labelling Guide for Mānuka Honey.
- NZTE support for Mīere coalition - a national coalition of Māori landowners, Māori honey producers and Māori investors.
- Sustainable Farming Fund programmes: Developing environmentally sustainable alternative to chemical treatments for Varroa; Honeybee genetics for sustainability and pollination security; Producing abundant bee pollinators for sustainable farming.

INTERVENTIONS SUMMARY

MPI and leaders in the Mānuka honey industry:

- Continue to support the PGP programme.
- Expand the PGP programme in association with NZTE to add breadth and depth to markets.
- Assist the Research Partnership with workshops, website and other similar steps including those to assist Māori land owners.
- Research and confirm policies related to expanding Mānuka honey planting as part of erosion control and carbon sequestration.
- Encourage research on technical issues, particularly those relating to benefits of ingestion of the product.
- Resolve practice issues such as the location of hives near to each other and the effect on honey volumes.
- Continue to work on standards to ensure the international integrity of the product.

Horizons Regional Council:

- Develop policies for inclusion in the One Plan about the clearance of land for planting Mānuka.

Iwi/Māori/hapū

- Actively encourage Māori land owners to participate in the development of the industry where it suits their circumstances.
MANUKA HONEY

THE OPPORTUNITY AT A GLANCE

**What? – the opportunity**

**Industry extension:**
- Building knowledge and practice.
- Extend mixed land use in hill country.
- Build markets, especially nutraceutical.
- Build on cultivars and PGP advances.

**Leverage off:**
- Hill country availability.
- Landlocked Māori land.
- Existing operators.
- Emerging supply chains.
- Local enthusiasm.
- Rural internet development.

**Overcome:**
- Information asymmetry.
- Short term market uncertainty.
- Scaling issues.
- Farmer uncertainty.
- Some diseases.
- Market damage through poor marketing.

**Act to:**
- Solve technical issues.
- Create regional project structure.
- Confirm site specific / local feasibility.
- Source investment.
- Harness leadership.
- Establish robust quality and labeling programme.

**Why not? - obstacles**

**Why? – will it succeed**

**How? – interventions, actions and arrangements**

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MANAWATŪ-WHANGANUI GROWTH STUDY 2015

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6. OPPORTUNITIES AND ENABLERS

OPPORTUNITY: FRESH VEGETABLES

WHAT? – THE OPPORTUNITY

The region is good at growing vegetables, has a long history of successful cultivation and has significant areas of high quality, class 1 and class 2 soils (over 25,000 hectares and 150,000 hectares respectively). With a saturated domestic market the only real further opportunity for vegetable growers in the region is export.

International markets are large and growing and there are opportunities to provide fresh products to them, but there are significant barriers, particularly for the individual or groups of small operators.

Perishable products require timely logistics. Volumes from individual suppliers have to be sufficient to feed supply chains. Markets need to be built and actively managed with the leverage of scale, quality and price. Scale is required to reduce production costs. All this is not easy.

A tightly organised production-to-market structure focused on a limited number of markets (to generate volume) appears to be the best opportunity. This would require dedicated regional leadership working closely with other New Zealand suppliers and wholesalers through to key distributors in defined markets.

The region already has some expertise in vegetable growing and processing. The sector is relatively small, contributing around $85m or 1% towards the regional economy. Every 1% lift in output increases the regional economy by $1m and adds around eight new jobs.

Change of land use can deliver significant expansion of vegetable production and adds to economic activity and jobs.

There is a strong prima facie case for investigating the expansion of the fresh vegetable export trade and an assessment of its impact on jobs and local GDP.

Advice from informants is that this opportunity would have to be tackled at scale. However, given the logistics required this has to be regarded as a speculative opportunity. A committed effort of regional collaboration would be required.

Current patterns and projections

Horticulture New Zealand have informed us that the sector involves 1,770 growers throughout New Zealand of whom 120 are located in the Manawatū-Whanganui region. Of the 120, around 10 produce 90% of the volume.

Three areas of the Manawatū-Whanganui region have soils and climate which are particularly suited to vegetable growing. These are located adjacent to Ohakune, adjacent to Levin and in the lower part of the Rangitikei District. The area located in Rangitikei has a

62 Horticulture New Zealand website and pers. com Chris Keenan
focus on mixed broad acre vegetable and arable cropping including yams, potatoes and squash for export.

In the Horowhenua area, the largest businesses are Kapiti Green and Woodhaven Gardens who together operate over 600 hectares, employ 120 people and generate turnover of $16-$18 million. A third large venture, Tender Tips, operate one of the nation’s largest asparagus growing ventures. The focus in the Horowhenua area is on domestic market greens and brassicas as well as potatoes for processing and export.

Data compiled by BERL for 2013 for the Ohakune area suggests vegetable growing in that area:

- Employs 135 FTEs (a decline of 2.1% between 2003 and 2013).
- Contributes $14 million or 1.5% of the District’s GDP.
- Involves 11 business units.

Supply to markets from different parts of New Zealand is often sequential to reflect differing temperature regimes with, in general terms, supply in the warmer parts of New Zealand being provided to market earlier than supply from southern parts of New Zealand, including from the Ruapehu area.

In general terms, timing and climate are the key factors in creating market opportunity. The big opportunities for some key vegetable crops are from spring through to early autumn. For asparagus there is a much more defined season as it is a perennial crop. There are some notable exceptions and currently leeks are one vegetable which is grown year round with a steady export market into Japan.

Ohakune has some significant advantages in carrot, potatoes, parsnip and brussel sprout production as a result of elevation and the associated cold winters.

**Employment**

The sector has some specialisation with 875 jobs. The wages share of output is modest at 18% but is significantly higher than red meat and dairy which both sit at 11%. The sector has large spill-overs to other sectors like transport and logistics. At present the sector is actually losing jobs both nationally and regionally and this will continue unless a major initiative is undertaken.
### 6. OPPORTUNITIES AND ENABLERS

#### TABLE 12: EMPLOYMENT IN VEGETABLE GROWING

<table>
<thead>
<tr>
<th>Element:*</th>
<th>Number, 2014</th>
<th>% of total</th>
<th>% growth, 2004-2014</th>
<th>Specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>16,300</td>
<td>0.8</td>
<td>-7</td>
<td>..</td>
</tr>
<tr>
<td>Manawatū-Whanganui Region</td>
<td>875</td>
<td>0.9</td>
<td>-21</td>
<td>Medium</td>
</tr>
<tr>
<td>Territories</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruapehu</td>
<td>123</td>
<td>2.5</td>
<td>-23</td>
<td>High</td>
</tr>
<tr>
<td>Whanganui</td>
<td>21</td>
<td>0.1</td>
<td>-42</td>
<td>Low</td>
</tr>
<tr>
<td>Rangitikei</td>
<td>89</td>
<td>1.6</td>
<td>-36</td>
<td>High</td>
</tr>
<tr>
<td>Manawatū</td>
<td>43</td>
<td>0.5</td>
<td>-87</td>
<td>Low</td>
</tr>
<tr>
<td>Palmerston North</td>
<td>210</td>
<td>0.5</td>
<td>0</td>
<td>Low</td>
</tr>
<tr>
<td>Tararua</td>
<td>6</td>
<td>0.1</td>
<td>100</td>
<td>Low</td>
</tr>
<tr>
<td>Horowhenua</td>
<td>368</td>
<td>4.5</td>
<td>52</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: Statistics NZ, NZIER

Notes:
- ..: Not available or applicable
- * Specialisation is calculated as revealed comparative advantage. We summarise the results as High, Medium and Low, where high is RCA score of more than 1.15, medium is below 1.15 but greater than zero, and low is less than zero.

** Filled jobs. The sector is defined for this purpose as:
- A012200 Vegetable Growing (Under Cover)
- A012300 Vegetable Growing (Outdoors)
- C114000 Fruit and Vegetable Processing
- F360500 Fruit and Vegetable wholesaling
- G412200 Fruit and Vegetable Retailing

Vegetable growing, processing and selling is a relatively small sector, accounting for around 1% of regional jobs. However, the sector is proportionately large in some sub-regions like Horowhenua. Sector employment growth in the region is patchy, with declines in most sub-regions.

**The importance of market management**

All fresh vegetable export opportunities are reliant on air freight, with some exceptions, including the Pacific Island tourist market for mainly potatoes. The spot market is the current biggest opportunity. To take advantage of this opportunity, timely local market intelligence is required but with sufficient certainty to build a business case.

On-farm infrastructure exists both in Ohakune and the Horowhenua to enable production to be scaled up if demand can be secured. The market offering must of necessity be at the ‘premium product’ level (quality, sustainability, quarantine control). This will not necessarily attract a higher price but it will sway a purchaser who may be looking at two similarly priced items.

The Rangitikei area has significant potential for expansion of vegetable growing including seed growing, provided markets can be secured. There is also significant potential to use the transport logistics strengths of the Palmerston/Marton area to expand fresh vegetable exports. This includes producing more local produce for delivery to New Zealand-wide...
supermarkets by Speirs Ltd from Marton and the long term potential for direct export for fresh vegetables from Ohakea (see separate section of this report on ‘transport’).

**Comparative Advantage**

Compared to the Hawke’s Bay region, the Manawatū-Whanganui area is currently under-developed particularly in the processing and wholesaling areas. At present the focus is largely on growing alone, making the whole industry vulnerable (see Table 13).

Regional Comparative Advantage analysis of Manawatū-Whanganui and Hawke’s Bay indicates that Manawatū-Whanganui compares well, however, Hawke’s Bay is strongly represented in processing.

**TABLE 13: POSSIBLE OPPORTUNITIES IN THE VEGETABLE SECTOR**

*Revealed comparative advantage (>1 has advantage)*

<table>
<thead>
<tr>
<th></th>
<th>Manawatū-Whanganui</th>
<th>Hawkes Bay</th>
<th>Areas of opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A012200 Vegetable Growing (Under Cover)</td>
<td>0.3</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>A012300 Vegetable Growing (Outdoors)</td>
<td>3.1</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>C114000 Fruit and Vegetable Processing</td>
<td>0.4</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>F360500 Fruit and Vegetable Wholesaling</td>
<td>0.9</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>G412200 Fruit and Vegetable Retailing</td>
<td>0.6</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>Vegetable related</td>
<td>1.1</td>
<td>4.2</td>
<td></td>
</tr>
</tbody>
</table>

*Source: NZIER analysis of Statistics New Zealand Business demography statistics*

Table 13 shows that the Manawatū-Whanganui region has expertise in some aspects of vegetable growing already, but not to the same extent as Hawke’s Bay. The column labelled Areas of Opportunity identifies the extent of improvement possible in Manawatū-Whanganui if the Hawke’s Bay yardstick were used.

New Zealand currently occupies only 1% of global trade in vegetable production (See Table 14). The small contribution New Zealand makes to the global vegetable trade is also illustrated in Table 15 where New Zealand’s contribution barely rates a mention. However, this same table illustrates the huge international growth in the importation of vegetables by the large European, North American and Asian countries.
TABLE 14: GLOBAL VEGETABLE AND FRUIT TRADE ( EXPORTS ), 2013 EXPORTS AND MARKET CONCENTRATION

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>US $b</th>
<th>Share</th>
<th>Growth, 10y</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>NZ</td>
<td>0.3</td>
<td>1%</td>
<td>37%</td>
</tr>
</tbody>
</table>

**Top 5 exporters**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>US $b</th>
<th>Share</th>
<th>Growth, 10y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Netherlands</td>
<td>7.9</td>
<td>13%</td>
<td>87%</td>
</tr>
<tr>
<td>2</td>
<td>China</td>
<td>7.9</td>
<td>13%</td>
<td>261%</td>
</tr>
<tr>
<td>3</td>
<td>Spain</td>
<td>6.4</td>
<td>10%</td>
<td>66%</td>
</tr>
<tr>
<td>4</td>
<td>Mexico</td>
<td>5.5</td>
<td>9%</td>
<td>111%</td>
</tr>
<tr>
<td>5</td>
<td>USA</td>
<td>4.4</td>
<td>7%</td>
<td>114%</td>
</tr>
</tbody>
</table>

|        | RoW                 | 30.9  | 49%   | 149%        |
|        | World               | 62.9  | ..    | 131%        |

*Source: NZIER analysis of UN Comtrade database*

TABLE 15: TOP VEGETABLE IMPORTERS

Imports and NZ’s relevance

<table>
<thead>
<tr>
<th>2013 imports</th>
<th>Growth, 2003-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>US$m</td>
<td>NZ share</td>
</tr>
<tr>
<td>USA</td>
<td>9</td>
</tr>
<tr>
<td>Germany</td>
<td>7</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>5</td>
</tr>
<tr>
<td>France</td>
<td>3</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>3</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3</td>
</tr>
<tr>
<td>Canada</td>
<td>3</td>
</tr>
<tr>
<td>China</td>
<td>3</td>
</tr>
<tr>
<td>Japan</td>
<td>3</td>
</tr>
<tr>
<td>India</td>
<td>2</td>
</tr>
<tr>
<td>World</td>
<td>64</td>
</tr>
</tbody>
</table>

*Source: NZIER analysis of UN Comtrade database*

Despite its relatively small share of the international market, New Zealand is a well-established vegetable exporter and to a very diverse range of countries. For the year to March 2015 New Zealand exported $550m of vegetables. Clearly, New Zealand growers are able to meet international price points despite production and transport costs.
Of our top 10 markets, five are in Asia, being our closer neighbours (than Europe or North America). Australia still dominates at 40% while Japan and Fiji are at 20% and 5% respectively.

It is evident that Asian traders are buying produce off the market floor in Auckland and exporting it themselves to Asia and trading successfully.

All these indicators suggest that there is a market opportunity, the real question is whether a significant increase in scale can be achieved into these markets and over what time period.

The viability of fresh vegetables as a major export growth area needs in depth market analysis. Our assessment is that the market connections are already in place and price points are competitive. This is a strong platform for increasing volume. Market engagement is required to secure such market volumes and then the challenge of scaling up production faces the industry in the region.

Data compiled by Rabobank, on the basis of an assessment of vegetable growing economics in the Horowhenua area suggests:

- Income per hectare for intensive vegetable production can be up to 25 times greater than other farming such as livestock farming.
- Intensive vegetable production can support up to 10 times more FTEs than other primary sector agricultural opportunities. 95% of wages are estimated to be spent locally.
- Expenses can be up to five times that of other farming ventures and these also flow through the local economy.

The low temperature growing environment in Ohakune means that lesser quantities of pesticides and herbicides are required to grow vegetables in this area compared to other parts of New Zealand. This, alongside the ‘Mt Ruapehu’ brand, may be a competitive advantage which has not been fully taken advantage of.

**CASE STUDY**

By way of illustration of the challenges, the UK imports significant quantities of fruit, vegetables and flowers from Africa. High value products (like beans and cut flowers) are air freighted and low-value and non-perishable bulk items are seaborne. The value supply chain connects up good growing conditions and low labour costs with a ready consumer market in the UK.

Production has increased massively in places like Kenya to meet this increase in demand driven initially in large part by one British supermarket, Tesco. It has increased economic opportunities. But there have also been some costs, particularly environmental degradation through excessive use of pesticides and social issues through the use of child labour.

The Kenyan experience shows the importance of market channels provided by UK supermarkets, which in turn created a strong value chain to large scale operators, who could co-ordinate to produce, store and transport vegetables. The supermarkets and the interface with the destination markets, were critical in the Kenyan example to define what is produced and how it is produced. It also illustrates the long term commitment that is required from markets and suppliers. Suppliers from the Manawatū-Whanganui do not yet have the scale to exert this level of control on the market, nor are they trying as most
operate in isolation. The example also demonstrates the value of seeking out Foreign Direct Investment partners with an interest in playing a stronger role in connecting the ‘source to market’ logistics for fresh vegetables.

Credence goods

There is a growing market for credence goods, in which New Zealand has strong capabilities. A credence good is a complex, new product with quality and/or safety aspects that cannot be known to consumers through sensory inspection or observation in consumption. The quality and safety characteristics that constitute credence attributes include the following:

- Food safety.
- Healthier, more nutritional foods (low-fat, low-salt, etc.).
- Abundance of suitable soils.
- Authenticity.
- Production processes that promote a safe environment and sustainable agriculture.
- “Fair trade” attributes.

The credence is established through certification and the use of increased labelling in transit. This, as described in the case study above, has led to a transformation of the Kenyan vegetable industry over time, from fragmented collection of smallholders to a few vertically integrated and large players. In emerging markets, vegetable consumption is increasing with population, but limited arable land means extensive use of fertiliser and pesticides. Ineffective food standards mean that many purchasers worry about food quality and safety. There is a niche but growing market for safe fresh vegetables – or credence agricultural goods as they have been described above.

New Zealand has a number of characteristics that meet the definition of a credence good, particularly through a good food safety record, authenticity of local products (through traceability, localisation, etc.), rules and regulations to ensure environmental safety and sustainable practices. New Zealand’s transparent rules, regulations and standards for traceability, food safety, environmental standards and social standards are necessary elements and place it well in forging value supply chain links.

The Manawatū-Whanganui region has a number of advantages to be able to connect into this sector. It has good quality soil and an abundance of land to increase vegetable production. There is ample local capacity to expand on existing vegetable processing capability. It is in a logistics hub and is able to quickly connect to sea or air-freight.
WHY?

Summary of the rationale

- An established industry in Horowhenua, Rangitikei and Ruapehu with wider potential.
- An industry constrained by a domestic market but eager to expand, is consolidated and appears to have leadership capacity.
- Growing international demand in Asia.
- Seasonality benefits for the Northern Hemisphere.
- Job-intensive nature of the industry.
- Plays positively on the international reputation of New Zealand as “fresh”.

WHY NOT?

Marketing of vegetables is challenging. Informants told us they have found their product on shelves in some Asian markets with supply sourced by offshore traders operating from the market floor in Auckland. Horticulture New Zealand believes that this type of market is alive and well in Australia, Hong Kong, Singapore and the Pacific Islands. Small growers are particularly vulnerable to this behaviour.

Fragmentation

Growth in the sector will only occur if integrated supply chain and ‘scale’ opportunities are secured in international markets. Considerable further work is required if this objective is to be achieved. The domestic market is saturated. Scale is the key to flattening out market fluctuations.

The types of challenges involved are well illustrated by the situation of asparagus. Heinz Watties has stopped taking New Zealand-grown asparagus for canning in favour of cheaper Peruvian product. The February 2015 decision affects up to 15 growers in Hawke’s Bay and several in the Rangitikei area. Growers elsewhere sell all their asparagus fresh on the domestic market or to Japan but even this market is not secure. About 3,000 tonnes of asparagus is produced in New Zealand a year, of which 2,500 tonnes is sold domestically. Just 300 tonnes go to Japan and the remainder is canned.

To achieve significant asparagus penetration into export markets:

- Coordination across product categories and increased scale and season length will be required to ease the supply chain economics.
- Focus should be on developing markets and not just Japan. To do this, the industry needs market development infrastructure. This will almost certainly be as true for other vegetables as it is for asparagus.

In short, this involves getting to where Kenya has got to, but very quickly. Fast scalability would be required and this market development would be a major challenge although it may be possible in a contained area such as Horowhenua, Rangitikei and Ruapehu and would require premium product with premium branding and most importantly an integrated marketing effort. In addition it is possible that some of the fragmentation issues of the past may incrementally be addressed by the producer amalgamation which is taking place at present and is projected to continue.
6. OPPORTUNITIES AND ENABLERS

**Workforce**

Maintaining a sufficient labour force to service the industry is an on-going challenge even at current levels of production. This is both an obstacle and an opportunity. An increase in industry scale will only be possible with a training and workforce management strategy.

**Scale of Growth**

It has to be borne in mind that the scale of this industry is small at present. Even if strong growth was achieved it would initially only create a modest number of new jobs. This would not change until the sector was able to build scale.

**Quality**

Sanitary and phyto-sanitary issues are a significant hurdle for some fresh vegetable exporters. This may act to constrain potential growth. The high cost of production when compared to some international growers implies that optimum leverage will need to be obtained from the quality and general sustainability characteristics associated with New Zealand produce.

**FILTERS SUMMARY**

**Impact:** the vegetable growing industry in New Zealand has plateaued and has not been able to move much past the domestic market. The fresh market is the one which offers opportunities because of the scale of its growth.

**Trend:** the global market in vegetable trade is growing strongly, more than doubling in the past decade. New Zealand is a small player, but it is also growing (by 37% in the past decade versus 131% in total global trade). The demand for vegetables is largest in advanced markets, where incomes are high and they import exotic and cheaply produced products from other places. Emerging markets are also increasingly demanding fresh vegetables, increasing incomes make imports more affordable and issues with local products (quality, pollution, etc.) are further bolstering demand. Demand for high quality vegetables will increase with global growth and growing middle classes in Asia. New Zealand accounts for around 0.6% of global trade in vegetables and has a relatively large presence in Japan and has gained market share in USA.

**Competitive/comparative advantage:** the region has significant specialisation in vegetable growing already with nearly 900 jobs currently in the sector. There are particular sub-regions that are specialised in vegetable growing or processing in Manawatū, Ruapehu, Rangitikei and Horowhenua. In Horowhenua the sector is a major employer, accounting for 5% of all jobs. The specialisation is linked to the quality of the soil, climate and access to transport links.

**Employment intensity:** the vegetable growing sector’s labour intensity is moderate. Jobs in the sector tend to be low paid. The sector is losing jobs (21% in the past decade in Manawatū-Whanganui compared to 7% nationally – although growing strongly in Horowhenua). The positive spillovers to other businesses in the region are quite high, particularly in transport and logistics.
### TABLE 16: OVERALL METRICS FOR THE VEGETABLE INDUSTRY

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Current size (filled jobs)</th>
<th>Employment intensity</th>
<th>Linkages to other sectors</th>
<th>Stage of lifecycle</th>
<th>Impact</th>
<th>Trend</th>
<th>Competitive advantage</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current size (filled jobs)</td>
<td>875</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment intensity</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linkages to other sectors</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage of lifecycle</td>
<td>Mixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>GDP adding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job adding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trend</td>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive advantage</td>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td>Current size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employment intensity</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Linkages</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stage of lifecycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: NZIER

### HOW?

**Objective** – substantial growth of the export market for fresh vegetables from the region

**Strategic intervention** - Feasibility study of establishing an export marketing vehicle based in the region with sufficient scale to establish secure markets and supply chains.

**Cooperation and coordination**

The challenge is one of cooperation and coordination, not unlike industries such as wine and seafood have experienced. The Manawatū-Whanganui region potentially has the scale and the cohesiveness to achieve something the industry nationally has not achieved. The challenge is to meet the high fixed costs involved in establishing markets and supply chains.

Two key interventions have been identified by informants as being critical to growth of vegetable production for export. The first is to establish a common information portal for growers. This would enable growers to better understand constraints and opportunities including matters related to environmental regulation etc.

The second intervention relates to the need for much higher levels of collaboration between growers to achieve the scale needed to optimise access to international markets. More particularly Ohakune, Rangitikei and Horowhenua growers need to get together to leverage international market opportunities and logistics. In the view of a Horticulture New Zealand spokesman, only then can the opportunities associated with the Korea free trade agreement and the like be capitalised upon.

In other words, a structure is needed that puts the smart people together and someone needs to be employed to make this happen. Attempts have been made to do this in the
past but they have not so far been successful. Our impression is that they have not been sufficiently ambitious.

An associated need is to grow a combined brand and build transport hubs and associated logistics.

What support is required?

In general terms, vegetable growers as a sector could profit from receiving help with co-ordinated industry action, possibly from wholesalers like Turners and Growers or Horticulture New Zealand, to get beyond the saturated domestic market and achieve the scale and integrated supply chain logistics required to take advantage of export opportunities. Once established, NZTE could likely assist with developing markets. Korea looks like a particularly ripe market to target given the progress being made in this area with the Free Trade Agreement.

First up, it will be necessary to form strong customer facing relationships in target markets (e.g. through wholesalers and retailers) and then to connect into the growing demand for credence vegetables.

Workforce interventions will be necessary with organisations such as UCOL perhaps able to assist.

It also needs to be borne in mind that speed to market is everything for fresh produce. Communications generally and high speed internet in particular, will be a vital factor in the success of such an initiative.

Relevant current central government initiatives:

- Enhancing New Zealand’s market access: implementing the Government’s Free Trade Agreement agenda; addressing behind the border barriers in key markets; implementing NZ Inc. Strategies; increasing NZ’s representation in emerging markets.
- NZTE programmes that build the capability of companies to export (e.g. ‘Better by Capital’).
- Rural broadband initiative and further roll-out of ultra-fast broadband roll out – creating a platform for adoption of technology in the horticulture industry.
- Sustainable Farming Fund: programme quantifying the relative effectiveness of the key practices advocated for reducing sediment and phosphorus loss on cultivated land; Investigating strategies to increase potato yields.

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63 Pers. Comm Chris Keenan, Horticulture New Zealand
INTERVENTIONS SUMMARY

Horticulture New Zealand / industry interests:

- An early assessment needs to be done of what countries and in what product areas export growth is most viable.
- Once this assessment is satisfactorily completed the next step is to appoint an experienced sector leader to establish a small implementation team and charge them with the task of:
  - Establishing a tightly focused production (multi-grower) to market structure.
  - Securing a limited number of markets.
  - Establishing associated logistics.
  - Establishing clear branding to reflect the region’s provenance and credence of locally sourced product.
  - Developing strong grower collaboration.
  - Developing a common information portal about regulations, quality expectations, etc.
  - Work with ITO and MSD to secure required employees.

NZTE:

- Continue to assist with market development activities.

UCOL/Primary ITO

- Assistance with workforce development activity, particularly adapted to the seasonal work regime of the industry.
FRESH VEGETABLES

THE OPPORTUNITY AT A GLANCE

What? – the opportunity

Build an export market:
- Analyse export market opportunities.
- Attack the problem as a whole region, not piecemeal.
- Build links direct to retailers.
- Build volumes.

Leverage off:
- Vegetables’ health advantages.
- Disease-free Ruapehu.
- Korea Free Trade Agreement (and others).
- Transport hub.
- Industry ambition.
- Rural internet access.

Why? – will it succeed

Overcome:
- Individualistic behaviour.
- Limited export market connections.
- Middleman interference.
- Market manipulation by some traders.
- Lack of critical mass in all respects.

Act to:
- Establish regional marketing/export initiative.
- Assess market opportunities in Australia and Asia.
- Develop logistics pathway.
- Bring whole industry along through collaborative action.
- Minimise workforce issues.

Why not? - obstacles

How? – interventions, actions and arrangements
OPPORTUNITY: 
POULTRY MEAT PRODUCTION 
AND GRAIN GROWING / 
PROCESSING

WHAT? – THE OPPORTUNITY

Poultry meat consumption is rising around the world, including in New Zealand. There is plenty of room for increased supply to China and Asian countries which are well below the levels of current poultry meat consumption compared to other parts of the world.

In essence the opportunity centres on establishing a large scale consortium of poultry meat growing farms and facilities at suitable locations within the Rangitikei, Tararua, Manawatū and Horowhenua districts.

The proposal is that these would align with a large scale modern poultry meat processing, packing, transport logistics and marketing facility, possibly taking advantage of established infrastructure or alternatively involving construction of new facilities adjacent to centres of production.

The focus of this enterprise would be entirely export to meet international, particularly Chinese, demand for protein.

New Zealand has a unique poultry disease-free and sustainability status which provides a premium positioning for our product.

Exporting of eggs and meat is currently at a token level and a major effort would be required to grow markets and supply chains (besides production). Poultry meat production is essentially a farming activity and therefore is moderately labour intensive.

Considerable investigation has been done by potential investors on the potential of grain-growing and processing and it has passed the early viability assessments.

Grain growing and processing will not of themselves provide significant jobs but upstream and downstream activities - particularly in conjunction with, or as an enabler for, the production of poultry meat, will make both sets of initiatives important employment generators.

Estimates of the size of the export revenue prize arising from significantly increasing the volume of poultry meat would only be guesswork at this early stage. In essence the opportunity looks extremely good. China is consuming about one quarter of the volume of poultry meat of other countries such as Australia and New Zealand. The growth of the Chinese middle class and their willingness to pay a premium for product with the right provenance, positions New Zealand particularly well to fill this market gap.

While the region is specialised in poultry for eggs, it is not in meat. Neighbouring Waikato has nearly 2.5 times the number of jobs in the poultry and related sectors. As demand for poultry continues to increase, the Manawatū-Whanganui region could plausibly reach a
similar scale to Waikato, adding some 1,200 jobs. The potential would be much larger if export markets are established.

When poultry production is combined with the grain-based chicken food production sourced from the class 1, 2, 3 arable land located on the river plains from Levin to Whanganui and beyond, and the comparative water rich status of this area is taken into account, the potential prize seems even more secure.

There is a clear *prima facie* case for taking the establishment of grain growing/processing and poultry meat production facilities to a business case and feasibility level with intensive investigation of their viability. The case for poultry meat is contingent on being able to secure markets and being able to scale up production and supply.

## Poultry Meat Production

*Current patterns and projections*

The poultry market includes eggs, meat, processing and sales. The best export opportunity is meat. By international standards the sector is small, but is growing strongly.

The Manawatū-Whanganui region has a strong position in egg production, but not in meat farming or processing. Figure 29 uses Waikato, a significant poultry area, as a comparator.

**Figure 29: Possible Opportunities in the Poultry Related Sector: Regional Comparative Analysis of Manawatū-Whanganui and Waikato**

*Revealed comparative advantage based on employment (>1 has advantage)*

<table>
<thead>
<tr>
<th>Area of Opportunity</th>
<th>Manawatū-Whanganui</th>
<th>Waikato</th>
<th>Areas of opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A017100 Poultry Farming (Meat)</td>
<td>0.5</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
<td>A017200 Poultry Farming (Eggs)</td>
<td>6.1</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>C111200 Poultry Processing</td>
<td>0</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>F360200 Meat, Poultry and Smallgoods Wholesaling</td>
<td>0.4</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>G412100 Fresh Meat, Fish and Poultry Retailing</td>
<td>0.7</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Poultry related sector</td>
<td>1</td>
<td>2.1</td>
<td></td>
</tr>
</tbody>
</table>

*Source: NZIER analysis of Statistics New Zealand’s Business demography statistics*

Figure 29 illustrates that the Manawatū-Whanganui region has an existing specialisation in poultry farming for eggs. Neighbouring Waikato has wider expertise in poultry, particularly in poultry meat and processing. The column Areas of Opportunity illustrates the potential for poultry production compared to the yardstick of the Waikato which is a significant poultry area.
Employment

The poultry sector is relatively small, employing around 9,530 people nationally and 473 people in the region (see Table 17).

Employment has grown at a gradual pace over the past decade, cumulating to 10% growth in national jobs over the last decade (and similarly at 11% in the region) – albeit off a low base. National production rose 24% in the same time, meaning poultry farming is becoming more productive and less labour intensive over time. Current volume rests almost entirely on the domestic market which has grown strongly over recent decades (see Figure 30).

### TABLE 17: KEY STATISTICS FOR POULTRY RELATED SECTOR

<table>
<thead>
<tr>
<th>Element:*</th>
<th>Employment (**)</th>
<th>Number, 2014</th>
<th>% of total</th>
<th>% growth, 2004-2014</th>
<th>Specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Broad areas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td></td>
<td>9,530</td>
<td>0.5</td>
<td>10</td>
<td>..</td>
</tr>
<tr>
<td>Manawatū-Whanganui Region</td>
<td></td>
<td>473</td>
<td>0.5</td>
<td>11</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Territories</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruapehu</td>
<td></td>
<td>6</td>
<td>0.1</td>
<td>0</td>
<td>Low</td>
</tr>
<tr>
<td>Whanganui</td>
<td></td>
<td>78</td>
<td>0.5</td>
<td>56</td>
<td>Low</td>
</tr>
<tr>
<td>Rangitikei</td>
<td></td>
<td>0</td>
<td>0.0</td>
<td>-100</td>
<td>Low</td>
</tr>
<tr>
<td>Manawatū</td>
<td></td>
<td>43</td>
<td>0.5</td>
<td>-41</td>
<td>Medium</td>
</tr>
<tr>
<td>Palmerston North</td>
<td></td>
<td>55</td>
<td>0.1</td>
<td>-35</td>
<td>Low</td>
</tr>
<tr>
<td>Tararua</td>
<td></td>
<td>9</td>
<td>0.1</td>
<td>0</td>
<td>Low</td>
</tr>
<tr>
<td>Horowhenua</td>
<td></td>
<td>279</td>
<td>3.4</td>
<td>47</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: Statistics NZ, NZIER

Notes:

.. Not available or applicable

* Specialisation is calculated as revealed comparative advantage. We summarise the results as High, Medium and Low, where high is RCA score of more than 1.15, medium is below 1.15 but greater than zero, and low is less than zero.

** Filled jobs. The sector is defined for this purpose as:

- A017100 Poultry Farming (Meat)
- A017200 Poultry Farming (Eggs)
- C111200 Poultry Processing
- F360200 Meat, Poultry and Smallgoods Wholesaling
- G412100 Fresh Meat, Fish and Poultry Retailing

Table 17 illustrates that the poultry-related sector is small, but growing. Horowhenua is the largest of the sub-regions in the Manawatū-Whanganui in terms of employment, but there is a small presence of poultry related employment in Whanganui, Palmerston North and Manawatū as well. The region overall has moderate specialisation in poultry-related sectors.
Competitive advantage

New Zealand has a high standard of production and with our disease-free status our product is desirable. This nation-wide competitive advantage, for both eggs and poultry meat, because of the rigour of our biosecurity arrangements, partially explains the recent growth in export demand albeit from a low base. This means that New Zealanders are low users of remedies such as antibiotics to control disease. Well-fed birds mean that in comparison to many other countries, growth hormones are not employed in New Zealand.

This disease-free status also has attitudinal impacts. There are strong movements against the use of chemical remedies in all types of animal production. In addition, in the egg industry, production is moving towards colonies which have a higher animal welfare status than conventional cages featured in much of the rest of the world.

Export revenue from poultry meat has a value of $74 million (2014). This indicates that New Zealand is not yet a significant player in this export market (see table 18). The main markets are Japan and China.

Comparative consumption rates

Our research indicates that the consumption of poultry in US, Australasia and Malaysia is currently 40 kg per capita pa whereas in China it currently sits at 10 kg. This is said to be because of environmental and disease issues.

Other sources suggest chicken is the fastest growing source of protein in China but it still represents only 17% of the country’s total meat consumption, compared to 40% in Taiwan and Hong Kong.

The pattern of growth in the consumption of poultry meat is similar globally – chicken is becoming a more frequently consumed protein. A rising and more discerning middle class in Asia, who may not trust the quality of local product, will add to the global demand for poultry (see Table 19).

FIGURE 30: NEW ZEALAND POULTRY CONSUMPTION PER CAPITA

Kilos of poultry meat per capita

Source: Statistics New Zealand

Figure 29 illustrates that poultry consumption has trended higher over time, although New Zealand’s tightened financial position gave rise to a decline in the period around 2009.
Figure 31 illustrates that poultry consumption like other protein, tends to increase with incomes. The figure above shows that in high income countries like the US, poultry consumption per capita is very high compared to Indonesia. As the incomes of emerging markets, with large populations, grow, the potential future market for poultry will be orders of magnitude larger than at present.

Table 18: Top Poultry Importers, Imports and NZ’s Relevance

<table>
<thead>
<tr>
<th></th>
<th>2013 imports</th>
<th>Growth, 2003-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>US$m</td>
<td>NZ share</td>
</tr>
<tr>
<td>Germany</td>
<td>3</td>
<td>0%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Mexico</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>France</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Japan</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Belgium</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>China</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>World</td>
<td>27</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: NZIER analysis of UN Comtrade database
Table 18 shows the largest consumers of imported poultry. NZ is not a player in a strongly growing global market. All the zeros in the right hand column illustrate graphically that poultry tends to be a domestic product, but the globally traded market is also large (and New Zealand has practically none of it).

**TABLE 19: GLOBAL POULTRY TRADE (EXPORTS) -2013 EXPORTS AND MARKET CONCENTRATION**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>US$ b</th>
<th>Share</th>
<th>Growth, 10y</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>NZ</td>
<td>0.1</td>
<td>0%</td>
<td>946%</td>
</tr>
</tbody>
</table>

**Top 5 exporters**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>US$ b</th>
<th>Share</th>
<th>Growth, 10y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brazil</td>
<td>7.3</td>
<td>21%</td>
<td>290%</td>
</tr>
<tr>
<td>2</td>
<td>USA</td>
<td>5.7</td>
<td>16%</td>
<td>188%</td>
</tr>
<tr>
<td>3</td>
<td>Netherlands</td>
<td>4.4</td>
<td>13%</td>
<td>209%</td>
</tr>
<tr>
<td>4</td>
<td>Germany</td>
<td>2.3</td>
<td>7%</td>
<td>215%</td>
</tr>
<tr>
<td>5</td>
<td>France</td>
<td>1.9</td>
<td>6%</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>RoW</td>
<td>12.8</td>
<td>37%</td>
<td>150%</td>
</tr>
<tr>
<td></td>
<td>World</td>
<td>34.4</td>
<td>..</td>
<td>174%</td>
</tr>
</tbody>
</table>

Source: NZIER analysis of UN Comtrade database

Table 19 shows that New Zealand is a small player in global poultry trade, which is growing rapidly. The largest exporters tend to trade with neighbouring countries.

Current export of poultry products is small, however ventures into the poultry export market are very new for New Zealand as poultry has been largely seen as a domestic industry. Our exports have been largely focused on Australia and the Pacific Islands with 70% of exports to those countries.

The Japan market has opened with exports from the region. They are small but with significant growth potential according to informants. Those informants also told us that the Chinese market, which currently has low consumption of poultry (but is likely to increase) is more challenging, but not impossible to break into. Export growth has been 16% to the year ended March 2014 and 6% to the year ended March 2015. Our assessment is that this market is just beginning to take off.

It would appear that there is sufficient export activity to conclude that poultry exporters can achieve international price points. The question then becomes what scale of export can be leveraged from which markets. The comparative advantage of New Zealand’s disease-free status and, as a result, its ability to achieve high production levels are critical to success in international markets. Tight integration with good quality grain mixes for poultry feed is also a potential comparative advantage.

The challenge in poultry expansion is market development, mainly in Asia. Informants were optimistic about the opportunities but cautioned that much work (and patience) will be required to build these markets. Market intelligence in Asian countries requires direct engagement and this has so far been limited. Without such engagement it is difficult to assess the actual potential of the Asian market.
GRAIN GROWING AND PROCESSING

Current patterns and projections

Grain processing in the region currently employs 113 persons. The number of persons employed in the sector has declined 33% in the period 2004-2014 (see table 20), contrasting 17% growth nationally. This is not a labour-intensive industry (particularly the growing of grain) with wages representing only 7% of output. There are quite strong spill-overs to the rest of the economy, however.

TABLE 20: GRAIN PROCESSING KEY INDICATORS

| Element:* | Employment (**) | | | |
|-----------|-----------------|----------------|-----------------|----------------|----------------|
|           | Number, 2014    | % of total     | % growth, 2004-2014 | Specialisation |
| Broad areas |                  |                |                  |                |
| NZ        | 2269            | 0.1            | 17               | ..             |
| Manawatū-Whanganui Region | 113           | 0.1            | -33              | Medium         |
| Territories |                |                |                  |                |
| Ruapehu  | 3               | 0.1            | -67              | Low            |
| Whanganui | 18              | 0.1            | 100              | Low            |
| Rangitikei | 47              | 0.8            | -30              | High           |
| Manawatū | 39              | 0.5            | -25              | High           |
| Palmerston North | 3            | 0.0            | -75              | Low            |
| Tararua   | 0               | 0.0            | -100             | Low            |
| Horowhenua | 3              | 0.0            | -80              | Low            |

Source: Statistics NZ, NZIER

Notes:

.. Not available or applicable

* Specialisation is calculated as revealed comparative advantage. We summarise the results as High, Medium and Low, where high is RCA score of more than 1.15, medium is below 1.15 but greater than zero, and low is less than zero.

** Filled jobs. The sector is defined for this purpose as:

- A014500 Grain-Sheep or Grain-Beef Cattle Farming
- A014900 Other Grain Growing
- C116100 Grain Mill Product Manufacturing
- F331200 Cereal Grain Wholesaling
- I530100 Grain Storage Services

Table 20 demonstrates there are few grain-related jobs, whether in Manawatū-Whanganui or nationally, accounting for 0.1% of all jobs. While the sector is growing nationally, it is shrinking in the region. Existing regional facilities for storage and distribution are currently established near Feilding (Mt Stewart) and near Foxton.
Sector performance

The performance of the sector has been poor and any development is off a small base. The grain sector opportunity for the region (see Figure 32) lies in establishing a new national scale facility which tend to be in the 10,000 to 20,000 tonne grain complex size. To be competitive this would need to:

- Be a state of the art and technology-driven facility encompassing grain drying, processing and storage.
- Include processing elements such as crushing, pellets and bagging.
- Integrate transport logistics encompassing rail and road.
- Involve and manage multiple products (maize, barley, wheat, palm kernel/PKE).

Canterbury sets the standard in grain-growing in the country. Below is a comparative analysis, using the revealed comparative advantage measure, with Canterbury to demonstrate the potential for Manawatū-Whanganui.

FIGURE 32: POSSIBLE OPPORTUNITIES IN THE GRAIN RELATED SECTOR

Revealed comparative advantage measured by employment (>1 has advantage)

<table>
<thead>
<tr>
<th>Area of Opportunity</th>
<th>Manawatū-Whanganui</th>
<th>Canterbury</th>
<th>Areas of opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A014900 Other Grain Growing</td>
<td>0.6</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>I530100 Grain Storage Services</td>
<td>0.0</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>C116100 Grain Mill Product Manufacturing</td>
<td>1.7</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>F331200 Cereal Grain Wholesaling</td>
<td>0.4</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>A014500 Grain-Sheep or Grain-Beef Cattle Farming</td>
<td>1.9</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>Grain related</td>
<td>1.1</td>
<td>4.3</td>
<td></td>
</tr>
</tbody>
</table>

Source: NZIER analysis of Statistics New Zealand Business demography statistics

Figure 32 shows that the Manawatū-Whanganui region has a moderate grain processing capacity compared to Canterbury and less than half the grain production capacity of that region. In addition there is capacity to expand storage and wholesaling sectors. The column Areas of Opportunity highlights the comparative potential for the region. This assumes there is an outlet for the grain which is envisaged as the poultry and dairy industries.

The development of a grain processing facility would encourage more local farmers to grow maize, barley and wheat and thereby optimise the land use capability in the Rangitikei area. The facility would provide employment opportunities in the central facility and within on-farm production and transport operations.

Geographic suitability

One informant involved in the industry has suggested that the Rangitikei District may not be the best in New Zealand for growing maize, barley and wheat but it is in the top echelon for each of these and for the adoption of multi-crop mixed production systems.
The lower Rangitikei area is particularly suitable for the construction of a grain processing facility because it:

- Is close to secure gas and electricity supplies which are essential inputs to a grain processing facility.
- Has water availability (irrigation is usually required for grain growing).
- Has a central location and associated transport logistic advantages which will enable ease of inward and outward product movement and in particular:
  - Provide opportunity to minimise the current cost of product transport from considerable distances including from Canterbury.
  - Still enable product from other regions to be sourced e.g. PKE via Port Taranaki and thereby would increase the volume, diversity and resilience of the grain processing enterprise.
- Would overcome current regional location capacity limits in drying and storing and thereby would enable better use of harvesting windows suited to the local area rather than those determined by a processor operating in a region with a different growing pattern.
- Would reduce the volatility of product price which is endured currently by those users who are reliant on Australian product and in addition would grow the opportunity to secure forward purchase contracts with agreed prices.

The establishment of such a facility also has potential flow-on benefits such as it:

- Would provide a secure feed source to support expansion and intensification of not only the poultry meat sector but also the pig, pet food (noting that pet food businesses are already established in the region – with growth potential, in Whanganui and Marton) dairy industry and malting industry.
- Could become a potential additional site alongside South Canterbury for seed growing noting that some farmers are growing pea seed now and that this would require additional infrastructure. At scale this is a longer term opportunity as there are well-established companies such as Midland Seeds and South Pacific Seeds who are currently expanding their range of crops. Our preference is that the grain growing and processing opportunity should not be unduly complicated by flow-on opportunities at this early stage.

**WHY?**

*Summary of the rationale*

- Poultry meat is the fastest growing demand category of animal protein product virtually world-wide.
- Current exports of poultry meat from New Zealand are very small but emerging - the Asian market poses the greatest opportunity.
- Grain processing would strongly support the emerging poultry industry and an established dairy industry.
- Grain processing would provide construction and operational revenues to the region.
Grain processing would provide an outlet for arable crops which would encourage optimum use of class 1, 2 and 3 lands.

Grain growing and poultry meat production would encourage diversification in the agricultural sector and would help to insulate the region against shocks in any one product category.

Both grain processing/growing and poultry meat production are moderately labour intensive.

There may be additional comparative advantages associated with relative geographic isolation (fewer issues with neighbours) and proximity to feed, assuming grain production proceeds in parallel.

**WHY NOT?**

**POULTRY MEAT PRODUCTION**

New Zealand currently does not have a meaningful presence in the global poultry market. The development of this industry would mean a standing start in export terms. It has a very robust domestic market. Most importantly, a customer ‘market back’ focus means that priority must first be given to securing large, preferably Chinese or Asian-based, customers.

Animal welfare issues could stymy this industry with activists pressing the industry to go wholly free-range. That will make New Zealand production uncompetitive with most other countries in the world meaning exporting would be virtually impossible.

**GRAIN GROWING AND PROCESSING**

The matters which would need to be addressed to establish an optimally scaled grain processing, storage and distribution facility include a rail siding at Marton and the selection and consenting of an adjacent processing site and facility. Initial KiwiRail estimates to establish a rail siding at Marton are not attractive and this makes the project less viable.

The facility would require sufficient certainty about market opportunity to enable it to be of optimal size. It would also require land use change in the area of sufficient scale to guarantee product supply to meet market demand 365 days/year.
FILTERS SUMMARY

POULTRY MEAT PRODUCTION

**Impact:** the poultry meat opportunity does not currently score highly on a range of important quantitative measures (see summary data in Table 20). The key negatives arise from its current small scale (although the impact on a sub-region could be large) and its comparative low labour intensity (both directly and indirectly through spill-overs to other sectors). There is also uncertainty on the capacity and capability of the industry to export, given New Zealand is still largely untested in the global poultry export market.

**Trend:** Poultry (meat and eggs) is a fast growing sector. Consumption of protein is increasing and chicken’s share is increasing within that. The global market for chicken meat and eggs has been growing strongly, but New Zealand is a small player in the global market. Protein consumption increases with incomes. The broader story of increasing protein consumption is bolstered by increased poultry share of meat consumption as incomes rise.

Globally traded poultry meat increased by over 170% in the past decade.

Increasing demand from the emerging market presents significant potential, if the existing dominance of large producers like the USA can be overcome. Over the next decade, Chinese incomes (as approximated by GDP per capita) are likely to increase by around 7% a year. Other countries with this level of GDP have poultry consumption of around 20kg per person. This translates into a potential increase in poultry meat demand of around 10 million tonnes over the next decade in China (around 600 times New Zealand’s current consumption). India could add another 6 million tonnes.

The global increase in demand will be widespread across all industrialising countries throughout Asia. Given the scale of demand, New Zealand cannot hope to meet much of the new demand; rather the opportunity may be more in producing specialised products, creating channels to market and marketing our ‘premium’ product status to targeted segments to achieve prices which more than cover freight costs.

**Competitive/comparative advantage:** the poultry sector is relatively small in the Manawatū-Whanganui region, employing around 500 people. The largest presence is in the Horowhenua district. Much of the poultry is geared to egg production, rather than meat. There is not strong specialisation, but sufficient to form a foundation for growth.

**Employment intensity:** the poultry sector is growing strongly, both in terms of jobs (up 10% over the past decade, similar to the national average) and also consumption. Consumption in New Zealand has grown steadily over time, although there was a reduction during the recession. Neighbouring Waikato has nearly 2.5 times the number of jobs in the poultry and related sectors. As demand for poultry continues to increase, the Manawatū-Whanganui region could reach a similar scale to Waikato, adding under an optimistic ‘export focused scenario, some 1,200 jobs. That potential would need to see a significant increase in sales, which is likely to be from export markets.
### TABLE 21: OVERALL METRICS FOR POULTRY

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Current size (filled jobs)</th>
<th>Employment intensity</th>
<th>Linkages to other sectors</th>
<th>Stage of lifecycle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>875</td>
<td>Low</td>
<td>High</td>
<td>Mixed</td>
</tr>
</tbody>
</table>

Impact
- GDP adding
- Job adding

Trend
- Domestic
- Export

Competitive advantage
- Domestic
- Export

Summary
- Current size
- Employment intensity
- Linkages
- Stage of lifecycle

Source: Statistics NZ, NZIER

### HOW?

**Objective** – to leverage significant expansion of poultry growing in the region together with increased land use intensification.

**Strategic Intervention** – an in-depth study of the viability of poultry growing in the region. If viable it is assumed that grain growing and processing would easily follow because one is dependent on the other.

### POULTRY MEAT PRODUCTION

The challenges of this opportunity are significant as it involves a major diversification of primary sector activity for the region. Strong sector leadership through some sort of local industry development structure would be required to:

- Identify international markets. Engage and develop relationships into the market(s).
- Establish supply chains.
- Build on current investor interest.
- Possibly enlist the assistance of a leading business development facilitator.
- Establish a business case.
- Contemplate an expanded PGP bid to facilitate the above actions.

---

**Note**: Statistics NZ does not provide data with sufficient granularity to enable a similar table to be produced to apply filtering to grain processing.
This level of action is required because essentially this opportunity involves action from a standing start. To be competitive, poultry growing and grain growing will need to be developed in parallel. Every step in the domestic supply chain will need to be confirmed as being more competitively priced than that established by global competitors. This focus will need to be at the heart of the development of the business case.

Capital requirements are likely to be significant. Consents will be required for appropriate sites, including for waste disposal.

Subject to the development of a compelling case NZTE could be invited to use their existing networks to help secure strategic international investment.

Established infrastructure and services associated with a Marton or Palmerston North-based hubbing facility may assist with distribution logistics.

There is also an opportunity to capitalise on existing New Zealand-based technology, genetics and disease control knowledge to learn from, construct and operate hatcheries and parent stock farms. This includes knowledge to operate ‘free range’ or ranch style farms as part of the mix of poultry growing options to counter growing market concern about caged birds.

New Zealand’s reputation as a high quality food producer and provenance should be woven into marketing initiatives. New Zealand’s disease-free status bypasses concerns about the diseases which feature in the Chinese poultry market.

GRAIN GROWING AND PROCESSING

There are interests in the region who are active on this particular opportunity which makes it, in part, a proprietary opportunity. That said, they will face challenges and may or may not be able to deal with them alone.

Resource consents for the facility will be required – these can be challenging to secure. The site will need licenses etc. to import PKE and there is significant process involved in this.

There is a complementary advantage in increasing grain production, which is a key input for the poultry sector. For both to be successful, both would need to proceed in parallel.

A business development process is required to move this opportunity from an area of interest to one of commitment to action and investment. This should be undertaken by a group made up of current local interested investors and NZTE with local government assistance.

ADDITIONAL CONSIDERATIONS AROUND POINTS OF INTERVENTION

- **Poultry meat**: Provide NZTE input to assist the current group of interested investors to further develop and confirm the feasibility of their business case and to secure their commitment to direct their capital toward the incremental growth of poultry meat growing facilities; use NZTE / MFAT networks to assist to develop markets.

- **Grain production**: Request Horizons Regional Council and Rangitikei District Council to work with local land owners to investigate the potential of PGP funds, or other sources
of funds, to confirm the feasibility of grain growing and supply chain logistics including comparative returns, water needs and availability, land use capability opportunities and transport matters – including the business case for a rail siding at Marton.

- **Grain processing**: Provide NZTE input to assist the current group of interested local investors to further develop and confirm the feasibility of their business case and to secure their commitment to capital investment toward the construction and operation of an optimal scale processing facility.

**Relevant current central government initiatives:**

- NZTE programmes that build the capability of companies to export (e.g. Better by Capital).
- Enhancing New Zealand’s market access: implementing the Government’s Free Trade Agreement agenda; addressing behind the border barriers in key markets; implementing NZ Inc. Strategies; increasing New Zealand’s representation in emerging markets.
- Rural broadband initiative and further roll-out of ultra-fast broadband roll out – creating a platform for adoption of technology in the industry.

**INTERVENTIONS SUMMARY**

Local industry leaders/MPI:

- Appoint a business development facilitator to work with the leaders in the poultry and grain processing sector:
  - Confirm the business case for both poultry meat and grain processing.
  - Consider a PGP bid and, if appropriate, develop one to add depth to the business case and or investigate the potential for assistance under other current government programmes.
  - Secure specific market interest with a focus on China.
  - Establish infrastructure and related services including a rail siding at Marton.
  - Establish a template for poultry farming resource consent purposes.
  - Promote landowner interest in grain growing.

NZTE:

- Assist with market identification and development.
### Poultry Meat Production

#### The Opportunity at a Glance

<table>
<thead>
<tr>
<th>Industry Extension:</th>
<th>Overcome:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Build a substantive poultry export industry in the region.</td>
<td>• Cost perceptions resulting from distance to market.</td>
</tr>
<tr>
<td>• Provide the market for a local grain industry – poultry and dairy.</td>
<td>• Perceptions in markets about importing poultry.</td>
</tr>
<tr>
<td>• Align poultry and grain development.</td>
<td>• Fear of scale.</td>
</tr>
<tr>
<td></td>
<td>• Transport logistics.</td>
</tr>
<tr>
<td></td>
<td>• Social license issues on animal welfare.</td>
</tr>
</tbody>
</table>

#### Why? – will it succeed
- International market growth.
- NZ’s disease-free status.
- Existing operators and industry strength.
- Transport hub
- Grain growing/processing potential.

#### Why not? - obstacles
- Cost perceptions resulting from distance to market.
- Perceptions in markets about importing poultry.
- Fear of scale.
- Transport logistics.
- Social license issues on animal welfare.

#### How? – interventions, actions and arrangements
- Undertake business case on both poultry and grain.
- Build industry cohesion.
- Leverage transport hub.
- Assess export market.
- Identify capital sources.
- Secure certainty of poultry welfare legislation.

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**POULTRY MEAT PRODUCTION**

**THE OPPORTUNITY AT A GLANCE**

**What? – the opportunity**

**Why? – will it succeed**

**Why not? - obstacles**

**How? – interventions, actions and arrangements**
OPPORTUNITY: AFFORDABLE CARE AND LIFESTYLE FOR OLDER PEOPLE

WHAT? - THE OPPORTUNITY

The whole shape of ageing is expected to change rapidly in the next decade. The proportion of older people (65+) in the community will rise sharply and the majority will have at least moderate wealth. Retirement will become a life phase rather than a hard date and older people will be looking to carefully plan the segue from work to retirement pursuits.

Internationally, notably in the Netherlands, there is a move away from segregating older people, whether in retirement villages or rest homes, and instead creating arrangements where they are in closer proximity to young people and families.

Demographically-driven demand for rest home care will soon outstrip supply. There is a boom in the retirement village market with ancillary care services but affordability is likely to be a factor for many coming into the age-group.

The Horowhenua district is ideally suited to be a centre for affordable care and lifestyle for older people. Levin, in particular, is an established town already servicing a sizeable ageing population. This potentially provides a foundation for the development of care models that will meet the needs of economy budgets and an increasingly cash-strapped Government when it comes to servicing the older population.

Advantages of the location include climate, highway upgrades underway, travel time and safe travel to Wellington and its international airport significantly improved and land costs at a fraction of city prices.

Thinking more of Havelock North than Mount Maunganui, the opportunity is for Horowhenua to leapfrog into new models of care as a key centre for modern, affordable care and retirement living, in other words a lifestyle not just a rural servicing district.

Estimates of returns from this approach would be only guesswork at this early stage, but a relatively small amount of investment would have a major impact on prosperity and employment in a town like Levin.

There is a prima facie case that affordable care and lifestyle for older people is a significant opportunity able to be capitalised upon in the medium term.

Current patterns and prospects

There is significant growth in services in this age group across the region as the demographic of older people thickens up. There are 11,230 jobs in this sector across the region. Horowhenua, for its size, is over-represented and this is in part because it is developing as a living destination (of modest proportions) for older people. Horowhenua currently has 11 rest homes with 500 residents – one in Otaki, two in Foxton and eight in Levin.
The dynamics of this sector over the next 30 years will involve a lot more people entering the age group and demand for rest home accommodation facilities outstripping supply. The economics of ageing will also be complex with Government having to bear more and more cost through rest home subsidies. The cost to Government is a serious concern. As people living in these expensive facilities use up their savings and reach the subsidy threshold Government is likely to incur very significant subsidy costs. Trends towards longer life expectancy are also going to exacerbate this problem.

There are attempts to offset this trend with community care approaches based around the ‘ageing in place’ concept. International experience indicates that consumer preferences for care are also changing, driven by both economic and social preferences. The segregation of older people into large establishments, whether rest homes or retirement villages, will likely become less popular with more intermediate care growing such as home care, supported living and similar arrangements.

Land availability and cost for large facilities such as rest homes and retirement villages in main centres like Wellington will also work against the current trend of building in these locations. In fact, industry informants told us that the current building activity in Wellington would probably be the last for some time for these exact reasons.

**Future models of care**

With its small size but significant aged care experience, Horowhenua has the opportunity to lead with modern models of care and lifestyle for older people that emphasise quality on a budget. The foundation of this is the relatively low land and property values. Such modern care models could involve:

- **Housing trust** – that rents, leases or sells on a buy-back arrangement local properties for older people to live in through the retirement phase of their ageing process. This has potential application to Government’s current desire to get community providers involved in social housing projects.
- **Home care and support** – such services need to be linked to each of the other services on this list.
- **Serviced units** – small clusters of units that are rented or sold on buy-back arrangements and which include communal facilities handily located to community services.
- **Marae-style clusters** – small clusters of units, some with rest home levels of service that are co-located with other community services or where they are associated with an actual marae, and with Kohanga Reo and youth facilities (encouraging inter-generational interaction).
- **Specialist hubs** – which provide high level care such as dementia and hospital level services.

While there are examples of all of these types of arrangements in different parts of the country, we are not aware of any location where they are deliberately co-located in a planned fashion. This is the opportunity that could be grasped by Horowhenua if it had a will to do so. Such models provide scope for both public and private provision. Isolated examples of these types of arrangements are already being developed in other parts of the country by large retirement village enterprises.
Such a configuration of lifestyle and care-related accommodation is only possible with a strong set of support services around it. These services include GP and medical services, pharmacy, specialist and wellness services, some of which are funded publicly and some by the user.

The emerging silver and white haired markets (in marketing parlance), besides their immediate needs of accommodation and health, increasingly seek retail, hospitality, wellness and leisure services. These demands often overlap with general demand patterns and are difficult to isolate to an ageing population. They also seek a range of lifestyle opportunities such as recreation, sports and social facilities and services which will have dual application for older people and the community in general.

The heart of this approach is to integrate older people, as long as they can, into the life of the community and vice versa. This adds to quality of life for all concerned, but with the emphasis on de-institutionalisation of aged care, it also makes living for older people potentially more affordable.

A pattern has emerged in New Zealand of aged dormitory areas within driving distance of larger cities - Mosgiel near Dunedin, Oxford near Christchurch, Waikanae near Wellington, Mount Maunganui near Auckland and Hamilton and Havelock North near Hastings/Napier. Horowhenua is near Wellington and will be closer with the roading improvements, but because its relatively limited development of aged care to date and its need to attract people for reasons other than immediate proximity, it needs to offer a different and compelling approach. We believe that this model, if pursued, will actually have broader application in the region beyond Horowhenua. In other words, this is not about competing with other regions; it’s about being well positioned to capitalise on the growth in demand for aged care services occurring everywhere and thereby increasing the number of jobs in the district – with subsequent flow-on benefits.

Levin and Foxton

The concept would involve towns like Levin and possibly Foxton emerging as lifestyle towns as well as their rural servicing function. It does not all have to take place in those towns either. It can include developing innovative ways to support older people while they continue to live in their ‘down-sized home’ in coastal villages like Waitarere or Foxton Beach and at the same time providing choices about the level of support they may require as their capacity to be self-contained weakens. Such an approach is now common place in the Netherlands and is emerging in Germany and Sweden with glimpses in New Zealand. Places like the Horowhenua could become a centre of best practice which incorporates concepts such as universal design particularly for new housing.

The opportunity being promoted here is an affordable aged person’s living destination. This is a new market that is emerging as the numbers in the 65+ age group expand. These are people of modest means reliant on National Superannuation and an additional moderate supply of revenue from a capital base of life-long savings.

As an opportunity it is about additionality. The nature of the opportunity extends well beyond the local demand for elderly care and retirement living services, though these are relevant. The opportunity is based on inter-regional (and even international) flows of elderly people as well as those already in the region.
Figure 33 shows the sources of inward migrants to the Manawatū-Whanganui region over the 5 years to 2013, for people aged 65 and over. The biggest sources are Wellington, overseas and Auckland. The total immigration to the region was around 30,000 during the five years to 2013 giving a sense of the scale of current demand.

Local patterns of ageing

The easy assumption is that the sole source of over 65 migration to the area is from Wellington. In point of fact the catchment is much wider and begs the question of what are the attraction factors that produce figures of this nature and which draw people even from off-shore.

Looking at existing patterns in the Manawatū-Whanganui region, it has a relatively old population (16% above 65 years compared to 14% nationally). In most districts within Manawatū-Whanganui the under 65 population is shrinking, with the exception of Palmerston North City and Manawatū District (which account for about half of the regional population).

The regional population grew by 2% or 3,700 people between the 2001 and 2013 censuses. This was all driven by the over 65’s, which grew by 7,900 people while the under 65’s shrank by 4,200 people. The region will age further in future years according to Statistics New Zealand projections, suggesting that an increasing percentage of the regional economy will revolve around older people. This suggests a significant portion of potential local demand. This is not the rationale from recommending this opportunity
except in as much as the region is already gearing to meet the requirements of an aging population.

The broad aged and health care sector accounts for 12% of filled jobs in the region, compared to 10% nationally. While the sector is larger, growth has been slower than the national total (over the last 10 years the number of filled jobs has grown by 4%, compared to 23% nationally). The health care-related segments and aged care sectors account for around $540m or 6% of regional GDP which was $9.1b in total in 2014.

**Comparative advantages**

There are existing specialisations in some services, but the region is not yet reflecting a full service offering such as that provided in an established retirement destination like Tauranga/Mount Maunganui in the Bay of Plenty (see Figure 34). There are gaps in GP services in particular and in services like pathology and diagnostic imaging services, physiotherapy and chiropractors (see Figure 34). This may be seen as a weakness, or alternatively, as an opportunity to close these gaps.

The sector is not bogged down with too many outdated facilities such as rest homes and land prices are very affordable.

Trends in healthcare for the aged are based on strengthened primary health access, much of which would operate in the local community. The blending of primary and hospital care would be part of the new model of care envisaged in this opportunity.

The Horowhenua District Council is strongly committed to the development of this sector in their district and is prepared to provide leadership for it.

**Employment**

There is a significant base of jobs in aged care in the region. Horowhenua’s job base is significantly smaller than either of Palmerston North or Whanganui partly because they are larger centres and because there are hospitals in both cities. Growth in these two areas is generally in line with national trends. We have particularly identified Horowhenua as an opportunity area because it has many of the indicators of potential for operating to an evolved care model: a base of activity and leadership, under-investment in existing models, and the other items we identified in the section on comparative advantage.
### TABLE 22: EMPLOYMENT IN THE AGED CARE-RELATED SECTOR

<table>
<thead>
<tr>
<th>Element:*</th>
<th>Employment (**)</th>
<th>Specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number, 2014</td>
<td>% of total</td>
</tr>
<tr>
<td>Broad areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>196,400</td>
<td>10</td>
</tr>
<tr>
<td>Manawatū-Whanganui Region</td>
<td>11,230</td>
<td>12</td>
</tr>
<tr>
<td>Territories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruapehu</td>
<td>376</td>
<td>8</td>
</tr>
<tr>
<td>Whanganui</td>
<td>2,602</td>
<td>16</td>
</tr>
<tr>
<td>Rangitikei</td>
<td>247</td>
<td>4</td>
</tr>
<tr>
<td>Manawatū</td>
<td>497</td>
<td>6</td>
</tr>
<tr>
<td>Palmerston North</td>
<td>6,287</td>
<td>14</td>
</tr>
<tr>
<td>Tararua</td>
<td>358</td>
<td>6</td>
</tr>
<tr>
<td>Horowhenua</td>
<td>877</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: Statistics NZ, NZIER

Notes:
- .. Not available or applicable
- * Specialisation is calculated as revealed comparative advantage. We summarise the results as High, Medium and Low, where high is RCA score of more than 1.15, medium is below 1.15 but greater than zero, and low is less than zero.
- ** Filled jobs. The sector is defined for this purpose as:
  - Q853100 Dental Services
  - Q853200 Optometry and Optical Dispensing
  - Q853300 Physiotherapy Services
  - Q853400 Chiropractic and Osteopathic Services
  - Q853900 Other Allied Health Services
  - Q859100 Ambulance Services
  - Q859900 Other Health Care Services n.e.c.
  - Q860100 Aged Care Residential Services
  - Q860900 Other Residential Care Services
  - R913900 Amusement and Other Recreation Activities n.e.c.
  - S951100 Hairdressing and Beauty Services
  - S952000 Funeral, Crematorium and Cemetery Services

The table above shows that the region has some specialisation in the broader healthcare, aged care sectors and some related sectors. A large share of the labour pool is already in this sector and employment is growing, albeit not as fast as nationally. Whanganui, Palmerston North and Horowhenua already have some comparative advantages in this broad sector.

Figure 34 below compares services in Bay of Plenty and compares them with Manawatū-Whanganui. The column “Areas of Opportunity” indicates services that would benefit from development in Manawatū-Whanganui if its service levels were to be comparable with Bay of Plenty.
6. OPPORTUNITIES AND ENABLERS

FIGURE 34: POSSIBLE OPPORTUNITIES IN THE AGED CARE SECTOR: REGIONAL COMPARATIVE ADVANTAGE ANALYSIS OF MANAWATŪ-WHANGANUI AND BOP

Revealed comparative advantage in employment (>1 has comparative advantage).

<table>
<thead>
<tr>
<th>Service Description</th>
<th>Manawatū-Whanganui</th>
<th>Bay of Plenty</th>
<th>Areas of opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q840100 Hospitals (Except Psychiatric Hospitals)</td>
<td>1.0</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>Q851100 General Practice Medical Services</td>
<td>1.0</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Q851200 Specialist Medical Services</td>
<td>0.6</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Q852000 Pathology and Diagnostic Imaging Services</td>
<td>1.1</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>Q853100 Dental Services</td>
<td>0.9</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Q853200 Optometry and Optical Dispensing</td>
<td>1.1</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>Q853300 Physiotherapy Services</td>
<td>0.8</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Q853400 Chiropractic and Osteopathic Services</td>
<td>1.1</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>Q853900 Other Allied Health Services</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Q859100 Ambulance Services</td>
<td>1.5</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Q859900 Other Health Care Services n.e.c.</td>
<td>0.9</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Q860100 Aged Care Residential Services</td>
<td>1.6</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Q860900 Other Residential Care Services</td>
<td>1.3</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Age care related services</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

Source: NZIER analysis of Statistics New Zealand Business demography statistics

The areas of opportunity are simply the difference between the position in Manawatū-Whanganui and Bay of Plenty. The specialisation is not as deep and broad as the grey capital of New Zealand, Bay of Plenty. The column Areas of Opportunity illustrates the potential for aged care and related services compared to the yardstick of Bay of Plenty, which is a significant retirement destination.

THE HOROWHENUA DISTRICT COUNCIL PERSPECTIVE

- The Horowhenua District Council is of the view that the upcoming redevelopment of Levin and Foxton townscapes will contribute to the attractiveness of these locations as a place to accommodate the needs of the ageing population.
- The factors which they view as being an advantage for the Horowhenua area in terms of care of older people include:
  - Horowhenua property and living costs are considerably lower than those in Wellington. A move to Horowhenua may therefore be seen as an easy ‘equity release’ mechanism. A retiring couple could sell their $800K house in Karori, build their dream home at Waitarere Beach and still put $300k in their back pockets for a cruise, or a trip to Australia to visit family.
  - Horowhenua is well connected to airports, and has rail passenger access, etc. People can move to the District and stay connected.
A local Private Training Establishment has developed a tailored training centre to support the demand for care providers.

- The Council has noted that many existing providers are reviewing plans for growth and expansion to meet increasing demands for elderly care in their area.

- In addition a number of new residential unit developments are underway in the Levin and Foxton area including:
  - The Trackside Villas development which is commencing the second stage of a three stage development
  - A large (up to 500 units) development (‘Speldhurst Country Estate’) is currently being launched at the site of the old Kimberley Hospital. This is currently at resource consent stage for an initial 90 unit-title dwellings
  - A Hawke’s Bay developer is currently considering options to facilitate the development of a large site next to both an existing Summerset facility and the Horowhenua Integrated Family Health Centre.
  - Te Waiora, a new community health clinic, has recently been opened in a strategic location in Foxton. This will provide accessible quality health care to the local Foxton community.

What about Whanganui (and other parts of the region)?

The City of Whanganui is also well positioned to service the grey and silver haired markets. It is already a significant player in this sector in the region. There is a centre of excellence project in aged care and service development underway together with linkages between the DHB and health technology companies. There is no reason why Whanganui cannot develop this capability also. We have selected Horowhenua as the initial point of intervention because of its proximity to the Wellington market and the opportunity to pioneer an evolved model of care and lifestyle for those ageing. This does not stop other districts emulating all or parts of the model.

WHY?

Summary of the rationale

- Close to Wellington.
- Close to secondary and tertiary hospitals (Capital Coast, Mid Central and Whanganui).
- Close to an international and a regional airport (Wellington and Palmerston North).
- Relatively low cost of land compared with metropolitan centres.
- Comparative attractive climate.
- Elderly-friendly community scale.
- Established base of care provision, though sufficiently flexible for consideration of new models of care.
6. OPPORTUNITIES AND ENABLERS

This opportunity is developmental rather than immediate. There are indications of commercial champions willing to take the idea forward but considerable pre-work is required to clarify the concept and assess its viability.

Realising this opportunity will require co-ordination and cooperation and most of all, local leadership. Partnerships across research, education, health, Government and the private sector will be required. This is a major undertaking.

Workforce issues

While there is a local workforce to service this opportunity it is doubtful whether it is large enough. Many in this sector are relatively low skill and training interventions could prove helpful. Recruitment of international expertise such as from the Philippines may also be necessary. These two types of interventions would need to be managed together.

Perception issues

Success will depend on a changed perception of Levin - less as a rural service centre and more as a lifestyle community. This is a big step for the town. Horowhenua is not Queenstown or Mount Maunganui. It does not currently have the cache of these locations. Any development would need to project a strong sense of its intrinsic value and points of difference such as affordability, community scale and proximity to urban centres and other services.

Health service issues

There are significant deficits in health services which would have to be addressed, particularly for GPs and medical services. There is also the question of accessibility of secondary and tertiary hospitals. Three hospitals are about an hour away from Horowhenua which is just about the outer limit, particularly as people get impaired at older ages.

Transport issues

Public transport within the region and to main centres remains an uncertain proposition. The Capital Connection train is a marginal proposition at this point. Loss of links such as this would work against the interests of this proposition.

FILTERS SUMMARY

Impact: the aged care sector adds to regional economic performance. An 80 bed rural facility is estimated\(^6\) to add $32m to the regional economy over a decade and boost employment by around 66 additional jobs.

For a sub-region like Horowhenua, it represents a 0.8% lift on current employment, which lost 6% of its jobs (of all jobs not just aged care) in the past decade.

There are also likely to be wider spill-over benefits. There are already prospective plans for a 500 unit development, which could boost employment by 5% for a territory like Horowhenua when completed.

**Trends**: the sector is also growing. Employment in the aged residential care sector has grown by around 15% in the past decade and 11% for the broader health and related sectors. The growth rate has not been as fast as the national rate (24%), but the sector is clearly in a growth phase and there is potential for faster growth in the Manawatū-Whanganui region than seen historically. The Grant Thornton report on residential aged care commissioned by the New Zealand Aged Care Association indicates that demand will exceed supply of rest home care in the next few years and this situation will prevail for a long period. The current trend of provision is to associate rest homes with retirement villages. This necessitates new builds and this pattern is being seen around the country. Horowhenua, in particular, has a good supply of affordable land for such enterprises and the ageing in place options outlined in this section.

**Competitive/comparative advantage**: the region has an existing specialisation in aged care and a number of related services in health and residential care services. For example, the aged care residential services account for 2.6% of regional employment, compared to 1.6% nationally – the region is specialising in aged care. The broader sector including health, which supplies services to aged care is much larger at around 11,230 jobs, accounting for 12% of regional jobs.

**Employment intensity**: the aged care and related health and services sectors are relatively labour intensive. Just over half of all the output in the sector is paid in wages (compared to 22% in the general economy), which benefits the local economy through gainful employment. These jobs are a combination of low paid and some highly specialised and highly paid positions. There are also spill-over benefits. The aged care and related sectors are linked to numerous other sectors, by purchasing products and services from them. Money spent in the age care related sector is 1.8 times more powerful than a similar increase in the overall economy.

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66 http://nzaca.org.nz
### TABLE 23: OVERALL METRICS FOR OLDER PEOPLE CARE AND LIFESTYLE

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Current size (filled jobs)</th>
<th>Employment intensity</th>
<th>Linkages to other sectors</th>
<th>Stage of lifecycle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11,230</td>
<td>Very high</td>
<td>Very high</td>
<td>Growth</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP adding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job adding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trend</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Competitive advantage         |                          |                      |                           |                   |
| Domestic                     |                          |                      |                           |                   |
| Export                       |                          |                      |                           | n/a               |

| Summary                      |                          |                      |                           |                   |
| Current size                 |                          |                      |                           |                   |
| Employment intensity         |                          |                      |                           |                   |
| Linkages                     |                          |                      |                           |                   |
| Stage of lifecycle           |                          |                      |                           |                   |

Source: NZIER

### HOW?

**Objective:** to create affordable person-centred models of continuing care for older people through retirement to advanced care in a community context.

**Strategic Intervention:** this is a complex opportunity to realise. In the first instance a detailed concept and feasibility is required negotiated in a consultative fashion with a wide range of interested parties including iwi.

While we believe there is a *prima facie* case for this opportunity, it requires considerably more validation than is possible in this report. Some of this work is known to have been done already by developers interested in the region but we have not been provided access to it. More information is required to better understand demand and the comparative cost advantage for older people locating to Horowhenua and their likely origin.

**Relevant current central government initiatives:**

- District Health Board (DHB) assessment of individual’s needs and eligibility of services, provision of funding of service providers and provision of services directly such as hospital interventions. Legislation and compliance of service providers to sector standards and DHB contracts.
- National Science Challenge – ‘Ageing Well.’
INTERVENTION SUMMARY

Horowhenua District Council, DHBs, iwi:

- Develop the concept as it applies to the district and sub-district areas immediately adjacent such as Otaki (iwi interests).
- Undertake validation of the concept with all necessary parties (Government and community).
- Establish a pathway to implementation.

Training Providers:

- Work with private sector health providers, iwi and the DHB to develop a health care training and attraction programme compatible with the opportunity.

DHB, Community-based health care and “lifestyle” providers:

- Assess how they can assist in the development of the concept.
- Assess what it means in terms of extending support services e.g. physiotherapy and rehabilitation services, as well as other indirect services such as those related to mobility transportation, supermarket delivery services, entertainment, in-home monitoring, e-services, medical equipment, travel booking services and food and beverage also need to be in the mix.
- Assess feasibility of recruiting trained people and developing facilities (which will give investors necessary confidence).

DHB, Specialist providers:

- Undertake a demand assessment exercise to assess requirements for the provision of specialist care e.g. dementia services. Numbers needing this service are expected to double over the next 10 years (increasing 4% p.a.) which will require a response from aged care providers and Government.
- Assess the requirement for GP services and emergency services and how they will be developed to support the opportunity.
AFFORDABLE CARE AND LIFESTYLE FOR OLDER PEOPLE

THE OPPORTUNITY AT A GLANCE

**What? – the opportunity**

A new concept of care for older people:
- Affordable care
- Community-integrated care
- Integration of rest home, retirement and independent living
- Modern presentation
- Human scale community

**Why? – will it succeed**

Leverage off:
- Existing capability and capacity
- Proximity to Wellington / airport
- Affordable property values
- Trainable local workforce
- Benign climate

**Act to:**
- Create a concept/vision
  - Form a feasibility vehicle
  - Complete a feasibility study
- Engage parties including health, providers and professionals.

**Overcome:**
- Perception that it’s not Mount Maunganui or Queenstown
- Passivity
- Related services deficit
- Transport issues

**Why not? - obstacles**

**How? – interventions, actions and arrangements**
OPPORTUNITY:
BUSINESS PROCESS OUTSOURCING AND FOOD INNOVATION OUTSOURCING

WHAT? – THE OPPORTUNITY

International companies are in search of talent and skill wherever they can find it and this is, in part, driving a trend towards international outsourcing. There is growth in New Zealand and worldwide in the tertiary services sector and business process outsourcing (BPO) in particular. The opportunity is for Manawatū-Whanganui to capture some of this growth through the use of existing capacity and capability geared partly to a domestic market, but mainly to an international market.

Within business process outsourcing the contact centre industry is rapidly maturing worldwide and while at one time it was relatively cost driven, now qualitative as well as cost factors are important. This opportunity has become more real in recent years because of the apparent interest of companies in quality and not just cost solutions. A region like Manawatū-Whanganui is able to deliver quality solutions.

New Zealand generally, and Manawatū-Whanganui in particular, have specialised science and technical capability in the agri-tech, food-tech and bio-tech industries focused around Massey University and the various research centres mostly located in Palmerston North. The opportunity is for international companies to outsource their requirements to the region where the region is able to offer unique benefits that make it competitive internationally.

The outsourcing opportunities outlined here have short and long term dimensions. Contact centres are in the immediate foreground whereas other professional services and particularly science and technical services (Food HQ) are a longer term proposition.

The contact centre opportunity is appealing because it is urban or town-based, it is flexible and offers employment to a wide range of people. Contact centres offer jobs to lower skill people and are particularly relevant for second household incomes and tertiary students. This is an important balance for building jobs, incomes and community resilience. It is also rapidly developing into higher skilled areas (e.g. technical analysis and advice, high trust functions needing strong interpersonal skills) and as such will provide higher paid roles than traditional centres would have provided.

Work in the region on the contact centre opportunity is now well advanced and while Manawatū-Whanganui does not have a decisive regional advantage, apart from its strong existing cluster of contact centres, the mere fact that so much work has been done places it in a strong position to take advantage of this opportunity should it be proven to be real. The proposal of the parties working on the call centre opportunity at present is to double current jobs in three years to a total of 2,000 (FTE equivalents).
Food HQ’s objective is to outsource to international companies using established local capability and capacity. This is still very much an emerging area as Food HQ finds its place in the world. Its vision is to double its scientists, researchers and students to 4,000 while attracting $150m pa in international food R&D.

CONTACT CENTRES

This is a priority focus of Spearhead, a regional development agency, which has defined and quantified the sector and has undertaken solicitation activity in Australia to try and woo Australian firms to establish contact centres in Manawatū-Whanganui. This work is being supported by NZTE.

There is an international trend to outsourcing generally which has been well documented. In the contact centre industry, this had previously been to third world countries. The trend has reversed as companies have realised the importance of considerations such as local information, language and culture. This is now rated as more important than cost especially in the top-end functions which require stronger customer relationships.

The attractions of outsourcing, apart from cost are:

- Greater flexibility to scale operations.
- Standardisation of processes.
- Meeting compliance regulations.
- Gaining access to talent and a good quality labour market from which to draw staff.
- Gaining access to technology.
- Achieving change often not possible with in-house operations.
- Benefitting from business outsourcing expertise not able to be achieved internally.

As a generalisation, large enterprises focus on cost, while mid-market operators focus on provider solutions. The latter are the target for Manawatū-Whanganui as they are in scale with the local communities.

The principal focus is inbound customer service (as distinct from sales and technical support).

Spearhead estimate there are 322 companies operating contact centres in New Zealand with 30,970 “seats” (individual operators). The average cost per seat is around 15% lower in New Zealand than Australia and Manawatū-Whanganui is 35-40% lower than Australia. This is achieved because of lower wage and overhead costs.

Staff turnover rates are estimated by Spearhead to be 6-10% in Manawatū-Whanganui versus 40-50% in Auckland and similar rates in large Australian cities. Reasonably close access to an international airport is important for clients wanting to visit operations.

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67 Pers. comm: Craig Nash, Spearhead.
Wellington is sufficiently close to potential suppliers in the Manawatū-Whanganui region and the high daily frequency to international connections is promoted as being an advantage of the region. This is often an early hurdle for Australian businesses.

The hunt to attract contact centres and other outsourcing business has been underway for three years. The key opportunity is to bring contact centre operations across the Tasman to Manawatū-Whanganui to take advantage of cost and workforce quality advantages.

**FOOD HQ**

The vision of Food HQ is to be New Zealand’s international centre for collaborative food research, so its ambitions are wider than simply an outsourcing model. However, outsourcing food research from national and multi-national food companies is part of the concept.

Its vision is to generate value for the global food industry through innovation across the value chain\(^68\). The partners’ mid-term goal for Food HQ is to have it ranked among the top five food innovation centres in the world, in terms of economic and social impact.

Food Innovation NZ, as the fledging genesis of Food HQ, was launched in August 2009 as a collaborative partnership between Massey University, AgResearch, Plant & Food Research, Fonterra, Riddet Institute (the National Centre of Research Excellence in Food and Nutrition), and the Bio Commerce Centre.

The plan, as stated in the Food HQ Vision 2025 document, is ambitious and includes:

- Development of a fully integrated super campus in Palmerston North with approximately 4,000 public and private researchers, PhD students and educators involved in the food value chain,\(^69\) all together achieving critical mass to make a difference on a global scale.

- Capital investment of $250m leading to $230m in added economic activity each year.

- Desire to help boost the annual value of New Zealand’s food exports to $60 billion by 2025.

- A mechanism to help meet the 70% increase in global food demand expected by 2050.

- A mechanism to fill the gap created by the apparent downsizing of food company research and development in-house expertise.

Food HQ is viewed by leading proponents as a gateway for other R&D organisations, companies and support industries to enable them to engage and co-locate with each other as a cluster. They see themselves as a portal to facilitate research and development at the value-added end of the food value chain. They want to be at the heart of supporting the Manawatū-Whanganui economy and demonstrating the vibrant science environment of the region.

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\(^{68}\) As quoted in the Vision 2025 document prepared by Food HQ which is available on the Food HQ website

\(^{69}\) An estimated 2000 persons are currently part of the Food HQ network
As one informant\textsuperscript{70} described it, Food HQ is a platform for:

- Collaboration and interconnectivity between all parts of the food chain.
- A mechanism to help fast track innovative food ideas.
- The ‘virtual’ entrepreneurial ‘food expert’ and middle man to give clients a simple point of entry and an account manager function to the wide array of New Zealand food innovation capability, particularly that located in Manawatū-Whanganui.
- A train track with stations – with a “facilitating conductor” connecting these stations i.e. a mechanism for providing inside knowledge about where people should go to access experts who will help food producers get where they want to go, whether these experts be related to science research, technology, commercialisation, brand development, packaging, biosecurity issue management, regulatory matters, market assessment or logistics.

Many of the members of Food HQ are distributed networks in their own rights (including Massey, Plant Food Research, Ag Research and the Riddet Institute). Food HQ is designed to be a powerful local cluster with the objective of tying all these networks together locally.

If it were to succeed it would provide enormous benefit to the region. Because the principal target is international companies it would effectively generate export dollars. It would also leverage development of the capability and reputation of New Zealand’s skills in science and innovation in the food industry. It would help to build a cluster of capability that would advance the whole region, and for that matter, New Zealand as well.

**WHY?**

*Summary of the rationale*

- The rationale for contact centres includes:
  - Ready supply of labour.
  - Competitive rental levels.
  - Trend towards Business Process Outsourcing.
- The region has in excess of 1,000 contact centre jobs now, providing a foundation for expansion.
- The rationale for food-related technical and scientific outsourcing through Food HQ includes:
  - Extension of current capacity and capability.
  - International trends towards outsourcing in this market.

\textsuperscript{70} Pers. Comm. Professor Richard Archer
WHY NOT?

Contact centres

Despite the general attractions of Business Process Outsourcing, the industry is still at an early stage in New Zealand and even internationally. Potential outsourcing-seeking sectors for focused marketing attention include banking, insurance, manufacturing, energy and utilities, media and entertainment, hi-tech and public sector.

There is no strong comparative advantage for the region and the current 1,000 jobs is a small, but not insignificant, base to build from. The decisive factor is the commitment of the region to the development of this capability which primarily involves clear lines of connection to customers.

Clients are particularly looking for stability, cost savings, knowledge and delivery competence. These competencies need to be proven as available from the region.

Critical mass is another question. Indications are that there is barely sufficient potential critical mass and for this reason the whole of lower North Island is being seen as a market rather than just Palmerston North.

Food HQ

Food HQ is young in its development cycle. There are some eye-wateringly innovative ideas but few, to date, have materialised into business structures which can be used as success case studies to leverage further success.

The strength of Food HQ is the idea and its potential, but it is made up of individual enterprises co-located but arguably, insufficiently cohesive to make real progress as a whole entity. To us it appears to have not resolved the conflicting demands of individual organisation goals and the vision of the whole cluster. Until this is resolved Food HQ is likely to progress very slowly. A more enabling structure is required if the idea is to translate into reality.

If Food HQ is left to receive its impetus largely or solely from the private sector (especially entrepreneurs and angel investors), development will be slow as there is costly business infrastructure required and returns on capital will be long term.

Food HQ as an opportunity is tantalising but very challenging. We believe it requires a much sharper focus if it is to reach anything like its promise.

FILTERS SUMMARY

Because of the formative stage of business outsourcing in the region it is difficult to filter using the same measures as applied to other opportunities; however we have drawn the following conclusions:

Impact: the potential impact on the region of service and science outsourcing is significant. It represents an urban rather than rural service. It focuses on the second household income market and jobs are very divisible allowing part-time work. Companies tend to outsource a whole operation so that each start-up could be quite significant in size and have a material effect on the region.
**Trend:** Global activity around outsourcing is increasing, not only in contact centre provision but in other areas of expertise such as technical, scientific, and legal. Whether the global market is interested in New Zealand has yet to be established. If it is, and business is attracted, then it will make a welcome addition to New Zealand’s export earnings and create further opportunity.

**Job intensity:** The contribution of outsourcing to creating jobs is its major attraction. As a sector, it is highly job-intensive, and this is true of both contact centres and hi-tech science-based outsourcing like Food HQ. It also offers opportunities for training and skill improvement which will potentially have spin-offs into other areas.

**HOW?**

**Objective:** To create a base of service offerings, principally service and science outsourcing activity, in the region that becomes a platform for building a regional reputation as a quality and reliable provider.

**Strategic intervention:** The first point of intervention should be contact centres. As outsourcing goes, they are the least complex. Food HQ is a more gradual and long-term proposition although the potential rewards are much greater.

**CONTACT CENTRE**

A great deal of effort has already gone into the hunt for contact centre markets. It is regarded as a gradual process of persuasion and building of critical mass. Persistence is essential because these are long-term projects for major companies. Current interventions appear sufficient at this point, but if they are unsuccessful, they will require review. We note the following points:

- Spearhead has projected a target of doubling jobs in the Manawatū-Whanganui region over the next three years – from 1,000 to 2,000 jobs (FTEs).
- Spearhead, with support from NZTE, is involved in developing a concept to collaborate with Wellington and Hawke’s Bay in attracting business process outsourcing industries, with the larger target being to secure 3,000 jobs across the lower North Island over the next three years.
- Spearhead has an established programme of recruitment of clients. So far it has had limited success, but our assessment is that persistence is likely to pay off. A current pilot scheme in conjunction with NZTE and Vision Manawatū is showing promising signs which validates our view.
- Minister English recently met with the Australian business Council. From these discussions, he believes a strong opportunity will arise over the next two years as they struggling Australian economy will prompt business to look at new cost-effective options.

Once established and a local “brand” is recognised in terms of quality, then the industry has long-term potential. The effort is currently funded by ratepayer and taxpayer money and is unlikely to succeed without such public support.
This industry, at its current level of revenue and growth prospects, is unlikely to be attractive to independent investors although large outsourcing companies who contract to clients are also being targeted.

**FOOD HQ**

On March 31, 2014 Massey University unveiled a $22m upgrade of the Manawatū campus Riddet Complex, its base for food technology and engineering. The major revamp was viewed as a significant step in the planned $250m investment into Food HQ. This is a real indicator of a willingness to back the potential of the idea.

Within the Food HQ ambit is the FoodPilot which is a member of the NZ Food Innovation Network (NZFIN). The Network has four open access facilities for development and manufacturing of new food products. One such facility is the Hamilton-based 500 kg per hour spray drier largely devoted to infant formula and dairy applications. The FoodPilot is the most comprehensive facility in the NZFIN having the widest range of equipment suited to the largest range of food industry sectors. But the FoodPilot equipment is small scale suited to research and development where product is made to generate information (e.g. stability, flavour, texture, shelf-life) while the other facilities are suited to small scale manufacture of product for sale.

A further example of the work of Food HQ is the convening of the Ewe Milk Products and Sheep Dairying Conference covering such issues as: ewe milk product consumers and markets; processing and manufacturing; sheep dairy farm operations; sheep genetics and; industry structure and organisation. Sheep milk was an opportunity we examined as a possible opportunity for the region, but at this stage rejected it because of its micro scale and lack of infrastructure. As a result of input like this it may again emerge as a possibility.

These are all important developments and are fundamental to the economic success of the region as they are counter to the effects of global pressures this report has discussed extensively. To meet its promise, a public/private development structure (possibly involving iwi) that integrates diverse operations that is adequately financed is required. Food HQ is a big idea and requires robust and integrated governance.

One way to achieve this would be for Government to continue and potentially increase its weighting of research grants in favour of collaborative models i.e. incentivise parties to work together. A second intervention is to establish a five year co-funding model with Food HQ partners. The purpose of this would be to drive collaboration specifically on Food HQ and to enable the search for and receipt of global revenues to be fast tracked.

Our conclusion is that the plans of Food HQ around outsourcing need to be more specific and pragmatic to ensure they are achieved and until that is the case it is difficult to recommend further action despite the enormous opportunity it represents.
Relevant current central government initiatives relating to business process and food science outsourcing:

- NZTE involvement in attracting BPO investment to the region through co-funding a lead generational consultant in Australia, research and facilitation activity.
- Further roll-out of ultra-fast broadband roll out – creating a platform for adoption of technology for the industry.
- Establishment of Food Safety Science and Research Centre – national virtual centre hosted by Massey University.
- National Science Challenges – The High-value Nutrition Challenge, Our Land and Water - Toitū te Whenua, Toiora te Wai, Ageing Well - Kia eke kairangi ki te taikaumātua tanga
- Contestable science funding
- Crown Research Institute core funding which supports many of the partners within FoodHQ
- MBIE contestable science funding.
- Funding for the New Zealand Food Innovation Network including the FoodPILOT within Massey University.
- Callaghan Innovation support for Bio Commerce Centre
- Tertiary Education Commission funding for Centres of Research Excellence
- The Dairy PGP project referenced earlier in the report includes off-farm components based at the Fonterra Research Centre.

INTERVENTIONS SUMMARY

Local Authorities, Spearhead and NZTE

- Increase resources to support and grow current initiatives to recruit contact centres to the region.

Food HQ

- Note the support for Regional Research Institutes contained in the 2015 Budget

Food HQ partners

- Revisit governance arrangements to devise a structure that provides strong collaborative incentives to achieve a more integrated and robust business model.
- Consider what more can be done to add servicing the needs of regional business and sectors to the business model.

MBIE

- Weigh research grants in favour of collaborative models such as those aligned with Food HQ
- Establish a five year government co-funding model with current Food HQ partners.
## Business Process Outsourcing and Food Innovation Outsourcing

### The Opportunity at a Glance

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ENABLERS:
DISTRIBUTION AND TRANSPORT

WHAT? – THE ENABLER

The opportunity here is to provide a regional transport vision which aligns transport interests with development opportunities and current priorities. To a degree this is achieved within the current Regional Land Transport Plan (RLTP) but there are matters of detail that require further attention. The rest will largely be carried out by commercial interests.

The region has a clear advantage for distribution hubbing throughout the lower North Island. It is of concern that already two distinct hubs are developing – one in the north east and the other in the south west (Longburn) of Palmerston North. Volumes are such that it is unlikely two hubs can be sustained and pursuing these two options could result in the under-performance of both.

Recent refinements to the Government and New Zealand Transport Agency’s transport investment framework give appropriate priority to the role of transport as an enabler of economic growth. The region’s leaders may find value in continuing to search out ways to apply the elements of this framework more rigorously.

Additional rail sidings and increased use of the rail network may assist with growth in the region. Business and regional leaders, with the support of Government, should develop a united case for consideration by Kiwi Rail.

With the Manawatū’s unique location as the junction for several major rail and road networks, there is opportunity for the region to lead the way to improve national supply chain efficiency and gain greater returns from adoption of a strategic approach based on a single ‘freight network’ rather than road and rail as separate entities.

Securing an Ohakea based ‘fresh and urgent’ air freight service to international markets will require a clear vision and on-going focused attention on defining and achieving achievable and incremental steps toward that vision.

The transport network

The Manawatū-Whanganui region is located at the centre point of five road and rail networks which connect Hawke’s Bay, Wellington, Taranaki and other parts of region located to the North. Palmerston North is near the centre of the region’s transport network. It is located close to State Highways 1, 2 and 3.

State Highway 1 to the North provides a link from the Region to the Port of Tauranga. Tauranga is New Zealand’s largest port in terms of export cargo volume. State Highway 1 also provides road linkage to the ‘Golden Triangle’ regions of Auckland, Bay of Plenty and Waikato. These regions account for around two-thirds of New Zealand’s freight movements and have over half of New Zealand’s population.

Marton connects rail lines linking Wellington and Taranaki. Businesses producing freight in Palmerston North and surrounds are also able to take advantage of the rail link to the Hawke’s Bay.
Palmerston North has a significant domestic airport. This includes direct, but limited freight links to Auckland International Airport. It is one of only three airports in New Zealand which operate on a 24 hour basis. Ohakea Defence Airbase is capable of servicing wide bodied jets. Its current focus is as an air-force training facility.

The region has an extensive network of local roads primarily to service the needs of the agricultural and forestry sector. A market of up to 700,000 people will be created within little more than one hour’s drive from Levin and surrounds. This will be assisted by the completion of Transmission Gully and Kapiti Expressway routes to Wellington which are being upgraded as part of the ‘Roads of National Significance’ programme. Their completion will provide significant market opportunities for Levin businesses, particularly those related to fresh food and elderly care/retirement living.

The strategic location of Palmerston North and the central location of the region as a whole is such that it has become a key staging point and distribution centre for high value imported and domestic freight between Auckland and Wellington and to a degree, also between Auckland and the South Island.

**Distribution and Hubbing**

The region’s location and potential to quickly package and redistribute produce places it in a strong position to capitalise on further transport hubbing (collection, amassing product for volume and redistribution) and the associated growth opportunities which depend for their success on the:

- Reduced distance of travel, traffic volumes and the interconnectivity of the flow of traffic
- Need to be more competitive than any other player when it comes to ‘input’ costs.

An example of recent investment to capitalise on the region’s hubbing capacity is the announcement in 2014 of an inland port and intermodal freight hub at Longburn, just south of Palmerston North. This is a joint venture agreement with the Ports of Auckland, Napier and Icepak. This facility is reusing the old Longburn freezing works site which sits on the North Island Main Trunk Line and is adjacent to State Highway 56. Cool stores and container handling facilities have been established.

Toyota, EziBuy, Food Stuffs and other agencies have located their hubbing ventures in an area located to the north east of Palmerston North, close to the airport at Milson but without direct rail siding services. To a degree there is competition between this site and the Longburn site.

In addition, we have been informed that a third land-based logistics partnership is also looking at improving ways to move freight regionally and nationally.

Whanganui is also growing as a transport hubbing centre and Marton is the site used by one distributor with potential for expansion as a site for food and grain/stock-food distribution. Whanganui’s hubbing capacity is based on the Heads Road Industrial Estate. Freight volumes are, in part, facilitated by a daily return freight train service to Wellington’s CentrePort.

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71 Pers.comm., Brendan Duffy, Mayor, Horowhenua District Council, November 2014
This raises the concern about multiple hubs alluded to earlier. Regional transport planners need to be mindful of this issue with an evidence-based approach.

**PRIMARY SECTOR PRODUCT DISTRIBUTION**

The regional economy is largely based on production from the primary sector. The region has the largest number of stock movements in the country.\(^{72}\) The establishment of a resilient road and rail network is therefore critical.

A high percentage of beef and lamb production from throughout the region is first transported to meat processing facilities located throughout the region.\(^{73}\) Most of this processed product then makes its way out of the region for export overseas. Distribution also occurs to domestic markets located in other parts of New Zealand.

About 44% of processed meat in New Zealand\(^ {74}\) is conveyed by rail around New Zealand mostly for export through the Ports of Tauranga or Napier. Most meat processing plants have railway sidings. Movement of milk and dairy products occurs from dairy farms to processing plants located at Pahiatua, Palmerston North and Whareroa near Hawera in Taranaki. Processed milk products are mostly transported by rail for export from the Port of Tauranga.\(^ {75}\)

Rail is used to convey milk from collection facilities at Oringi and Longburn to the Fonterra Whareroa plant in Hawera. There is also a large counter flow of export product from Hawera to the Ports of Napier and Tauranga. In 2015, the upgrade of Fonterra’s Pahiatua milk processing facility will be completed. This will include construction of a new milk powder dryer. All the milk produced in the eastern North Island from Hawke’s Bay to Wellington will then be converted to milk powder at this upgraded Pahiatua facility. This will negate the need for it to be transported to Hawera by rail.

The reopening of the Castlecliff branch rail line in May 2011 provided direct access to Open Country Dairy’s (OCD) Whanganui factory. Construction by OCD of a second dryer will be completed at the Whanganui site in 2015. Completion of this facility is expected to result in increased milk tanker movements on State Highway 3 and on local roads near Whanganui to reflect the greater volume of milk being processed at this site. Some of this extra volume will displace milk collected by Fonterra for processing at the Whareroa plant. Increased volumes of OCD milk product will also be transported from Whanganui to Port Taranaki at New Plymouth for export.

Forestry is likely to contribute to increased demands on the transport network in the period between 2018-2030. Rangitikei, Ruapehu and Whanganui Districts account for more than 75% of the total land area planted with radiata pine in the region and 7% of the

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\(^{72}\) See draft Manawatū-Whanganui Regional Land Transport Plan

\(^{73}\) Information about the meat processors in the region is provided in the section of this report addressing the opportunities associated with the beef and lamb sector

\(^{74}\) National Freight Demand Study, Deloitte et al. Prepared for the Ministry of Transport, 2014

\(^{75}\) Fonterra has an arrangement with meat processors known as ‘Kotahi’ which is designed to capitalize on the benefits arising from economies of scale by using joint in-land port facilities and common shipping and port facilities
area in exotic tree plantation for harvest nation-wide (128,000 hectares\textsuperscript{36}). Most of the region’s logs will be transported via road (over 90% nationally), particularly using local roads, but in some instances they will be transported by rail. Most of the region’s logs are exported via the Ports of Napier and Wellington (CentrePort).

### PEOPLE MOVEMENT

Palmerston North City and Manawatū District are experiencing modest population growth. This will need to be accommodated by providing road improvements suited to the needs of persons commuting between their place of residence and their place of work. This includes growth in rural residential living throughout the Manawatū District and the growth of residential living in the Aokautere area to the East of the Manawatū River.

Conversely, population decline in the other parts of the region will bring about its own set of transport problems, including the capacity of a declining ratepayer base to fund necessary road improvements.

A percentage of both freight and people movement in the Manawatū-Whanganui region is between adjacent regions. This has placed an increased demand on roads which by-pass Palmerston North. It has also drawn the attention of the region’s transport planners to the capacity of roads in adjacent regions. The related need is to avoid ‘pinch points’ at any location used as part of the journey between the origin and destination of freight and people.

Due to its central location and ease of access, Palmerston North is regularly selected as a domestic conference and sporting venue. Domestic and international visitors are as important, or perhaps more important to the economies of Ruapehu and Whanganui Districts as they are to other locations in the region. These other districts have major recreational attractions associated with the volcanic plateau and Whanganui National Park.

The Ruapehu and Whanganui Districts also have two of the ‘Great Rides’ that make up part of the National Cycle ways Network ‘Nga Haeranga’. These are the ‘Timber Trail’ near Taumaranui and the ‘Mountains to Sea’ cycle trail which traverses the Whanganui River. Increased domestic tourism using mountain biking trails in the Ruapehu District is contributing to the 365 day use of roads and accommodation in that area. Previously winter skiing was the dominant attraction.

State Highway 43 (‘The Forgotten Highway’) is now functioning as an emerging tourist route between Stratford and Ruapehu Districts.

\textsuperscript{36} National Freight Demand Study, Deloitte et al. Prepared for the Ministry of Transport, 2014
WHY

Summary of the rationale

The rationale for enablers is a little different from that of opportunities. We consider transport and distribution to be key enablers because they go to the heart of the present and long term future of Manawatū-Whanganui as an exporting area. Logistics and supply chains are absolutely vital to economic growth because they:

- Unlock new sites for development such as logging opportunities.
- Provide access to new, better or cheaper resources and thereby lower the cost of goods manufactured in New Zealand and increase the nation’s competitiveness.
- Allow access to a wider labour market and, as a consequence, potentially lower labour costs.
- Open up new and larger markets.
- Allow economies of scale.
- Generally make New Zealand more attractive as a place to live, work, play or visit.

Hubbing requires particular attention in the region because:

- The region is well placed geographically to be a hubbing centre.
- Effective hubbing could be an accelerator for the economy.
- Ineffective, duplicated or inefficient hubbing could be a handbrake for the economy.
- The region itself is widespread and requires a rational transport and hubbing network to operate more strongly as a unit.

WHY NOT?

A number of road transport issues and challenges have been identified in the draft Manawatū-Whanganui Regional Land Transport Plan (Manawatū-Whanganui RLTP) as matters requiring on-going attention. Priority will need to be given to the resolution of these matters if the full growth potential of the region is be capitalized upon. They include the need for better:

- Integration of land use and transport planning to produce a more resilient network.
- Provision of a more structured road hierarchy to accommodate anticipated future freight growth – with designated roads being designed to be fit for the purpose for which they are used.
- Use of the region’s advantages as a freight distribution centre.
- Linkages to and within other adjacent regions.
• Investment in secondary strategic links that play a role as east-west links.\(^{77}\)
• Provision for an appropriate network of tourism routes.
• Provision for anticipated population and economic growth\(^{78}\) in the Palmerston North and Manawatū area.
• Provision for road safety in the region and better provision for the needs of pedestrians and cyclists.
• Maintenance and on-going improvements to the region’s rural road network, particularly with increased forest harvesting, agricultural intensification and potential increases in tourism traffic.
• Mitigation of the adverse environmental effects arising from construction and use of the regional transport system.

Progress on the above matters implies a need for focused collaboration between all of the region’s local authorities and the New Zealand Transport Agency. It also implies a need for priority to be given to interventions which will enable the growth potential of the region to be fully unlocked.

It is also apparent – as mentioned previously – that the hubbing/redistribution industry has established itself within the region without the benefit of a clear overall ‘optimising’ strategy. Individual investments have been made in property with the expectation that road and rail links will come to them rather than the other way around.

FILTERS SUMMARY

Transport is a key enabler in many aspects of the region’s economy and it will be critical to unlocking the opportunities identified in this study. Enablers are not designed to produce economic growth themselves but to facilitate growth for sectors and industries. There is, however, no doubt that the growth of hubbing services will provide jobs. The key rationale for it is economic efficiency, that is, the quick and cost-effective movement of products and produce (and tourists) in and out of the region.

This requires a clear vision, sound research and courage to support the options that are in the long term best interest of the region. The decisions required have been clearly laid out in this section.

\(^{77}\) These routes also perform as alternative routes in the event of road closure and as roads for tourism/economic development purposes. The lengthy period of closure of the Manawatū Gorge road has made the region’s leaders very conscious of the need to put in place contingency measures to overcome the effect of significant natural events on transport networks.

\(^{78}\) The challenges listed in the Manawatū-Whanganui RLTP also include the need to better cater for the transport demands of smaller households, urbanisation, an ageing population and the need to ensure that land use planning fully reflects the associated demand for an efficient transport network.
HOW?

**Objective:** to create certainty and maximise productivity around transport and distribution, especially hubbing, so that the commercial sector can develop opportunities in a firm and sure context.

**Strategic Intervention:** that local government releases a clear statement on their position and actions on the matters listed as key interventions at the end of this section with a focus on integrating current actions with the opportunities identified in this Study.

TRANSPORT OBJECTIVES AND INTERVENTIONS IDENTIFIED IN DRAFT REGIONAL LAND TRANSPORT PLAN (RLTP)

The draft Manawatū-Whanganui RLTP is well constructed and in our view clearly anticipates the future transport needs of the region, particularly those which will support growth in the region’s economy. The RLTP outlines a number of strategic priorities and provides detailed programmes of work and interventions to deliver on them. The growth related priorities include:

- Enhancing freight efficiency across the region.
- Enhancing the strategic advantage of the freight hubbing role played by the region.
- Improving the connectivity of key strategic routes.
- Establishing a resilient and multi-modal transport system.
- Providing for efficient road maintenance and delivery.

A set of prioritised activities have been identified within the region’s RLTP to deliver on the above priorities. Of particularly importance is the upgrade of the Whirikino Trestle bridge (the long bridge over the Manawatū River near Foxton) to avoid the need for heavy vehicles to bypass this route.

The RLTP also gives emphasis to the importance of maintaining the existing road network of the region at its current level of service. New Zealand Transport Authority’s (NZTA) November 2014 decisions about Funding Assistance Rates (FAR) for each of the region’s districts, and the region as a whole, will make a valued contribution to the achievement of this objective. Several key informants have informed us that these assistance rates appropriately recognise the varying ability of ratepayers to meet their share of these costs and that the new rates have been well received.

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79 This list is a paraphrased summary of the information provided in the Manawatū-Whanganui Regional Long Term Plan with an emphasis toward those aspects which may contribute to regional growth.

80 This priority reflects the fact that the Region serves as the crossroads for much of the north-south and east-west traffic in the lower North Island.

81 Most districts in the region will receive minor to moderate increases in their financial assistance rate.
VIEWS OF KEY INFORMANTS

Most of the growth related transport issues of interest and concern to the key informants interviewed as part of the Study have been captured within the RLTP. Other matters of detail raised by key informants are included in the sub-regional profiles included in Section Eight: Sub-regional Profiles.

OHAKEA

Another opportunity which has received considerable attention over the last few years by Manawatū-Whanganui leaders has been the viability of using the Ohakea Airbase for the wide bodied jet transport of fresh produce directly to international markets. This is viewed by regional leaders as remaining a live opportunity deserving of on-going focus. Securing such a service – even in the longer term – will require a clear vision and on-going focused attention on achievement of a number of clearly defined and incremental steps. The challenges are:

- The need to amass sufficient volume of appropriate product to fill a cargo jet on a regular basis, including back fill.
- Establishing export volumes in key areas such as fresh vegetables that are sufficient to sustain such a service either seasonally or on a year-round basis.
- Establishing a service which is distinctly more competitive than the comparative speed, efficiency and competitiveness of transporting product by road or domestic air from the Palmerston North airport and or by road to Auckland airport for export to the multitude of destinations serviced by this airport.
- The need to establish logistics and storage infrastructure – including cool stores, at Ohakea.
- Accommodating the priority currently accorded to use of Ohakea for defence purposes.
- The need to adopt a ‘market back’ approach82.

Many of the opportunities identified in this Growth Study focus on conveying products, often perishable, to international markets, or accessing remote areas for tourism. These recommendations hinge on logistics and the transport network being efficient and contemporary.

82 A ‘Market back’ approach gives priority to securing markets and then working back down the supply chain to ensure that every link is secured before generating more product locally. Stated more precisely, the message is ‘don’t generate additional export product without a clear market opportunity and / or a globally competitive price’.
FURTHER CAPITALISING ON HUBBING AND DISTRIBUTION CAPACITY

As already observed, there is a need to seriously consider the costs and benefits of consolidating and better integrating the region’s existing freight hubbing capacity. In particular, the question to be addressed is whether better value could be achieved by focusing Palmerston North hubbing capacity at just one site rather than two and by viewing sites at Whanganui and Marton as part of a ‘feeder’ network as well as sites in their own right.

A single hubbing site may generate additional benefits as a result of the:

- Increased freight volumes and therefore improved freight logistics capacity and efficiency (faster flow of product).
- Dedicated and better planned road and rail services and better related District Plan provisions.
- Increasing investment in the region from the National Land Transport Fund.

Any changes of policy obviously need to be evidence-based.

Optimising access to available funding

NZTA have suggested to us that the key to gaining access to additional transport funding is to understand and optimise the transport investment opportunities inherent in the current Government and NZTA transport investment paradigm (see Figure 35, below). Particular attention has been drawn to the following matters:

FIGURE 35: TRANSPORT INVESTMENT FUNDING PARADIGM

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83 Noting that the competitive advantage of preferred hubbing sites arises from reducing the number of ‘touches’ on any item of freight as it moves from source to destination.

84 If the Milson site was to be the preferred site, then there may also be merit in considering the cost benefit of constructing a dedicated rail siding to this site and also the designation of defined roads as being ‘freight use dominant’.

85 This diagram has been used by NZTA as part of its engagement programme with local authorities throughout New Zealand.
Other initiatives

Transport investment framework: recent refinements to the transport investment framework applied by Government and the NZTA give appropriate priority to the role of transport as an enabler of economic growth. The region’s leaders may find value in applying some of the elements of this framework in more detail, than has been the case in the past, to support a case for increased levels of expenditure in the future.

Rail sidings: additional rail sidings and increased use of the rail network may assist with growth in the region. Business and regional leaders, with the support of Government, should develop a united case for consideration by Kiwi Rail.

Road and rail integration: there is further opportunity to maximize production returns by adopting a national transport management system which better integrates road and rail. With the Manawatū’s unique location as the junction for several major rail and road networks, there is opportunity for the region to lead the way to improve national supply chain efficiency and returns from adoption of a strategic approach based on a single ‘freight network’ rather than road and rail as separate entities. The region’s leaders should offer their region as a case study to prove the efficiency gains which could be achieved from higher levels of integration - in association with the region’s locational hubbing advantages.

Hubbing capacity: further work is required to explore what more could be gained by growing and rationalising the region’s hubbing capacity. As a way of resolving this challenge, a dedicated study led by the Regional Council may be required with a focus on the comparative merit of having one, two, three or more hubbing sites in the region and how they may relate to each other. In addition, further guidance is required about whether the growth of hubbing capacity should be market led or alternatively, whether the establishment of additional capacity would be ‘the catalyst’ for that growth. Moreover, given the current sunk investment, the study should identify how future growth may be moulded to optimise the value of current investment. The overall objective would be to seek out ways to maximize the speed and efficiency of the movement of freight to, from and within the region.

Air freight: securing an Ohakea based ‘fresh and urgent’ air freight service to international markets will require a clear vision and on-going focused attention on defining and achieving clearly defined, achievable and incremental steps toward that vision. This would be best achieved by a consortium of local authority leaders working with fresh food producers and the Ministry of Defence to prepare a development and growth plan for fresh food/vegetable distribution with the use of wide body jets to Asia on a daily basis from Ohakea defined as the big goal.

This equally applies to the results of the Joint Transportation Study carried out with NZTA.
Relevant current central government initiatives:

- Funding support through the National Land Transport Programme including:
  - Improving resilience of Manawatū-Gorge (resilience for the SH3, East – West, corridor).
  - Replacement of Whakaruatapu Bridge.
  - Otaki to Levin section of the Wellington Northern Corridor.
  - High Performance Motor Vehicles (HPMV) programmes SH1, SH3, SH56 and SH57.
  - SH2 Otamaroho Curves passing lane extension and realignment.
  - SH57 Shannon North Seal Widening.
- Regional Roading Programme - Whirokino Trestle and Manawatū River Bridges upgrades.
- Consideration is being given to extending the 30-year transport view for the Greater Palmerston North area to include the whole Manawatu-Whanganui region.
- Funding Assistance Rate (FAR) review.

INTERVENTION SUMMARY

Manawatū-Whanganui Regional Land Transport Committee:

- Secure additional funds for investment in regional transport projects by further developing understanding and then more rigorously applying the NZTA/Government transport investment paradigm.
- Work with business leaders to develop and apply a case to Kiwi Rail for additional rail sidings in Marton, Whanganui and at the north east Palmerston North hubbing centre.
- Commission research to optimise and rationalise hubbing capacity.
- Develop a business case to optimise integration between road and rail transport modes.
- Work with food producers to develop a transport strategy for the export of fresh food.
- Work with NZTA, Spearhead and the private sector to continue to refine and achieve an integrated overview of the whole transport system, particularly the road and rail freight routes, and road and tourist routes (including cycle ways).
## TRANSPORT AND DISTRIBUTION

### THE ENABLER AT A GLANCE

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<td><strong>Leverage off:</strong></td>
<td><strong>Overcome:</strong></td>
<td><strong>Act to:</strong></td>
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<td>• Existing hub arrangements.</td>
<td>• Fragmentation.</td>
<td>• Set priorities.</td>
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<td>• Communication of that to private sector operators.</td>
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<td>• Efficiency of distribution.</td>
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ENABLER: 
PRODUCTIVITY OF MĀORI LAND

WHAT? – THE OPPORTUNITY

The Manawatū-Whanganui region has a comparatively large area of Māori land at 190,000 hectares. The major strategic challenge faced by a Māori land owner and the region is to optimise productive use of the land. It is treated as an enabler in this Study because many of the development opportunities canvassed in this Study such as sheep and beef, land use intensification, Mānuka honey and tourism would all benefit Māori land. The challenge is applying them to these land holdings. This challenge could be met with the assistance of:

- Better use of technology and information.
- Larger scale investment in integrated value chains.
- Access to capital to manage debt and expand land holdings.
- Capitalising on the advantages of adopting an integrated or ‘group’ approach across several holdings and owners.

Extent of Māori land

The Manawatū-Whanganui region is New Zealand’s second largest regional area by land mass. Within this area there are prime opportunities for improving land productivity throughout the entire region no matter whom that land is owned by. Many of these opportunities have been highlighted earlier in this report with reference to sheep and beef, land use intensification, Mānuka honey, tourism and even aged care.

The opportunity for Māori through the development and sustainable utilisation of Māori land is very significant. The significance of these opportunities is documented in studies undertaken by Te Puni Kōkiri (TPK\(^{87}\)) and more recently, by Pricewaterhouse Coopers (PwC\(^{88}\)).

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\(^{87}\) Owner Aspirations Regarding the Utilisation of Māori Land’, a report prepared for Te Puni Kōkiri, April 2011.

\(^{88}\) These PwC reports document the scale and cost benefit of interventions to unlock the potential of Māori freehold land. They may be found at https://www.mpi.govt.nz/document-vault/4963
There are approximately 190,000 hectares of Māori owned freehold land in the Manawatū-Whanganui region (see figure 36). Of the 190,000 hectares 127,000 hectares has land use capability falling into classes six (67,000h) and seven (60,000h).

Utilisation of Māori land for productive purposes is limited by various factors which include (but are not limited to) the viability and quality of the land and the lack of knowledge around how best to use that land. We have considered this fact in our recommended opportunities such as Mānuka honey, sheep and beef farming and tourism.

Nick Roskruge (2014) estimates that 20% of Māori land nationally is well managed, 40% is under-performing and 40% is underused. He says that current Māori farmland is returning $750m pa, the short term potential return from Māori land is $6 billion and about 15,000 Māori are employed in the farming sector. From these figures it can be assumed that there is considerable underutilised potential in the Manawatū-Whanganui region.

He also suggested that:

- Many owners of Māori land are not aware of the opportunities provided by that land.
- Land holdings lack governance arrangements to enable quality decisions.
- Absence of good information.
- Need for skill development of land users.

Treaty Settlements

All iwi within the Manawatū – Whanganui region are currently either engaged in Treaty Settlement negotiations with the Crown, have agreed to settlement in principle (AIP) or have received full and final settlement. Two iwi within the region have received full and final settlement, those being Ngati Apa and Ngati Ruanui Kitahi. These settlements provide a substantial capital base for investment which could contribute to industries that support the development of Māori land.

The recent Whanganui River Settlement – Te Awa Tupua, may generate investment decisions with a value of $120 million into the Whanganui River catchment and beyond, to the benefit of the people of that area, including iwi groupings and the wider Whanganui River community. The Whanganui River area is a prime site for the development of tourism with strong cultural overtones.

The lack of urban development and the rural nature of the Manawatū-Whanganui region mean that a portion of likely Treaty settlement investment will be toward the better use of land and water. This is quite different to the situation facing iwi in other regions such as those in Wellington and Auckland where economic growth opportunities primarily lie in ownership of commercial lands and in urban/city based developments. The finalisation of treaty settlements in the region will provide a significant resource base for Māori iwi and hapū to realise land use development opportunities. Bringing all suitable Māori


89 Quoted in the Dominion Post 30 October 2014 and in an interview with Dr Nick Roskruge, Institute of Natural Resources, Massey University.

90 City based economic growth opportunities will also be a focus of iwi treaty settlement investment assessment.
freehold land into production, improving the productivity levels of other land and changing the land use on defined areas to other more productive uses, will significantly increase the contribution of Māori freehold land to the Manawatū-Whanganui economy.

FIGURE 36 LOCATION OF MĀORI OWNED FREEHOILD LAND
Māori Values

Māori tradition highlights that land or whenua has a direct association with them because of their relationship to papatuanuku (earth mother). This relationship provides a base for Māori cultural values and principles and includes emphasis toward ‘ownership in perpetuity’ and an associated willingness to invest with long term sustainability in mind.

As an example of the above philosophy, the people of the Whanganui River have a prominent whakatauki or proverb which states ‘ko ahau ko te awa, ko te awa ko ahau’ meaning, ‘I am the river, the river is me’. This expression emphasises a Māori world view which brings together the genealogical relationships between Māori as people and the environment around them.

More particularly, this relationship is informed by the behavioural actions of iwi and hapū, which are built upon values, traditions and skills that relate directly to their locality. These relationships link directly to core Māori values and principles such as kaitiakitanga (stewardship), manaakitanga (care and consideration of) and utu (reciprocity).

The individuals talked to as part of the process of compiling information for this Study have emphasised that consideration of these key cultural values, among other things, is critical as they will more than likely play a considerable role in making decisions about how tools and methods for prosperity are used to increase the productivity of Māori land.

In the Manawatū-Whanganui region, PwC suggest 63,000 hectares of Māori freehold land used for sheep and beef and 10,000 hectares of dairy land could also increase its productivity. In addition, 11,915 hectares of forest and unproductive land could be converted to sheep and beef farming and 4,226 hectares could be converted from other uses to dairy.

The value-add of changing the land use applied to Māori freehold land in the Manawatū-Whanganui region would in this way be $42 million (stabilised year). A total of 272 new jobs could be created. A net increase of 5,440 forest land could generate $16 million extra per annum (stabilised year) and 12 additional jobs.

WHY?

Rationale

- There is a large amount of Māori freehold land in the region.
- Development of Māori freehold land will not only bring economic value to the owners, but there would be likely flow-ons into the wider Māori community such as increased employment.
- Work is being undertaken nationally which could be capitalised upon regionally to resolve some of the legal and ownership impediments to overcome the difficulties of development.
- There is interest and commitment of iwi to its development.
Key informants and our own research suggest that the constraints affecting use of Māori land relate to:

- Low levels of use of technology and information.
- Lack of scale of investment in integrated value chains.
- Constrained access to capital to manage debt and expand land holdings.
- Difficulty of accessing new capital and equity partners.
- Difficulty of accessing skilled external advice.
- Failure to make the best use of land use capability at all locations.
- Absence of planning for succession and failure to lock in preferred arrangements early enough in the life of current managers/owners to prevent a loss of momentum.
- Inadequate fertiliser application.
- Poor genetic quality of the stock.
- Failure to measure performance against clear benchmarks established by farmers on similar country and failure to adopt the performance of the best.
- Poor access to transport networks.
- Poor access to high speed broadband as a means of staying abreast of good advice and information.
- Lack of a skilled and motivated workforce.
- Need for more training and access to more workers with a stronger knowledge of the particular stock, feed and land issues faced in any one area.
- Lack of awareness of all owners with an interest in the development of Māori land of the opportunities provided by that Māori land.
- Enabling governance structures which do not assist quality decision making.
- Absence of good information sharing.
- Challenge of getting the right relationship between owners and the land including the difficulty of finding the right balance between sustainability concerns and the production aspirations of other owners.
- Finding and or developing the right skills amongst iwi at all levels of input – “the good people are spread too thinly on the ground”.

While this list of limitations may appear daunting our assessment is that most items amount to straightforward developmental challenges that face anyone wanting to develop land, though more challenging for much Māori land because of the lack of historical development. Core amongst all of the above challenges is the need to build Māori

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91 When compared against the challenges faced by other land owners – although many of these challenges also apply to other hill country farmers.
capability at operational, management and governance levels, again, similar to any agricultural land.

FILTERS SUMMARY

Filtering of enablers is a different matter to filtering opportunities. We have assessed the best approach to development of Māori land is to create real land use options in the hope that will drive the need for solutions to other issues such as ownership and legal problems. We applied our filters in the following way:

**Impact:** The extent of Māori land and Treaty Settlements in the region has the potential to make a significant contribution to regional development.

**Trend:** Māori land is a latent natural resource. It has the potential to add growth to sector opportunities. Productivity from Māori land has the potential to contribute to the export effort particularly where the products are either agriculture or tourism-related.

**Job intensity:** development of the use of Māori land cannot be separated from the development of Māori skills and capabilities. There is sufficient potential in Māori land to create a substantial number of jobs depending on the land use chosen. This will only succeed if it is backed with training opportunities.

HOW?

**Objective:** to accelerate the conversion of under-utilised Māori land to productive use.

**Strategic Intervention:** for iwi to form an action or enabling team, perhaps based around governance arrangements that may arise out of this Study. This team would establish machinery for helping Māori land owners resolve land use obstacles using the opportunities identified in this Study as motivation.

How to advance the interests of Māori and Māori land has been studied in depth and some of the ideas put forward – together with current models of action, are evaluated below.

_Pricewaterhouse Coopers_

PwC recommended that MPI build on current successful initiatives to roll out an intervention process to facilitate increased productivity on Māori land. More particularly, PwC and other key informants suggest adoption of the following interventions:

- Promote awareness of the case study benefits of the approach to farming Māori land adopted by Ati Hau Whanganui Incorporation (see below).
- Target Māori land managers with programmes designed to increase production on all hill country.
- Review and ramp up programmes to grow the base of labour skills amongst young iwi Māori.
- Define and circulate a case study model for successful Mānuka honey production on Māori land.
6. OPPORTUNITIES AND ENABLERS

- Explore the cost and benefit of developing access to land locked land in Rangitikei.
- Implement the findings of the Te Ture Whenua Māori Act Review Panel.

We would endorse these recommendations. We believe there are significant opportunities in sheep and beef, land use intensification, tourism and other sectors. Interventions in these sectors following on from this Study need to have clear actions related to the development of Māori freehold land. The question is - what are the best types of structures to enable this development and connection to take place?

Ati Hau Whanganui Incorporation – a successful venture

The Ati Hau Whanganui Incorporation occupies 101,000 hectares of Māori freehold land in the Manawatū-Whanganui region. The Corporation manages seven sheep and beef properties and one dairy property plus forestry interests. These are managed as part of a single integrated unit.

The Corporation was established in 2007. Its farming interests cover an area running from Ohakune to Whanganui River in a westerly direction. They include seven sheep and one dairy farm as integrated unit.

The major strategic challenge faced by a Māori land owner is to optimise productive use of the land and to take full advantage of ‘uplift production opportunities’ including honey and tourism. This challenge could be met with the assistance of:

- Better use of technology and information, and access to high speed rural internet.
- Larger scale of investment in integrated value chains.
- Access to capital to manage debt and expand land holding.
- Getting accountability in place for each unit of the farmed area while still capitalising on the advantages of adopting an integrated or ‘group’ approach across several holdings.

The challenges faced by hill country farmers generally are shared by Māori freehold land owners everywhere – with the same potential mechanisms for unlocking them.

The Corporation’s model could be replicated elsewhere.

The Incorporation has recently purchased Flock House station from AgResearch in partnership with fellow local farmers Hew and Roger Dalrymple. “This brings a unique combination of skills and capital to the farm and will assist to optimise opportunities.”

The Corporation already has a fully integrated supply chain and are looking to expand it by establishing connections with iwi from the east coast to optimise store stock and finishing stock opportunities and to further improve the general genetic quality of their stock.

The short term focus of additional production effort will be toward additional fencing and the strategic use of fertiliser. The Incorporation is currently valuing Mānuka honey production at $300k. They want to participate in adding value to this product and supply chain by, for example, allowing the product to mature in barrels.

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92 The views which follow have been shared with us by the Ati Hau CEO Andrew Beijman, Pers. comm.
93 See the detail provided in the earlier sheep and beef section of this report.
One key to development is to not be averse to incurring debt. A further critical element of success is to secure good governors. In the Ati Hau case the Board is and should be a force to be reckoned with. They need (and have) a wide network of valuable contacts.

Te Ranga Tupua94 – some thoughts on Māori land development

Representatives of Te Ranga Tupua when spoken to said:

“Education is an economic conversation. Investment in education will provide the backbone of the country’s future for iwi. Providing more education is fundamental to unlocking all development opportunities. Skilled labour is in short supply. Iwi need to partner with those with the skills to make good decisions and need to develop skills for youth to enable them to be employed on farms.”

Better GIS mapping would provide information about the location of Māori freehold land. This will help to get those with an interest aligned to take advantage of development opportunities. All land based decisions must be made with sustainability in mind. These decisions must balance land and water use and environment considerations95.

The allocation of a percent of available water to Iwi may be one way of providing additional land based opportunity.

The Whanganui Treaty settlement will provide a significant capital injection to the district. Being risk adverse means being at risk of doing nothing. Iwi need to have the courage to make the necessary investment decisions.

Research will help. Te Ranga Tupua has a fledging research unit in Whanganui. This could be used to grow understanding of Māori development opportunities.

An inland rail port or siding at Marton will provide development opportunity. Ati Hau is considering investment opportunities in this area.

Te Puni Kōkiri – further reflections

Views reflected in Te Puni Kōkiri (TPK) 2011 report on ‘Owner aspirations regarding the utilisation of Māori land’ said that land use should be within the context of:

- Values associated with land as a taonga tuku such as kaitiakitanga and manaakitanga.
- Cultural connection.
- Hunting and fishing opportunities.
- Direct use rather than through lease.
- Maximal financial returns, employment and building a financial base for future generations.

94 Te Ranga Tupua is a forum made up of representatives of iwi located in the northern part of the region.
95 These views were strongly reinforced by iwi from the south of the Manawatū-Whanganui region as well.
• Diversification into honey and tourism etc.

The TPK report also said that the barriers to achievement of full utilisation of Māori land include:

• Absence of commonality amongst ownership groups and management entities.

• Low level of information about the land, ownership and management.

• Incompatibility of regulation including that associated with Te Ture Whenua Māori Act 1993 such as: diverse expectations of owner consensus; difficulties of working in a Trust structure; the extent to which the trust structure relies on the (in)ability to locate and engage with owners.

It noted that changes should be made to regulatory settings to:

• Better enable fulfilment of owner aspirations.

• Better match the size and potential of land blocks to governance and management structures.

• Remove barriers to the actions of those management structures and groups who are already achieving owner aspirations.

• Reduce the risks and costs e.g. rates for those owners who are unable to use their land.

• Prepare a clear menu of options for land management to match ownership and land potential.

*Review Panel of Te Ture Whenua Māori Act*

Views put forward in the Report of Te Ture Whenua Māori Act 1993 Review Panel 2014 also throw light on the interventions required to unlock the potential of Māori Freehold land. Their report explores four areas:

• Enabling Māori land owners to affiliate and engage with their land.

• Ensuring there are effective structures to support effective decision making.

• Making sure resources are available to make and implement decisions.

• Enabling better use of Māori land.

The Panel put forward five propositions as means to make progress on resolving the above challenges:

• Enable the utilisation of Māori land to be determined by a majority of engaged owners, rather than by all land owners by such means as: a centralised database; enabling those who choose to be actively involved to make the necessary decisions; enabling sale or lease decisions to be made on the basis of a 75% vote from all registered owners with other (land management) decisions being on the basis of 50% of engaged owners.

• Enable all Māori land to be capable of utilisation through effective administration including providing clear mechanisms for external managers to be appointed to administer underutilised Māori land blocks where there is no engagement by the owners.

• Enable Māori land to have effective, fit for purpose governance including making reforms to laws to prescribe the duties and obligations of Māori land governance.
entities (and the alignment of these to the general law applying to similar entities) and clarify the jurisdiction of the Māori Land Court for related breaches

- Enable creation of an institutional framework to support owners of Māori land to make decisions and resolve disputes including ensuring the Māori Land Court remains an accessible judicial forum for resolving disputes that cannot be resolved by mediation
- Avoid excessive fragmentation of Māori land by creating a transparent registration process, developing legislative provisions which facilitate succession with minimal compliance requirements and reducing barriers caused by excessive fragmentation

*Our view about the next steps*

Our view is that decisions and actions will begin to flow when there are immediate and realistic opportunities for use of Māori land that the owners are able to consider. These would include the uses already mentioned as part of this Study – increases in beef and sheep productivity, land use intensification, Mānuka honey, tourism, and others.

We have noted in each of these sections of this Study that consideration should be given to utilisation of Māori land. It is our hope that the parties involved will take these recommendations and act on them.

We believe that if there are real development opportunities being presented to Māori owners that this will provide motivation for them to solve some of the issues raised in this section of the report and which impede progress. Conversations over opportunities are the best conversations to be having because there is the potential of an outcome.

This means that as part of the work-up of each of those opportunities specific consideration needs to be given to the potential use of Māori land or investment in the opportunities from Settlement money giving Māori a stake in the development of their region.

There is a strong case for an iwi-led initiative as part of the programme flowing out of this Study to provide support and advice to landowners who are contemplating opportunities but who do not know how to deal with the ownership and legal issues facing them. Such a service could draw on national remedies outlined in the Act and central governmental support. Then, perhaps, the combined action of their support and generation of opportunities will achieve the breakthrough that we are all seeking.

Such an iwi-led group should have a direct involvement in the institutions and arrangements set up to carry the recommendations of the Study forward. This would serve to keep the needs of Māori land in front of everyone involved and provide opportunities for formal linkage. That way, case studies could be advanced and this may create momentum across the whole area of Māori land in the region.
### Relevant current central government initiatives:

- Māori Agribusiness: Pathway to Increased Productivity programme.
- Sustainable Farming Fund programmes including: developing farm systems across multiple properties that deliver sheep and cattle to proprietary specifications for export; developing a monitoring and benchmarking framework for the Māori pastoral sector; integrated suite of farm management and benchmarking tools to improve productivity and profitability for Māori agribusiness.
- Te Pūnaha Hiriwaka: Māori Innovation Fund; Te Kakenga Ngātahi i te Ara Poutama - piloting Hono Framework, new generation farm systems and social return on investment models with Māori landowners in the Ohakea Plains. Pilot to collectively determine best sustainable use of landholdings that balance Rangitikei River with long-term economic, social and cultural goals.
- Te Pūnaha Hihiko Vision Mātauranga Capability Fund.
- Treaty Settlements currently being progressed.
- Māori ICT Development Fund - support enhanced use of ICT as an input into Māori business.
- Rural broadband initiative and further roll-out of ultra-fast broadband – creating a platform for adoption of technology in the primary industries.

### Interventions Summary

TPK/MBIE/MPI and iwi leaders from the region:

- Support an iwi led initiative to provide advice to Māori landowners which helps resolve decisions about development options and ownership and legal challenges.
- Provide for the direct involvement of iwi in the arrangements to be established to implement the findings of this Study.
- Give particular consideration to what more can be done to build the farm based skills of Māori.
- Ensure consideration surrounding the use of Māori land is part of the thinking of every team working on relevant Opportunities following the completion of this Study.
- Take account of funds earmarked in the 2015 Budget relevant to the development of Māori land.
PRODUCTIVITY OF MAORI LAND

THE ENABLER AT A GLANCE

**What? – the opportunity**

**Combined action:**
- To increase productivity and wealth to iwi.
- To present land development opportunities to land owners and iwi.
- To provide a compelling reason for action.

**Leverage off:**
- Large amount of land available.
- Partner industries, e.g. tourism and honey.
- The momentum created by this Study.
- Changes to the Act and Government support.
- Improved rural internet access.

**Overcome:**
- Sense of difficulty involved in any change.
- Lack of motivation to seek change on such a complicated issue.
- Governance weaknesses.
- Fear of debt.
- Lack of ambition.

**Why not? - obstacles**

**Act to:**
- Provide information and support to owners wanting to move farming enterprise forward.
- Form some sort of iwi agency to do this.
- Liaise closely with other “opportunity” teams.

**Why? – will it succeed**

**How? – interventions, actions and arrangements**
ENABLER: GROWING BUSINESSES

WHAT? – THE OPPORTUNITY

Building the human resource whether it be in schools, in workplaces or in the governance of companies or iwi/incorporations, is vital to the success of the opportunities identified in this Study. However, it is business that will carry opportunities forward as they have the motivation and the structures to do so. The business is a core unit of economic activity and in Manawatū-Whanganui their numbers are thinning.

Strengthening the small business infrastructure in potentially productive industries requires the development of business capability. There are strong expressions of need and willingness to act, especially in particular sub-regions such as Whanganui, Horowhenua, Ruapehu and Tararua.

Any number of interventions is possible. We believe the focus should be on business leadership – governance and management to enhance performance. This is the crucial intervention required.

Loss of small business infrastructure

The Manawatū-Whanganui region, typical of New Zealand as a whole, is populated by a large number of small businesses across all sectors, and particularly in the manufacturing and primary product processing industries – the industries that are losing jobs in the region. These businesses are, by and large, family businesses, often inter-generational (with limited or no independent governance), or are low level partnerships.

The potential benefits to the region are that these enterprises usually or currently have the potential to add value to commodities which, when considering the larger picture of the New Zealand and regional economy, is an important element of the infrastructure for creating a more strongly value-added economy.

Using the Statistics NZ dataset, the position of small businesses in the region can be assessed. The focus here is on manufacturing and processing (agricultural and non-agricultural). In 2004 – ten years ago – these types of businesses in the region represented 5.3% of these businesses nationally. At the same time they represented 5.4% of employment. However, in 2014 a quite different picture has emerged. The percentage of New Zealand business has fallen to 4.8% and employment had also fallen to a similar number.

This might not seem a lot, but measured against the whole of New Zealand it is very significant. In that period the country had grown significantly in most respects but small business activity in the region appears to have fallen.

This pattern of reduction of activity suggests that the small business backbone of the region comprising productive industries is gradually contracting. This aligns with the information we received directly from a great many industry informants (see sub-regional qualitative data in the Sub-Regional Profiles section in this Study).
These informants talked of two phenomena: the lack of replacements as businesses have moved offshore (particularly manufacturing businesses), and the lack of growth in existing businesses. Some portrayed this as portions of inability, unwillingness and lack of courage of many business people to take their business ahead, expand and chase new opportunities, especially in the export market. It certainly reflects the inability or unwillingness to modernise their offering any more than they had to in the light of global pressures.

By way of comparison, a region like Southland, which has at times struggled against the tyranny of distance and climate, has achieved growth and has been able to grow and streamline many of its local businesses. This is a state of mind rather than a state of the economy.

As further evidence that it is a mind-set issue, we were told by informants from Horowhenua where there are textile enterprises of various types which have carved out an on-going living after the massive shift of such manufacturing off-shore to Asia. Some of these companies have addressed the problem and found a niche which involves production of short runs requiring quick retooling and an adaptable and multi-skilled workforce. Asian producers are not interested in short runs because of the costs involved in constant retooling. There is evidence of companies in the agriculture sector achieving similar advancement through clever thinking and committed effort.

**Lack of business management skills**

This situation is not unlike what is prevalent in the rural sector, and dealt with separately in this Study, where some farmers are performing at levels below what they may be capable of and certainly below the capability of the land they farm, even given the nutrient limits regime they are obliged to operate within. To use the phrase coined for this – there is potential to move the bell curve to a level of better performance.

Informants noted that most small business operators were immersed in their businesses, often very good businesses, on a daily basis without a wider view. Collaborative alignments are often not sought. An example was given of a galvaniser and a trailer manufacturer operating as neighbours but not taking advantage of their common interests and networks to build scale and reach.

Examples were also given of a few businesses that successfully sought outside advice and others who recruited a board of directors to provide advice and an objective view of the business. Networking and using expert advice on business development is not a luxury, it is essential if growth is to be achieved. But instead, a ‘do-it-yourself’ mentality appears common together with resistance to external perspectives.

Those same informants made the point that there is no shortage of innovative or adaptive thinking in terms of the ‘doing’ of the business, but there is a lack of vision and courage when it comes to expanding the business and grasping opportunities.

This gave us great concern because there is little value in trying to leverage opportunities as we are recommending if there is not the business environment willing to take them up and run with them.

**Insularity**

Distance is a tyranny with high air travel cost and time away from small business to larger cities for superior learning and networking opportunities acting as significant regional
hurdles. Numerous company owners do not have the luxury or opportunity of working on the strategic direction of the business and by default are constrained to working in it.

Many of these businesses are innovative, or have been at various stages in their lives, but many could also be characterised as insular and slow to embrace change.

The uptake of business tools and processes such as ICT, HR management skills, methods to protect unique IP and collaboration with partner industries are all areas of under-performance. The philosophy and practice of lean businesses driving value for money was not in evidence when we asked informants. Many businesses, they told us, are not well “wired”. For example, they do not have websites which are today’s shop window, not just for product but for talent recruitment. Such “wiring” also needs to include high speed broadband access (and its active use).

Their insular stance means that they are not connected into networks, either in their district or more broadly out into their markets. The effect is that their growth is capped. Many are underperforming in terms of what they could achieve due to a lack of business management skills, inability to attract and manage capital and fear of loss of control as the enterprise becomes larger.

What is the opportunity? More than an opportunity, there is a huge need for strategic intervention with local businesses to build their management and governance capability without which they cannot take a full role in realising growth opportunities.

Broadband access and ICT utilisation by businesses

We have not treated broadband and ICT utilisation as a separate enabler in this report. It is relevant to just about every opportunity, and sits as one critical element of the “Growing Businesses” enabler.

Businesses increasing need to stay digitally connected to their value chain and wider business environment to stay competitive, innovate and grow market access. This requires access to high speed broadband but it often requires supporting businesses to better leverage ICT in their operations. This appears particularly important in the region where, as noted above, many businesses are very insular and lack even basic ICT tools such as websites. Broadband and digital capability is also an important enabler for many rural regional businesses in overcoming the impact of geographic isolation.

The Government has two major initiatives to deliver more reliable and faster internet to New Zealand homes, schools and businesses; the Ultra-Fast Broadband (UFB) Initiative and the Rural Broadband Initiative (RBI). Both are important in the region. The UFB Initiative aims to connect 75% of New Zealanders with fibre to their premises by the end of 2019, with peak speeds of at least 100Mbps. As of June 2014, 50% of the UFB build had been completed in Manawatū-Whanganui region. UFB connections are available in parts of Levin, Palmerston North, Fielding and Whanganui. The UFB build will be completed in Fielding and Levin in 2018; Palmerston North in 2019 and Whanganui in 2015. Infrastructure installation is moving at pace and this comes at a good time for the region.

6.0% of Manawatū-Whanganui users with access to fibre have taken up a UFB service which suggests more needs to be done to encourage broadband uptake and digital capability and to support businesses to utilise ICT across the region. For example the completion of fibre deployment in the urban areas of Whanganui has been supported by a number of initiatives by the District Council which are designed to extract maximum benefit from the deployment. These have ranged from programmes to assist businesses to
develop an on-line presence, enhancing on-line local government services and establishing a Digital Leaders Forum to search for opportunities to gain advantage from the broadband infrastructure. These programmes could be expanded to other parts of the region.

Our concern about growing businesses is not solely focused on urban enterprises. Connecting rural homes and businesses is equally important. Through the RBI it is expected that 86% of rural homes and businesses will be connected with rural broadband at peak speeds of at least 5Mbps by 2016. As of June 2014, almost 14,500 households and premises have access to new wireless broadband services and over 5,000 have access to new or improved fixed line broadband services. Again support programmes to help rural businesses utilise ICT will be important.

Expansion of the Government’s existing broadband initiatives and the new Mobile Black Spot Fund will continue to provide for the enabling infrastructure to support business growth.

WHY?

Summary of the rationale
- Small and medium sized businesses are the heart of the regional (and national) economy.
- The number of such businesses is falling in the region.
- It is from these businesses that growth will come and that is not evident.
- The key to intervention is the owner or the manager and the governors or shareholders.

WHY NOT?

The reasons why not are the very reasons that have impeded progress. These include no time, too many pressures, lack of staff, too old, too tired... there is any number of presenting reasons. In our view these are excuses. Too many business managers and owners lack a vision of what they could achieve. There is also a lack of belief.

Historically training interventions into these types of situations have a low record of success because those who attend courses or seminars are generally the ones who are doing better anyway. It requires a programme of getting beside people. Online support encouraging innovation, dispersal and market engagement needs to be considered.

Intervention into business is also a complex activity. Many of the problems they identify are real and require a solution. Any effective form of intervention is difficult to undertake and even more difficult to measure for effectiveness.

FILTERS SUMMARY

This is strictly an enabler activity. It is about developing skill sets and creating enabling structures for business that allows them to be more ambitious than is currently the case. This enabler does not lend itself to our filtering mechanism.
The principal filter is that such an enabler should be tightly targeted. This should not be directed to all staff, just owners and managers. It relies on those owners and managers, if successful, carrying their learning and attitude changes through their business.

**HOW?**

**Objective:** to stem the loss of business and have them more growth-ready and growth-focused

**Strategic Intervention:** this is a question of starting somewhere. In Southland Venture Southland mounted a Lean Management programme. A systematic intervention targeting owners and managers has the best chance of success.

Some local authorities have been trying to identify actions as they too have experienced a strong desire to investigate and remedy the problem identified by commentators and many business owners.

The section of this report on fresh vegetables noted the hesitation of suppliers in Horowhenua and Ruapehu to push their activity into export. If a viable fresh vegetable market is to be established it will require commitment and courage, together with businesses’ savvy and international networks. It will require collaboration using the power of all enterprises involved in the industry.

Others have done it. Coastal Spring Lamb in Whanganui is an example where successful domestic market initiatives are underway utilising premium positioning, and management has a strong clear vision. The same issues and opportunities are available to small scale manufacturers.

We have looked in other regions for examples. We were very impressed with the Lean Management programme\(^6\) operated by Venture Southland. This has recruited companies into the programme over a two year period and some have achieved staggering productivity gains of up to 100%. The lowest productivity gain was 20%. This demonstrates that progress is possible.

The following approaches have been considered:

- Bringing a team of executive graduates (perhaps from Massey University) into the area to run seminars with businesses about modern business practice and opportunities.
- Encouraging local networking through new or existing institutions such as the Chambers of Commerce. Employment by councils, the chamber or the Institute of Directors of the right type of highly motivated facilitator to encourage this type of activity.
- Linkages to larger organisations operating nationally such as Turners and Growers.
- Building a voluntary cadre of advisors or engagement of board governors who could assist businesses for periods when they are developing and initiating strategy are ideas

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\(^6\) This programme helps businesses reduce costs and streamline processes to achieve better profitability.
that have all been considered. This approach has been used successfully on several occasions.

- Development of online resources specific to the region.
- Exploring options whereby NZTE and local and central organisations could provide concentrated effort in the region to support export business growth. The recent Agribusiness Investment Showcase held recently at the Central North Island Fieldays is one example how business support might be accelerated in the region through short concentrated efforts.
- Supporting more companies in the region to develop products and services that have real export potential: possibly by taking advantage of NZTE’s coalitions work programme.
- Developing case studies and leveraging off them for the strong set of businesses established in Whanganui, Levin and elsewhere as an example to others.
- Packaging information about competitive real estate values, schools, warehouses, skills availability, high speed optic fibre cable etc. and actively marketing the advantages of say Levin or Whanganui or Marton to targeted South Auckland and other businesses whose leases may be about to expire makes sense and will be best advanced via a very well-funded and collaborative approach. This is potentially an EDA initiative.
- Convening more Institute of Director events in the wider region (currently these are run at a very low annual frequency) for the purposes of building business governance skills in the region and potentially recruiting new external Board members capable of having a positive influence on existing businesses.

These types of strategies are at a very detailed and operational level, but they are very important enablers for the sector and industry initiatives outlined earlier in this report. In small communities modest increases in business activity can have a huge effect on employment rates and community confidence.

We believe there needs to be a programme set up in a sub-region like Horowhenua to refine the model. It could draw on many or all of the interventions in the list above. It could employ the “surge” technique which is a very good one for effecting behaviour change. If successful it could be rolled out further through the region. Such an approach would need a multi-agency, multi-channel commitment.

Relevant current central government initiatives:

- Business R&D and business development support through NZTE and Callaghan Innovation funding and programmes including export programmes such as ‘Better by Capital’.
- NZTE Regional Investment Attraction programme.
- Rural broadband initiative, establishment of the Mobile Black Spot Fund and further roll-out of ultra-fast broadband – creating a platform for adoption of technology by business.

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97 A medium-sized business in Foxton established a Board of Directors and achieved considerable development as a result.
6. OPPORTUNITIES AND ENABLERS

- Better Public Service result areas such as ‘one-stop online shop’ and ‘digital transactions’.
- Inland Revenue Business Transformation programme aimed at giving small and medium-sized businesses simpler and faster ways to deal with tax.

INTerventions Summary

NZTE/BUSINESS AND LOCAL AUTHORITY LEADERS:

- Further explore and apply the initiatives listed under the “How” section of this section of the Study to targeted small businesses with an initial focus on those located in Whanganui and Levin.
- Assess the possibility of accelerating broadband roll-out across the region, but especially in Whanganui and Levin to support a focused programme of growing business strength and capability.
- Invest in up skilling and digital technology for business. This could involve running similar programmes to the Whanganui District Council digital capability programmes, in other parts of the region.
GROWING BUSINESSES

THE ENABLER AT A GLANCE

**What? — the opportunity**

Instill a growth focus in small enterprises:
- Enable businesses to take up opportunities.
- Focus on business owner and management skills.
- Build greater resilience.
- Sharper market focus.
- Wider networks.

**Why? — will it succeed**

Leverage off:
- Desire of local leaders to build capability.
- Increasing ambition for success.
- Existing educational and informational sources.
- Enhanced digital capability.

**Why not? — obstacles**

Overcome:
- In-the-business focus.
- Fear of risk-taking.
- Lack of networks and connections.

**How? — interventions, actions and arrangements**

Act to:
- Get beside businesses with potential.
- Support owners and managers with skills and advice.
- Enable businesses to take opportunities.
SECTION SEVEN: ACTIONS AND INSTITUTIONAL ARRANGEMENTS
7. ACTIONS AND INSTITUTIONAL ARRANGEMENTS

The essence of the approach we recommend to the follow-up to this Study is contained in two words:

- **Acceleration** - the premise that the opportunities described in this Study exist but they are unlikely to be realised in any timely way without intervention. The intervention must be designed to accelerate the realisation process. This report is the starting point.

- **Momentum** – the fact that these opportunities are the product of intense study and represent the best chance for harnessing focused community action on them.

The structure we propose as the means for achieving acceleration and momentum assumes public funding from ratepayers and taxpayers for a facilitating entity which is proposed in this section of the Study. We are aware that discussion is already taking place on how opportunities could be carried forward in Northland and in the Bay of Plenty. This section is a contribution to that discussion.

**TWO PHASES**

We envisage a two phased approach: a pre-commercial and a commercial phase. These are described as follows:

i. **Pre-commercial** – this is a developmental phase with the focus on pre-feasibility work. This work could take various forms depending on the requirement. In most cases this is likely to involve public and private involvement. This phase would encourage participation of stakeholders, draw on their ideas and build momentum around the opportunity. It would seek to test the viability of the opportunity, prepare a detailed intervention and support strategy and identify risks. The pre-commercial phase would operate largely on public funding.

ii. **Commercial** – this is the point at which genuine investors – public or private – take over work on the opportunity as part of the realisation process. At this stage the responsibility would fall on individuals or consortia to bring together a business case that they believe is investable. In doing this they will have access to the various enabling activities supplied by such public agencies as NZTE, MPI and MBIE. It is expected that a pathway to realisation will be created to maximise the chances of success.

The commercial phase would likely operate with a larger portion of private funding.

The implementation focus within this Study is the pre-commercial phase. It is expected that once the commercial phase is entered commercial interests will take over the initiative. It is possible that commercial interests may only take over part of the opportunity and further pre-commercial activity may be required in other areas.
FEATURES

The following characteristics should permeate the thinking about implementation:

- **Flexible response** – some opportunities relate to mature industries such as the dairy industry with existing organisational, industry and enterprise structures. Others, such as Mānuka honey, are early stage.

- **Interventions** – a carefully selected set of intervention actions have been identified within this Study for each opportunity. This is intended as the starting point for implementation (the pre-commercial activity). Some implementation points are more tangible and specific than others.

- **Place-based** – this is the current international thinking about economic development in western countries where regions have suffered from global impacts as is evident in Manawatū-Whanganui. It is part of our justification for engaging Districts in the realisation of opportunities.

- **Fast failures** – it is expected that under further scrutiny some of the opportunities will not stack up on criteria, for example, reasonable cost of realisation and lack of leaders (champions). Implementation resources will be limited so that if opportunities are not proving viable or there is lack of support the investigation should be halted at an early stage and the effort should be focused on other, more promising alternatives.

- **Nimbleness** – systems and structures need to be designed for maximum nimbleness in the implementation effort. This will encourage quick changes of direction if the situation warrants it.

- **Shared leadership** – it is hoped that parties with an interest in an opportunity will coalesce around it and assist with the process towards realisation. If such support is not forthcoming at an early stage then this alone may label an opportunity a fast failure.

- **Halo effect** – it is intended that the single-minded focus on specific opportunities will have a halo effect and that stakeholders will be drawn into that focus and contribute to it.

- **Project-focus** – the intention is to establish structures that will enable success, overcome challenges and bring together resources. It is not to create structures that collapse under their own weight. Light and active would be the hallmark and where the purpose has been served they would be dismantled.

PROGRAMME STRUCTURE

The structure for the implementation programme could be made up of a number of components. Read the diagram (Figure 37) from left to right. First are the sponsors – the chiefs (local government), Minister(s) and Iwi. They could self-appoint to form a Sponsors’ Group which is the core governance group of the Programme. The Sponsors’ Group could appoint a director (orange box) who would manage appointed and seconded staff who could provide assistance to enabling teams. A possible structure for the teams and the Sponsors’ Group is outlined over the page.

Enabling teams – one for each opportunity – could be a blend of stakeholders and district council representatives or nominees. Stakeholders are from industry or sector groups.
FIGURE 37: PROGRAMME STRUCTURE

ENABLING TEAMS

We propose stakeholder teams as the foundation of the implementation programme. They could be made up of parties with “skin in the game”. Each could be based around a single opportunity to ensure they are focused and single-minded. These facilitated teams could have a specific set of tasks to do to complete the feasibility and transfer of the opportunity into the commercial phase (see section below).

Teams could be comprised of those with a direct interest in the opportunity including those who have the potential to gain from the opportunity. It is difficult to envisage conflicts of interest, but rather it is hoped that enabling interests will be to the fore.

The teams could be facilitated by external people unless the teams felt they had the internal resources to do it themselves. The facilitators could be employed by the Director and backed by a support structure.

The teams’ programmes would differ enormously. For example, Mānuka honey is a relatively new industry but there is extensive work going on via a PGP project and other industry initiatives. The requirement would be to tap into this activity and become an extension of it. Conversely, the distribution and transport hub is almost totally a commercial idea and, in part, is already a reality. The team may focus itself on indicative future directions for distribution development so that both industry and local government can be pursuing a commonly agreed goal.

To summarise, the team structure could be as follows:

**Status:** Established under the auspices of Horizons Regional Council (on behalf of the Chiefs)

**Association:** Each team could be associated with a particular opportunity and one (or perhaps two) districts who wish to pursue that opportunity. Those districts would work in close association with the team.
ToR: Members could be appointed by the district mayor(s) in association with the Sponsors’ Group.

Estimated 10 meetings over 10 months.

Normal meeting procedure could apply.

Members should commit for the duration – no alternates.

Participants, not representatives.

Support: Facilitator could be supplied by the programme (probably externally sourced).

Supported by writer/analyst (possibly from the local EDA).

Reporting: To the programme director.

The task of the enabling teams could be to prepare:

1. A “Growth Acceleration Programme” report (GAP Report) for the particular opportunity on which they are working. This would be an in-depth assessment of the commercial potential of the opportunity and a ‘map’ of the potential and actual players in it. It could be known as the GAP report and would demonstrate how to bridge the gap between idea and action.

2. A “Growth Realisation Programme” presentation (GRIP presentation) for each opportunity. This could comprise a facilitated programme of communication to all interested parties outlining the nature of the opportunity, its potential, risks, etc. The purpose of this would be to recruit participants for a commercial entity(s) that could pick up the opportunity and take it forward. This could be known as the GRIP Report and would focus on getting stakeholders/investors to grip up onto an opportunity. It is more of a “sales’ report for investors and would essentially package the GAP report as a presentation.

Support for the teams would be crucial to their success. Inevitably some weight could fall on Horizons to use their resource of scientists, facilitators, planners and other specialist staff to assist teams with information and advice. It would also be important that teams can draw on the resources of Government departments. It could be the task of the Sponsors’ Group to ensure that these types of resources are as available as possible.

SPONSORS’ GROUP

In this model the Sponsors’ Group would be the governance group representative of the funders of the programme. It could be comprised of representatives from the region (nominated by the chiefs), from Central Government (nominated by the responsible Ministers) and iwi.

The sponsors’ group oversees the programme in partnership with Horizons Regional Council who jointly appoints a director for the whole programme.

The Sponsors’ group could be comprised of:

- Regional Council appointee - 1.
- Territorial Authority appointees – 2.
- Central Government appointee – senior official(s).
MANAWATŪ-WHANGANUI GROWTH STUDY 2015

- Iwi – two representatives (north and south).

The key role of the Sponsor Group could include:

- Funding.
- Enabling central and local government participation and contribution.
- Determine KPIs; define success; set priorities.

**ToR:** Self-appointed jointly by the Chiefs, Central Government and iwi.

Estimated 2-3 meetings over 10 months.

Normal meeting rules could apply.

There for the duration – no use of alternates.

A proper Terms of Reference should be developed.

**Support:** Secretarial services from the Programme Directorate.

**DISTRICTS**

The districts are very important to the implementation plan. This is because the districts are the ones feeling the pain of lack of economic growth. They have the burning platform and also the most to gain.

Each of the opportunities could be identified with one (or two) districts – e.g. Mānuka honey (Rangitikei and Whanganui), Older people care and lifestyle (Horowhenua), Hill country sheep and beef (Rangitikei and Whanganui), Tourism (Ruapehu and Whanganui) and Fresh vegetables (Horowhenua, Rangitikei and Ruapehu).

All opportunities could be designed to have wider implications than one district (but the designated district should be the starting point or initial focus).

All districts are nearing completion of their Long Term Planning (LTP) process with their communities and an alignment with councils’ LTP and other plans will need to be considered as part of the development of regional economic action planning.

**DIRECTOR**

It is envisaged that the Director would have a high level of autonomy relying heavily on the appointment of the right sort of person. The reason for this autonomy is to encourage flexibility and nimbleness. The following arrangements could apply:

**Appointment:** By Horizons Regional Council in consultation with the Sponsors’ Group.

**Employer:** Horizons Regional Council.

**Funding:** From the Sponsors’ Group.

**Term:** 2 years.

**Location:** Palmerston North.

**Responsibility:** Management of the Programme Directorate.
Staff:  
Facilitators (external).  
Policy analyst (seconded from Horizons or Central Government).  
Writer (seconded from EDAs).  
Secretarial support.  
Consulting support.

PROCESS AND ROLL-OUT

The preparation of this Study represents a once-in-a-decade opportunity to jump-start economic growth in the region. To be successful implementation needs to be strategically sound and well resourced.

All opportunities do not need to be progressed at once. Some naturally appear to be more immediate, while others are long term. It is recommended that they are advanced in groups or tranches and there are feedback loops to learn from, as part of the implementation process to apply to subsequent opportunities.

The opportunities are presented in this Growth Study in a rough order of probability of realisation with the first having the strongest probability. Some of the opportunities are built on strong existing industries and involve incremental growth, whereas others could be considered more as green-fields opportunities.

The Growth Study has and will generate momentum and this momentum should not be lost.

The following roll-out plan for 2015/16 is proposed. It is deliberately conservative in terms of the number of opportunities pursued. This is on the basis that it is better to do fewer well than the reverse:

**Stage One:**  
**Set-up:** Appointments, sponsor and governance, establishment  
(July/Aug).

**Stage Two:**  
**Sub-regional (district) briefings:** This would involve in-depth briefings to District audiences convened by the Councils on the opportunities in their area.  
(Sept).

**Stage Three:**  
**Invite proposals** - from Districts to mount an enabling team in the district on their priority opportunity. The number of teams initiated at this time would require careful consideration in terms of support resources - 3-4 groups is thought to be sufficient for the first round, but as activity matures new groups could be formed. Building teams with the right stakeholders and positive dynamics will be vital to their success. Time should be taken to get this right.  
(Sept/Oct).
Stage Four: Reporting – complete first cluster of GAP reports. These would be followed by a GRIP presentation phase aimed at transferring the opportunity into the commercial sector.  
(July/Aug 16).

Stage Five: Evaluation - evaluate the work of the first echelon of enabling groups at the end of year one (including the process used and its effectiveness) and apply the learnings to other groups underway or being formed. This could take the form of a stock-take meeting with the chiefs, Minister representatives and iwi to ensure that the programme is performing as best possible.  
(Continue programme on a sequential basis).

Districts would be invited to engage around their priority opportunity (possibly more than one). They would be asked to present a proposal to the Programme Director as to how they would go about undertaking the task. The Director would outline the resources available. An enabling team would only proceed if all parties were satisfied that it was well formed, adequately resourced and that there was a clear commitment from the district drive the process and the Programme Director to support it. A template or checklist of requirements could be useful to help district assess their readiness.

THE ENABLERS

Only three enablers have been chosen as priority interventions. They are Transport and Distribution, Productivity of Māori Land and Growing Businesses. Like opportunities, they require some investigation to validate their choice as the most important. An intervention programme then needs to be developed.

Our recommendation is the same as for opportunities – that a team is formed around each enabler with staff support from either local government or private sector interests such as from iwi or the Chamber of Commerce and that the programmes are funded and mounted as a priority. Transport and distribution is essentially a local authority issue, Māori land is an iwi interest and growing businesses is a Chamber and sector group interest.

The teams could be appointed as part of the Director’s responsibility and could report through the same channels as those for opportunities.
OTHER SUPPORT STRUCTURES

Besides the direct support provided by the Programme Director and the sponsors as already outlined, there would be the need for additional support and inputs. These could be as follows:

**Website:** A website specifically for the Programme. This could be linked to the Horizon’s site or be standalone. The site could have:

- Tabs on each of the opportunities / sub-regions.
- Agendas, minutes and background papers relating to each of the teams.
- Initially models for the GAP and GRASP reports and as they complete the actual reports would be available.
- Space for public and news media participation.

**Facilitation:** Facilitator skills are crucial to the success of the programme. It is envisaged that there will be a facilitator assigned to each team with one facilitator acting for two teams at any one time. Some form of practice training and on-going mentoring/supervision would be required to rapidly build capability.

**Status:** The teams would need to feel that they are valued and supported. A launch event attended by representatives of the Chiefs and even a Minister would reinforce the mandate the teams would need to get results and the status they would have in the community.

**Communication:** A sense of public momentum and interest around the programme would help propel it forward. This would require a carefully constructed communications and engagement package to support the programme.
SECTION EIGHT: SUB-REGIONAL PROFILES
8. SUB-REGIONAL PROFILES

This section contains a detailed sub-regional analysis for readers who are looking for a sub-regional perspective and to understand how we reached our conclusions. Table 24 provides a single-glance summary of the profile of each district. These data are reproduced in each individual section.

TABLE 24: SUB-REGIONAL PROFILES

See over page
TABLE 24: SUB-REGIONAL PROFILES

| Region                  | Manawatu-Whangawau region | Ruapehu district | Whanganui district | Rangitikei district | Manawatu district | Palmerston North city | Tararua district | Households in NZ | Manawatu-Whangawau region % of NZ | Ruapehu district % of NZ | Whanganui district % of NZ | Rangitikei district % of NZ | Manawatu district % of NZ | Palmerston North City % of NZ | Tararua district % of NZ | Households in NZ % of NZ |
|-------------------------|---------------------------|------------------|--------------------|---------------------|-------------------|----------------------|------------------|------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Population              | 231,200                   | 12,450           | 43,500             | 14,550              | 28,500            | 83,500               | 17,450          | 31,200           | 4,442,100                 | 5.2%                      | 0.3%                     | 1.0%                     | 0.3%                     | 0.6%                     | 1.9%                     | 0.4%                     | 0.7%                     |
| Population density (per km²) | 10                       | 2                | 18                 | 3                   | 11                | 233                  | 4               | 29               | 16                        | 63.9%                     | 11.3%                    | 11.0%                    | 20.0%                    | 72.5%                    | 147.2%                   | 24.7%                    | 181.2%                   |
| Age composition (% of regional total) |                          |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |                          |
| 0-14                    | 21%                       | 2%               | 20%                | 21%                 | 20%               | 22%                  | 19%             | 20%              | 5.2%                      | 0.3%                      | 1.0%                     | 0.3%                     | 0.6%                     | 1.9%                     | 0.4%                     | 0.7%                     |
| 15-24                   | 14%                       | 13%              | 12%                | 12%                 | 18%               | 11%                  | 11%             | 14%              | 5.3%                      | 0.3%                      | 0.9%                     | 0.3%                     | 0.6%                     | 2.5%                     | 0.3%                     | 0.6%                     |
| 25-64                   | 49%                       | 50%              | 48%                | 49%                 | 50%               | 46%                  | 51%             | 49%              | 4.9%                      | 0.3%                      | 0.9%                     | 0.3%                     | 0.6%                     | 1.8%                     | 0.4%                     | 0.6%                     |
| 65+                     | 16%                       | 13%              | 19%                | 17%                 | 16%               | 13%                  | 17%             | 23%              | 6.1%                      | 0.3%                      | 1.3%                     | 0.4%                     | 0.7%                     | 1.7%                     | 0.5%                     | 1.2%                     |
| Notes                   |                           |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (1) employed share of working age population |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (2) unemployed share of labour force |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (3) labour force share of working age population |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (4) Owned or in trust share of total stated |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (5) Dec-2014, QVNZ average house price |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (6) Nov-2014, MBIE average rent |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (7) Annual rent share of house price. Does not assume vacancy or take any operating costs. |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (8) Household income less annualised weekly rent |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |
| (9) Household income less mortgage payments assuming 20% deposit, 7% long term interest rate and 30 year term. |                       |                  |                    |                     |                   |                     |                 |                  |                            |                           |                          |                           |                           |                          |                          |                           |

8. SUB-REGIONAL PROFILES
Ruapehu has a smaller and younger population than the region as a whole. It has a similar age profile to New Zealand as a whole. The Māori population is large at 43%, compared to 16% nationally. The population has been shrinking at 1.5%pa (vs. 1.1%pa growth nationally). Personal and household incomes are much lower than the national average, due to lower wages rather than lower participation in work. Home ownership is low, even though houses are affordable relative to incomes.

Ruapehu’s biggest employers are in farming, tourism and government:

- Sheep and beef farming and agriculture support services are the biggest employers, but they have been shedding jobs over the past decade (over 20% of jobs lost in the past decade).
- Tourism (especially related to the ski fields and increasingly related to mountain biking) creates jobs in accommodation, hospitality (cafes, restaurants and bars) and retail (supermarkets, for example).
- Government has a strong presence through defence, education and health (although many organisations have been contracting over the past decade).
- There are two relatively large industrial sectors: heavy and civil engineering, which have grown strongly in recent years; pulp, paper and board manufacturing, which are declining sharply. Neither industry indicated an expectation of significant growth in the near future; in fact, survival was seen as the imperative.

**TABLE 25: SUB-REGIONAL PROFILE - RUAPEHU**

<table>
<thead>
<tr>
<th></th>
<th>Ruapehu district</th>
<th>NZ</th>
<th>% of NZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>People</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>12,450</td>
<td>4,442,100</td>
<td>0.3%</td>
</tr>
<tr>
<td>Population density (per km²)</td>
<td>2</td>
<td>16</td>
<td>11.3%</td>
</tr>
<tr>
<td>Age composition (% of regional total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>23%</td>
<td>20%</td>
<td>0.3%</td>
</tr>
<tr>
<td>15-24</td>
<td>13%</td>
<td>14%</td>
<td>0.3%</td>
</tr>
<tr>
<td>25-64</td>
<td>50%</td>
<td>51%</td>
<td>0.3%</td>
</tr>
<tr>
<td>65+</td>
<td>13%</td>
<td>14%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Māori share</td>
<td>43%</td>
<td>16%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

*Between 2001 and 2013 censuses*
### Skills, income and work

<table>
<thead>
<tr>
<th></th>
<th>Aged under 25</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tertiary educated (% of population)</td>
<td>50%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Personal income</td>
<td>24,100</td>
<td>28,500</td>
<td>85%</td>
</tr>
<tr>
<td>Household income</td>
<td>44,400</td>
<td>63,800</td>
<td>70%</td>
</tr>
<tr>
<td>Employed</td>
<td>5,520</td>
<td>2,001,009</td>
<td>0%</td>
</tr>
<tr>
<td>Employment rate(^{1})</td>
<td>63%</td>
<td>62%</td>
<td>101%</td>
</tr>
<tr>
<td>Unemployment rate(^{2})</td>
<td>8%</td>
<td>7%</td>
<td>114%</td>
</tr>
<tr>
<td>Participation rate(^{3})</td>
<td>68%</td>
<td>67%</td>
<td>102%</td>
</tr>
<tr>
<td>Average firm size (excl. zero sized)</td>
<td>7</td>
<td>11</td>
<td>65%</td>
</tr>
</tbody>
</table>

### Housing

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Home ownership rate(^{4})</td>
<td>55%</td>
<td>65%</td>
<td>85%</td>
</tr>
<tr>
<td>House price(^{5})</td>
<td>$138,465</td>
<td>$488,674</td>
<td>28%</td>
</tr>
<tr>
<td>House price to household income ratio</td>
<td>3.1</td>
<td>7.7</td>
<td>41%</td>
</tr>
<tr>
<td>Weekly rent(^{6})</td>
<td>$180</td>
<td>$375</td>
<td>48%</td>
</tr>
<tr>
<td>Rental share of household income</td>
<td>21%</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>Gross rental yield(^{7})</td>
<td>6.7%</td>
<td>4.0%</td>
<td>169%</td>
</tr>
<tr>
<td>Household income after housing costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After rent(^{8})</td>
<td>35,054</td>
<td>44,318</td>
<td>79%</td>
</tr>
<tr>
<td>After mortgage payments(^{9})</td>
<td>35,473</td>
<td>32,296</td>
<td>110%</td>
</tr>
</tbody>
</table>

All data 2013 unless otherwise stated

Notes

- \(^{1}\) employed share of working age population
- \(^{2}\) unemployed share of labour force
- \(^{3}\) labour force share of working age population
- \(^{4}\) Owned or in trust share of total stated
- \(^{5}\) Dec-2014, QVNZ average house price
- \(^{6}\) Nov-2014, MBIE average rent
- \(^{7}\) Annual rent share of house price. Does not assume vacancy or take any operating costs.
- \(^{8}\) Household income less annualised weekly rent
- \(^{9}\) Household income less mortgage payments assuming 20% deposit, 7% long term interest rate and 30 year term.
Ruapehu exhibits all the characteristics of the region identified in the earlier regional profile section of this Study with some to extreme. The cost of housing is low. Overall population is low reflecting the level of economic activity in the district. As Figures 38 & 39 illustrate, there are really no growth sectors in the district, aside from growth in the small professional services sector, nor are there obvious areas of comparative advantage.

Our investigations have concluded that there is one significant area of advantage and this lies in opportunities associated with the tourism industry, but it requires careful development so that it is a quality offering with strong revenues attached. While not a provider of large incomes, because of the small population of the district, tourism has the potential to make a significant difference to both GDP and employment.

**FIGURE 38: INDUSTRIES, SPECIALISATIONS, SIZE AND GROWTH - RUAPEHU**

Source: Statistics New Zealand, NZIER
There are also a number of other modest opportunities that have the potential to contribute incrementally to the district’s economy – the production and export of fresh vegetables and modest improvements in sheep and beef productivity. Our assessment is that the key ingredient is leadership to identify and exploit these opportunities.

OPPORTUNITIES IDENTIFIED BY LOCAL INFORMANTS

Tourism - tourism is regarded as a major opportunity and has been dealt with in detail in the tourism section of the report. It comprises a primary opportunity in mountain biking together with support opportunities in packaging the range of adventure tourism opportunities into a single and marketable package.

Sheep and beef – this is a main stay of the district economy, though there is little potential for growth beyond the productivity approach outlined in this report. Promoting wider farmer awareness of alternative fertiliser products e.g. rock phosphate and fine particle fertiliser and options to reduce the cost of transporting fertiliser were discussed.

Dairying – this is growing in the area, particularly on the flat volcanic soils close to Ohakune. Methods for growing this sector are similar to those in other parts of the region. Informants presented the opportunity of ‘brands’ associated with the attractiveness of the Mt Ruapehu landscape. While tempting, we do not see this as viable at this time because there is not the scale of activity to support the investment required.

Wild game - opportunities to continue to grow the volume of wild venison and wild boar products were identified.

Vegetables – there is already a significant vegetable industry in the area. It was noted that the Ruapehu District has some unique advantages for vegetable growing, particularly root

Source: Statistics New Zealand, NZIER
vegetables. The district could do more to capitalise on: ‘point of origin’ branding, the particular quality and flavour of Ohakune sourced product and the, the comparatively low use of fungicides, biocides and other pest suppressant chemicals because of the effect of the district’s cold climate.

Growth opportunities relate to product exports. Export regulations are viewed as being a challenge to deal with. Locals would welcome assistance to find methods to streamline the pathway through them. Water reticulation and irrigation were viewed as being a valuable contingency against the risks to production during dry summer months. Some informants viewed the cost and complexity of the water management regime to also be a challenge. They had some uncertainty about water availability, particularly from ground water sources.

Mānuka honey - the unique advantage associated with the Ruapehu District is the large size of the area of regenerating forest, with Mānuka dominance. Some informants believe there is an opportunity for a town like Taumarunui to establish itself as ‘honey central’. This could include local branding, advanced processing and production of medicinal honey products.

Specialty fruits - Ruapehu has pockets of very good land capable of growing fruits and nut trees. Informants from Taumarunui saw an opportunity to establish cooperatives for packaging and marketing and to achieve the benefits of scale. Advantage was also seen in researching and publishing a report documenting the suitability of the fruit and nut growing opportunities in the area or a ‘resource inventory’ of the comparative strengths of the district and, in addition, a platform to enable the connection of individuals and enterprises who are currently engaged in these activities.

Forestry - Winstone Pulp International (WPI) is a key contributor to local GDP. The scale of production reflects input costs, the value of the New Zealand dollar and the prices able to be secured on the international market. The current infrastructure and plant have latent capacity which is able to be ramped up when conditions justify it. There are challenges operating in a remote area relating to staff- many current skilled employees have their homes at other locations.

Freight - WPI transport their product to the Port of Napier by rail. The train returns empty. A more active search may assist to identify opportunities for backfill freight.

Education and training - informants, particularly those based in Taumarunui, saw benefit in broadening the range and depth of the training courses in the area to help build the skills needed by existing and new enterprises e.g. truck and tractor drivers and computing skills.

Recruiting and bonding professionals - veterinarians, medical professionals and other skilled professionals/trades are difficult to secure in small towns because of their remoteness. Informants called for an expansion of bonding schemes as a means of building necessary expertise in their communities.

Contact centre - towns like Taumarunui have a stable population, cheap real estate and a skilled work force suited to the competitive supply of contact centre services. Informants

99 Te Kuiti is also proposing that it be viewed as ‘honey central’.
suggested that these advantages be more actively marketed to potential clients such as part of the Business Process Outsourcing discussed in this report.

**Business leadership** - business leaders in both Ohakune and Taumarunui saw advantage of establishing a ‘development group’ to carry forward the types of initiatives displayed at the various meetings held as part of the Growth Study. The uniting force was the desire to avoid being the Ohura of the future (Ohura is seen by most as a ghost town following business closures in the town).

**WHANGANUI**

Whanganui is a modest-sized district accounting for 1% of New Zealand’s population. The population has been declining slowly at 0.2%pa\(^{100}\). The population is older than the national average. More Māori, typically young, live in Whanganui than across New Zealand as a whole. Incomes are lower than the national average, due to fewer employment opportunities and more jobs in lower paid industries. Lower housing costs tend to compensate lower incomes for home owners.

The largest employers are in health, aged care, education, farming, processing and transport:

- School education is a big employer, but it has shed jobs in the past decade. The future of Whanganui Collegiate was threatened but now seems assured for the foreseeable future.
- In contrast, health, aged care and public safety increased hiring.
- Sheep and beef farming is a large employer, but it is shedding staff. However, this has been offset by increased hiring in meat and meat product manufacturing.
- Road freight transport is a large employer and is growing strongly.
- The supermarket, grocery and hospitality sectors (cafes, restaurants and bars) are also big employers.
- Successful light industrial enterprises have succeeded in Heads Road and there is no strong indication of further expansion with the exception of the new Open Country Dairy plant in the area.
- Small scale development around the old port is underway.

\(^{100}\) Between 2001 and 2013 censuses
### TABLE 26: SUB-REGIONAL PROFILE – WHANGANUI

<table>
<thead>
<tr>
<th></th>
<th>Whanganui district</th>
<th>NZ</th>
<th>% of NZ</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>43,500</td>
<td>4,442,100</td>
<td>1.0%</td>
</tr>
<tr>
<td>Population density (per km$^2$)</td>
<td>18</td>
<td>16</td>
<td>113.0%</td>
</tr>
<tr>
<td>Age composition (% of regional total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>20%</td>
<td>20%</td>
<td>1.0%</td>
</tr>
<tr>
<td>15-24</td>
<td>12%</td>
<td>14%</td>
<td>0.9%</td>
</tr>
<tr>
<td>25-64</td>
<td>48%</td>
<td>51%</td>
<td>0.9%</td>
</tr>
<tr>
<td>65+</td>
<td>19%</td>
<td>14%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Māori share</td>
<td>24%</td>
<td>16%</td>
<td>1.5%</td>
</tr>
<tr>
<td>- Of which aged under 25</td>
<td>51%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Aged dependency ratio</td>
<td>31</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td><strong>Skills, income and work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary educated (% of population)</td>
<td>21%</td>
<td>29%</td>
<td>71%</td>
</tr>
<tr>
<td>Personal income</td>
<td>23,600</td>
<td>28,500</td>
<td>83%</td>
</tr>
<tr>
<td>Household income</td>
<td>43,800</td>
<td>63,800</td>
<td>69%</td>
</tr>
<tr>
<td>Employed</td>
<td>17,484</td>
<td>2,001,009</td>
<td>1%</td>
</tr>
<tr>
<td>Employment rate$^{(1)}$</td>
<td>55%</td>
<td>62%</td>
<td>88%</td>
</tr>
<tr>
<td>Unemployment rate$^{(2)}$</td>
<td>10%</td>
<td>7%</td>
<td>135%</td>
</tr>
<tr>
<td>Participation rate$^{(3)}$</td>
<td>61%</td>
<td>67%</td>
<td>90%</td>
</tr>
<tr>
<td>Average firm size (excl. zero sized)</td>
<td>10</td>
<td>11</td>
<td>91%</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home ownership rate$^{(4)}$</td>
<td>66%</td>
<td>65%</td>
<td>102%</td>
</tr>
<tr>
<td>House price$^{(5)}$</td>
<td>$182,365</td>
<td>$488,674</td>
<td>37%</td>
</tr>
<tr>
<td>House price to household income ratio</td>
<td>4.2</td>
<td>7.7</td>
<td>54%</td>
</tr>
</tbody>
</table>
Whanganui illustrates all the characteristics of a district struggling with its future. While the cost of commercial property and housing is low, the population is shrinking, ageing, and jobs are few. Unemployment is amongst the highest in the region and participation rates are comparatively low. Tertiary education rates are also comparatively low creating an issue for development of the region. As Figures 40 and 41 illustrate, there are really no growth sectors in the district except health which is publicly funded, nor are there obvious areas of comparative advantage. Areas such as manufacturing, though large by regional standards, are contracting and not producing new jobs.

The primary sector is relatively small for a district that has a significant hinterland. Much of it is hill country so development of the sheep and beef production would benefit this district. There are also opportunities in tourism and Mānuka honey. The difficulty for Whanganui is that none of these opportunities is sufficiently substantial that it might represent a “game-breaker”.

That said, Whanganui is an attractive city with a strong local sense of identity and a commitment to improvement. In our assessment, the opportunities consist of using that community cohesiveness to incrementally build business and enterprise, but with more energy and gusto than is the case at present. Arguably business costs such as rentals are sufficiently low to represent a significant advantage, but these are not yet making the required difference to the accumulation of activity. Whanganui is one of those centres where the concentration needs to be on small steps, but lots of them. Particularly relevant from our schedule of opportunities are:

- Sheep and beef development.
- Tourism.
- Mānuka honey.
- Growing Businesses.
However, in addition to this there is the need for a focus on community and civic amenities and city-based development such as the river and waterfront. In this respect Treaty Settlements may provide some of the break-through required to move the district forward. The following section identifies some of the projects that were communicated to us by district informants.

OPPORTUNITIES IDENTIFIED BY LOCAL INFORMANTS

**Approach to economic development** - the Whanganui District Council has rejuvenated its economic development structure and resourcing. Three Boards have been established under the banner ‘Whanganui and Partners’, with members drawn from local businesses. They have responsibility for leading economic development initiatives. The priority early focus is on visitor industries. Later focus will be directed toward education opportunities. An early project is to promote ‘Whanganui in a Box’ as a concept to:

- Grow existing businesses.
- Attract new business, investment and tourists.
- Build relationships with Whanganui Alumni.
- Promote Whanganui as the ‘right location’ for conferences and events.

The concept involves Whanganui and Partners converting a 40Ft shipping container into a promotional hub for Whanganui.

**Hill country farming** - farming remains the main stay of the district economy. Education, succession planning, farm integration (hill country and flat country), discussion groups, new equity partnerships, innovation, courage and tech transfer were all seen as the interventions to promote growth. These and interventions related to unlocking the potential of Māori freehold land are more fully addressed earlier in the report.

**Specialist crops, nuts and fruits** - as with Ruapehu, informants suggested that work be carried out to better define the best use of land with different capabilities.

**Coastal Spring Lamb** - the model applied by Coastal Spring Lamb to the development of this product has proven successful and may prove valuable if replicated elsewhere. The essential features are:

- The quality control of product (triple grading approach with taste and tenderness the key).
- Traceability.
- Provenance – part of a coherent story.
- Co-branding with Foodstuffs and mutual endorsement. The target posted by Coastal Spring Lamb is to crack the international market by the end of 2015. They currently sell 30,000 lambs domestically.

**Whanganui – Digital River** - Whanganui City is serviced by an optic fibre ultra-fast broadband service. The completion of the fibre deployment in the urban areas of Whanganui has been supported by a number of initiatives by the District council which are designed to extract maximum benefit from the deployment. These have ranged from programmes to assist businesses to develop an on-line presence, enhancing on-line local government services and establishing a Digital Leaders Forum to search for opportunities to gain
advantage from the Broadband infrastructure. The UFB provides very good download speeds and has enabled one company to develop and market film and commercials globally. Other companies could take similar advantage of this opportunity.

**Sport recreation and fitness** - Whanganui has always been known as a provider of facilities suited to high performance sports. New opportunities include marketing Whanganui Collegiate as a summer school for Indian cricketers (catering for a growing Indian middle class) and convening an international event, perhaps to be known as the ‘Iron Wakarama Māori’ Race over the distance of 100 km from Pipiriki to Whanganui. Of similar interest is the potential for growing cultural tourism experiences which connect the Marae of the Whanganui River to tourism, educational and recreational experiences.

**Freight logistics centre** - Whanganui is growing as a logistics centre for the efficient packaging and distribution of freight. Business leaders have leveraged charter train arrangements established with the Port of Wellington and Kiwi Rail (daily freight). The area is also suited to this use because of the comparative low cost of real estate ($38 per m² compared to $64 per m² in Auckland) and the 80,000 per m² of available warehouse space to hub and redistribute product. These arrangements also align with the transport of products from ‘Open Country Dairy Ltd’ processing facilities located on Heads Road.

**Open Country Dairy (OCD)** - New Zealand’s third largest milk processing Company is expanding its presence in Whanganui. A second whole milk drier is currently under construction. A third drier is a possibility. The factors contributing to the decision by OCD to grow the size of its facilities in Whanganui seen as relevant to other potential developments include: low cost real estate; reliable and competitive cost of labour; good supportive infrastructure and a business friendly council.

**Skills development / training** - some Whanganui-based companies are constrained in their growth because they are having trouble finding employees with the right skills. Key informants have suggested there is a general need to improve the quality of the skills development training and youth pathways (better guidance to students) in the District through such programmes as 100% Sweet.

**Image / Whanganui reputation / brand** - some informants suggested that a long term issue for the district is to address how Whanganui is perceived. They recommended adoption of focused programmes to market the comparative advantage of the City particularly to manufacturing businesses currently located in South Auckland on both economic and lifestyle grounds.
FIGURE 40: INDUSTRIES, SPECIALISATIONS, SIZE AND GROWTH - WHANGANUI

Source: Statistics New Zealand, NZIER

FIGURE 41: REGIONAL COMPARATIVE ADVANTAGE - WHANGANUI

Source: Statistics New Zealand, NZIER
Developments of facilities and services at the Whanganui Port - the District Council and some business leaders have an ambitious programme to rejuvenate and increase economic activity at the Whanganui Port. Current proposals include:

- Progressive reclamation of 4.6 hectares.
- Construction of additional sea wall and sea surge protection.
- Marina development and slipway construction.
- Development of recreational facilities including a café etc. and the hospitality sector.
- Construction of a boat trailer park and covered boat storage area and other services to meet the needs of the 700-900 recreational boat owners who are known to use the area in any one year.
- Reconstruction of ‘Wharf One’ to make it sound and suited to heavy lift crane use and able to support expanded coastal shipping operations (NB. The area is currently serviced by one Coastal trading vessel – the “Anatoki”).
- Extension of the rail corridor to Wharf Street (700 metres).
- Expansion of current commercial boat construction and servicing activities.
- Additional support for the coastal petroleum and mineral exploration industry (including Trans-Tasman Resources, when and if they are successful with their attempts to secure consent to mine iron-sand resources).
- Cycle way access to town.
- Limited adjustment to stop banks and surge/river training works.

The driver behind these proposals is to identify and secure existing and future uses of the port and have them actively contribute to the economic, environmental and social revitalisation of Whanganui. To achieve those objectives, basic works are required to improve the appearance and security of the area.

Whanganui District Council’s holding company is making progress on this proposal in partnership with Whanganui iwi group Tupoho Investments Ltd. A joint venture has been established to develop a business plan for the area (draft currently in development).

Whanganui District Council’s objectives focus on partial privatisation of the Port to maximise throughput. This is viewed as being essential if the potential of the area as a service port for local freight is to be capitalised upon, as part of an integrated regional logistic chain. To achieve this objective the Council want to make the area ‘fit’ for this purpose. This will include refurbishment of Wharf One at a cost of $1 - $2 million. It is understood than the District Council have committed an interest free loan of $1 million to start this task. They propose to eventually lease the area to a port operator.

The Harbour Endowment Trust, operating with a Crown grant of property, has the legal and financial capacity to borrow against its assets to fund part of the Port upgrading. Negotiations are proceeding with a view to having river management responsibilities, including river training arms and stop-banks taken over by Horizons Regional Council. Other investors and partners will be required. The sum of $10m has been suggested by project proponents as being needed to give the project the kick start it requires. An
incremental and pragmatic approach is proposed. The opportunity is seen as being critical to building the mana and attractiveness of the area.

RANGITIKEI

Rangitikei is a small district with 0.3% of the national population. Its population has been slowly shrinking at 0.5%\(^\text{101}\) pa, losing young working age people. Incomes are lower than the national average, due in part to household composition with more older people and single person households. Engagement in work is a little higher than the national average and unemployment lower. Home ownership costs are substantially lower than the national average.

The Rangitikei District is a mix of very versatile flat country and hard hill country dissected by the Rangitikei River and supported by a number of small service towns. Its economy is mainly rural-based:

- The largest employers in Rangitikei are farm-based. The sheep and beef sectors are the largest, but are in decline. Meat and meat product manufacturing is growing strongly. Dairy is also growing. But agriculture services, historically a large employer, are contracting modestly.
- Retailing is also a big employer. Most evident are supermarkets and groceries, cafes and restaurants, and other retailing.
- Pumps and compressor manufacturing is a unique regional offering, which is a large and growing employer. It is the most unique industry of the district and region, as measured by the regional comparative advantage metric.
- Speirs Foods is a significant food processing enterprise in Marton, with a national supply chain and distribution network
- Road freight transport is contracting (but growing in neighbouring Whanganui and Manawatū).

\(^{101}\) Between 2001 and 2013 censuses
### TABLE 27: SUB-REGIONAL PROFILE - RANGITIKEI

<table>
<thead>
<tr>
<th>People</th>
<th>Rangitikei district</th>
<th>NZ</th>
<th>% of NZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>14,550</td>
<td>4,442,100</td>
<td>0.3%</td>
</tr>
<tr>
<td>Population density (per km$^2$)</td>
<td>3</td>
<td>16</td>
<td>20.0%</td>
</tr>
<tr>
<td>Age composition (% of regional total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>21%</td>
<td>20%</td>
<td>0.3%</td>
</tr>
<tr>
<td>15-24</td>
<td>12%</td>
<td>14%</td>
<td>0.3%</td>
</tr>
<tr>
<td>25-64</td>
<td>49%</td>
<td>51%</td>
<td>0.3%</td>
</tr>
<tr>
<td>65+</td>
<td>17%</td>
<td>14%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Māori share</td>
<td>25%</td>
<td>16%</td>
<td>0.5%</td>
</tr>
<tr>
<td>- Of which aged under 25</td>
<td>48%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Aged dependency ratio</td>
<td>28</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

| Skills, income and work | | |
| Tertiary educated (% of population) | 18% | 29% | 62% |
| Personal income | 25,700 | 28,500 | 90% |
| Household income | 48,600 | 63,800 | 76% |
| Employed | 6,816 | 2,001,009 | 0% |
| Employment rate$^{(1)}$ | 64% | 62% | 103% |
| Unemployment rate$^{(2)}$ | 6% | 7% | 85% |
| Participation rate$^{(3)}$ | 68% | 67% | 101% |
| Average firm size (excl. zero sized) | 7 | 11 | 59% |

| Housing | | |
| Home ownership rate$^{(4)}$ | 65% | 65% | 101% |
| House price$^{(5)}$ | $142,772 | $488,674 | 29% |
| House price to household income ratio | 2.9 | 7.7 | 38% |
Rangitikei has the aged profile characteristic of New Zealand with a deficit of people in the income earning age groups. Personal and household incomes are below national averages reflecting a significant beneficiary population. Employment is strong reflected in the unemployment and work participation rates. House prices and rentals are significantly lower than the national average. Home owners, in particular, are in a strong position.

As Figures 42 and 43 illustrate, there is modest growth taking place in traditional industries which represent comparative advantage for the district. Education is also a strong point, largely represented by schools in the district.

Of the recommendations in this report, land use intensification and especially the use of irrigation is the most important. The District has a significant amount of high quality land that could be made more productive. Because of its labour requirements, the export of vegetables would significantly boost the local economy and would flow into the rural town of Marton which is struggling to hold its own.

Poultry and grain growing and processing also have potential in the district, particularly southern river plains.

**OPPORTUNITIES IDENTIFIED BY LOCAL INFORMANTS**

Informants suggested the district’s opportunities are centred in land use intensification, including pastoral irrigation and better use of the hill country.

**Vegetable growing and marketing** - vegetable growing is currently concentrated in the Horowhenua and Ohakune parts of the region. Some Rangitikei land owners also grow vegetables, including squash, for export. The soils and water resources of the district are suited to expanded vegetable production.

While it is not the role of this report to identify the potential associated with any particular company, it is noted that Speirs Foods Ltd, based in Marton, has 2,000 m² of
vegetable processing capability and currently has 200 product lines – mostly fresh salads – for distribution to supermarkets throughout New Zealand. This company has indicated its desire to locally source more of the ingredients for its product lines and to build on the region’s growing ‘brand’ as a food centre.

One grower in the area currently supplies peas to McCains in Hawkes Bay. One of the competitive advantages of the Rangitikei location is the use of low temperature deep bore water. The temperature of this water means the peas require less processing and therefore generally are of a higher quality. Opportunity exists to more fully capitalise on this advantage by not only expanding pea growing but also diversifying into other products.

**Freight distribution** - In general terms informants have said there is opportunity to make better use of Marton’s unique location as the meeting place of two highways and three rail networks. This could include establishment, with the support of Kiwi Rail, of a Marton-based rail siding. We understand this opportunity is currently being actively explored. If such a siding was constructed it could also be used to improve the logistics of transporting the 10,500 tonnes pa of meat and bone meal and wheat currently imported from Australia via Port of Napier for use by a significant local pet food manufacturer.

**FIGURE 42: INDUSTRIES, SPECIALISATIONS, SIZE AND GROWTH – RANGITIKEI**

Source: Statistics New Zealand, NZIER
National scale grain complex - several informants have identified the establishment of a national scale grain complex in the District as being a unique opportunity for the region. This is described in the section of this Study on “Poultry meat production and grain growing and processing”. Our examination of this opportunity indicates that it is worth pursuing.

Air transportation of fresh product to international markets from Ohakea - several business leaders in the area have been actively exploring the logistics, cost-benefit and market opportunities associated with the use of Ohakea air base for the direct export of fresh vegetable and other products with short shelf life. This opportunity is explored earlier in this report as part of the discussion on transport and distribution.

Goat and sheep milk - some informants noted growing market demand for non-dairy milk products. Initial assessment of market returns suggest these may be very competitive when compared to current dairy prices. To be successful, such a venture would need to operate at global scale for both grazing and processing and would require access to substantial numbers of good quality breeding stock which are currently in short supply. Informants also noted the synergy which could be achieved by working with Food HQ to ensure that all steps in the supply chain, including the application of state of the art product storage and processing technology, were fully explored and applied.

Pasture and crop irrigation - the irrigation section of this report addresses irrigation opportunities in the region. In summary, informants noted that the Rangitikei River has

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Goat milk was returning $19 kg MS with only $9 input costs at December 2014 pers. comm. Hugh Dalrymple.
unallocated ‘run-of-the-river’ water available for allocation for use for irrigation purposes. Horizons Regional Council has said that other water is also available in the area for harvesting when the river is at higher flow levels and or for extraction from groundwater sources. The extraction, storage and reticulation of this water would provide the backstop to land use intensification, including expanded dairying and cropping. Already, provided that nutrient loss limits are adhered to, the suitability for dairying of the sand country located between Whanganui and Levin has been proven.

**Sheep and beef** - Rangitikei was identified as having capacity to produce higher volumes of hill country sourced sheep and beef meat. (See elsewhere in this report for details, especially the “Sheep and beef farming and processing” section).

**Land locked Māori land** - Rangitikei was said to have more land (not necessarily Māori land) constrained by multiple ownership, absentee owners, fragmentation and access problems than other districts in the region. One informant said that possibly as much as 14% of the District was without land access. It is beyond the brief of this study to document the exact scale of this issue but to make progress, a first step would be to determine the location of this constraint and then assess the cost and benefit of putting in place roads and other means of access.

**Tourism** - the beauty of the landscape and recreational opportunities associated with the Rangitikei River was said by informants to sometimes be overlooked in favour of a focus on Tongariro and Whanganui National Parks. The area is said to abound with conservation and recreation opportunities. The suggested interventions included leveraging off Ruapehu opportunities (discussed in the “Tourism and visitor services” section of the Study and refocusing earlier joint regional tourism work - Te Kahui Tupua,103 - with high yield tourists being a potential target market. We agree that there are opportunities but they are isolated and need to be brought together into larger packages, which is discussed in more depth in the Tourism section.

**Real estate, brand and connection** - the common message offered by key informants was that the Rangitikei District should establish a district food brand and build ‘provenance’ from it. Equally important was the call to have:

- The comparative low cost of land and other production inputs recognised by investors located at more expensive locations.
- Local government ‘roll out the red carpet rather than the red tape’, in other words develop readiness approaches to potential industries and businesses.
- Local government to facilitate the process of keeping business leaders talking with each other and help them find the synergies to leverage shared opportunities.

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103 This was a $3 million project funded by the Ministry of Tourism as part of its major regional initiative [MRI] programme.
The Council informed us that they see merit in key actions along the following lines:

- Promote the quality of life, housing affordability, new tourism activities, ultra-fast broadband, river and outdoor activities and multi-sport opportunities.
- Develop a central business hub that includes information on regulatory requirements, financial advice, leases, available resources in the District including a register of vacant business and facilities.
- Encourage further development of the agriculture sectors by assisting them to grow more of what they are good at and processing it locally.
- Seek out and progress irrigation opportunities through increased community understanding and engagement.
- Develop strategies with the District’s schools and employers to create employment opportunities.

**MANAWATŪ**

Manawatū is a modest-sized district accounting for 0.6% of the New Zealand population. In contrast to some other parts of the region, the population has been growing at a moderate 0.7%pa (compared to 1.1% nationally). Incomes are comparable to the national average and around 30% higher after mortgage costs for the typical house. Employment is relatively high and unemployment low.

The district’s largest employers fall into four categories:

- Government is a large employer through defence and school education. Both have grown strongly over the past decade.
- Residential care services or aged care is a large employer and hiring grew by 33% in the past decade.
- Farming and related processing are large employers in sheep, beef and dairy farming, meat and meat product manufacturing, and services to agriculture. There is significant critical mass in agricultural production. Transport is also growing strongly.
- Retailing is a large employer. Supermarkets are not hiring more, but cafes and restaurants are.

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104 Between 2001 and 2013 censuses
### TABLE 28: SUB-REGIONAL PROFILE – MANAWATŪ DISTRICT

<table>
<thead>
<tr>
<th></th>
<th>Manawatū district</th>
<th>NZ</th>
<th>% of NZ</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>28,500</td>
<td>4,442,100</td>
<td>0.6%</td>
</tr>
<tr>
<td>Population density (per km²)</td>
<td>11</td>
<td>16</td>
<td>72.5%</td>
</tr>
<tr>
<td>Age composition (% of regional total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>21%</td>
<td>20%</td>
<td>0.7%</td>
</tr>
<tr>
<td>15-24</td>
<td>12%</td>
<td>14%</td>
<td>0.6%</td>
</tr>
<tr>
<td>25-64</td>
<td>51%</td>
<td>51%</td>
<td>0.6%</td>
</tr>
<tr>
<td>65+</td>
<td>16%</td>
<td>14%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Māori share</td>
<td>15%</td>
<td>16%</td>
<td>0.6%</td>
</tr>
<tr>
<td>- Of which aged under 25</td>
<td>53%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Aged dependency ratio</td>
<td>25</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td><strong>Skills, income and work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary educated (% of population)</td>
<td>21%</td>
<td>29%</td>
<td>73%</td>
</tr>
<tr>
<td>Personal income</td>
<td>28,400</td>
<td>28,500</td>
<td>100%</td>
</tr>
<tr>
<td>Household income</td>
<td>57,700</td>
<td>63,800</td>
<td>90%</td>
</tr>
<tr>
<td>Employed</td>
<td>13,668</td>
<td>2,001,009</td>
<td>1%</td>
</tr>
<tr>
<td>Employment rate (¹)</td>
<td>65%</td>
<td>62%</td>
<td>104%</td>
</tr>
<tr>
<td>Unemployment rate (²)</td>
<td>6%</td>
<td>7%</td>
<td>82%</td>
</tr>
<tr>
<td>Participation rate (³)</td>
<td>69%</td>
<td>67%</td>
<td>103%</td>
</tr>
<tr>
<td>Average firm size (excl. zero sized)</td>
<td>7</td>
<td>11</td>
<td>66%</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home ownership rate (⁴)</td>
<td>71%</td>
<td>65%</td>
<td>110%</td>
</tr>
<tr>
<td>House price (⁵)</td>
<td>$242,304</td>
<td>$488,674</td>
<td>50%</td>
</tr>
<tr>
<td>House price to household income ratio</td>
<td>4.2</td>
<td>7.7</td>
<td>55%</td>
</tr>
</tbody>
</table>
Feilding could be described as a single-minded town. It is agricultural through and through. It has achieved high standards of performance both on the land and in the processing facilities in the region. This is reflected in the reasonable household incomes, good employment participation and low unemployment.

It is a stable community with a high home ownership rate and a good house price to household income ratio.

Recommended opportunities that will benefit Manawatū include all those with an agricultural focus – land use intensification, sheep and beef and emerging industries such as Mānuka honey. Its already significant manufacturing base could be expanded with primary sector-related processing and manufacturing.
FIGURE 44: INDUSTRIES, SPECIALISATIONS, SIZE AND GROWTH – MANAWATŪ DISTRICT

Source: Statistics New Zealand, NZIER

FIGURE 45: REGIONAL COMPARATIVE ADVANTAGE – MANAWATŪ DISTRICT

Source: Statistics New Zealand, NZIER
Key informants from the Manawatū District viewed their area as the hub for the region of intensive agriculture, agri-business technology, agricultural servicing, innovation, precision agriculture and primary sector processing. Salient examples of this were quoted as being the:

**Cross slot no-tillage seed systems** – supplied from the district to global markets as a prime example of agri-business innovation (albeit with a current need for significant capital injection).

**Proliant Ltd** – who will take cattle blood from New Zealand's slaughter plants and use the blood plasma to produce bovine serum albumin**105** (BSA) for export. (Proliant have commenced construction of a new $24 million factory near Feilding. This will create between 25 and 30 jobs for the town and provide an expected economic boost of about $90m for New Zealand in the next decade).

**Snap Chill Ltd** – who are a Foxton-based company providing a hi-tech, low cost, non-glycol, relatively high speed and low energy cost solution to the need to rapidly cool milk. Farm dairy milk vats are used to achieve the temperature required by Fonterra and other processors to meet quality control purposes, using low cost energy windows.

**The Building Clever Companies (BCC) group** – who are developing plans for setting up an agri-tech accelerator which would have national reach into the regions.

**Figured Agri-Business** who provide a complete cloud-based livestock tracking, farm budgeting and forecasting tool that works hand-in-hand with Xero to help farmers improve farm performance and profits and leads the trend toward ICT based precision agriculture and information-rich farm decision-making.

**Interpine Forest Consulting and Data Management Company** – specialising in information technology and optimal decision making for the forestry industry.

Other opportunities discussed included:

**Innovation** – key informants suggested there was opportunity to build from the agri-business and technology strength of the region to create a concentrated ‘district of innovation’ where new businesses were cloned or grown as a result of ‘like minds working together’.

**Food HQ** – details about this Massey University-based support and research centre for innovation in foods are provided earlier in the report but for now it is simply noted that, in the view of Manawatū District informants, there is considerable opportunity for Food HQ to build from the success of Proliant by doing more to make the Manawatū the centre of ‘new world’ food products and processes.

**Precision agriculture** – there is an opportunity to the limits of precision agriculture by developing technologies which produce more, with fewer inputs and less waste. Cloud based and integrated information systems were viewed as being the critical measure for

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105 BSA is used in pharmaceuticals to test blood and vaccines and in medical research.
assisting primary sector decision makers to optimise the sustainability of their production systems including, for example, by using technology to help avoid leaving $1b of unused grass in the paddock annually and by adopting time saving and efficiency promoting technologies.

**Convene science agri-business fair** – informants believed that an important additional element for sharing the benefits of innovation was to find better ways of transferring information from Massey, Food HQ, and the market and about the comparative performance of farmers producing similar products on similar land. They also noted the need to make such transfers ‘two ways’ so that researchers and innovators, in turn were more aware of the problems and challenges faced on the farm and therefore, were better able to focus their research efforts.

**Making better use of the skills of ‘partners’** – informants from a number of districts noted the frequency with which the husband or wife of persons employed on a farm or in the Manawatū-based defence industry were often not able to apply their full skills and productive capacity simply because of the limits imposed by their isolated location. Suggestions for how this may be overcome included:

- **Establish more boutique/artisan products**: build a network of like-minded people, particularly in small towns connected to established tourist routes, to develop, market or supply specialist craft products and foods.
- **Speed up the roll out of high speed internet**: improve opportunities for skilled professionals to operate their business at distance.

‘**Farming is OK**’ – several of the agricultural-based informants noted the difficulty they were experiencing in recruiting good people to help them with their farming enterprises. They called for a number of programmes including:

- Making the agricultural and primary sector an attractive career option by developing a ‘workplace accord’ around standards.
- Supporting young people to transition from school to training to work by rejuvenating the current approach to ‘careers advice’ with high tech awareness tools, industry engagement and more careful planning for the needs of the workforce of the future.

**Medium scale water storage and irrigation** – the summer of 2014/15 took its toll on agricultural production because of drought conditions. Key informants were strong in their call for more effort to identify locations, for example, sub-catchments of the Oroua River, within which 100-plus farmers could collaborate to meet the costs of water storage and reticulation. The benefits of such research and the resultant investment decisions were seen to be that they would overcome the effects of the 1:3 yearly drought, which appears to be the current pattern, to create certainty for stock management and increase production by 25-33%.
PALMERSTON NORTH CITY

Palmerston North is the largest city in the region, accounting for nearly 2% of the New Zealand population. Massey University boosts the youthful population, but the city does not keep many of the young people after completion of the studies due to lack of opportunities. Incomes in the city are a little lower than the national average, but equal after rental costs or over 20% higher after mortgage costs. Employment conditions are similar to the national total, with slightly lower employment and slightly higher unemployment.

The Palmerston North economy has the hallmarks of a regional city and government town. The city’s largest employers are the university, defence and other service industries:

- Tertiary education is the largest district employer, although Massey University has cut headcount in the past decade. Science and research with an agricultural bias are associated with the university.
- Hospital, defence and school education are also large employers.
- An ageing population and good healthcare also supports a large and growing aged residential care sector.
- The city’s strategic location in the central North Island and its proximity to strong freight networks means that there is also a large logistics sector (in transport, warehousing and storage).
- As the largest city in the region, it also acts as the retail and hospitality capital.
### TABLE 29: SUB-REGIONAL PROFILE – PALMERSTON NORTH CITY

<table>
<thead>
<tr>
<th>People</th>
<th>Palmerston North city</th>
<th>NZ</th>
<th>% of NZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>83,500</td>
<td>4,442,100</td>
<td>1.9%</td>
</tr>
<tr>
<td>Population density (per km(^2))</td>
<td>233</td>
<td>16</td>
<td>1472.5%</td>
</tr>
<tr>
<td>Age composition (% of regional total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>20%</td>
<td>20%</td>
<td>1.8%</td>
</tr>
<tr>
<td>15-24</td>
<td>18%</td>
<td>14%</td>
<td>2.5%</td>
</tr>
<tr>
<td>25-64</td>
<td>49%</td>
<td>51%</td>
<td>1.8%</td>
</tr>
<tr>
<td>65+</td>
<td>13%</td>
<td>14%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Māori share</td>
<td>17%</td>
<td>16%</td>
<td>2.1%</td>
</tr>
<tr>
<td>- Of which aged under 25</td>
<td>56%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Aged dependency ratio</td>
<td>19</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Skills, income and work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary educated (% of population)</td>
<td>29%</td>
<td>29%</td>
<td>100%</td>
</tr>
<tr>
<td>Personal income</td>
<td>27,000</td>
<td>28,500</td>
<td>95%</td>
</tr>
<tr>
<td>Household income</td>
<td>58,500</td>
<td>63,800</td>
<td>92%</td>
</tr>
<tr>
<td>Employed</td>
<td>37,332</td>
<td>2,001,009</td>
<td>2%</td>
</tr>
<tr>
<td>Employment rate(^{(1)})</td>
<td>61%</td>
<td>62%</td>
<td>98%</td>
</tr>
<tr>
<td>Unemployment rate(^{(2)})</td>
<td>8%</td>
<td>7%</td>
<td>106%</td>
</tr>
<tr>
<td>Participation rate(^{(3)})</td>
<td>66%</td>
<td>67%</td>
<td>98%</td>
</tr>
<tr>
<td>Average firm size (excl. zero sized)</td>
<td>14</td>
<td>11</td>
<td>125%</td>
</tr>
<tr>
<td>Housing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home ownership rate(^{(4)})</td>
<td>62%</td>
<td>65%</td>
<td>96%</td>
</tr>
<tr>
<td>House price(^{(5)})</td>
<td>$289,439</td>
<td>$488,674</td>
<td>59%</td>
</tr>
<tr>
<td>House price to household income ratio</td>
<td>4.9</td>
<td>7.7</td>
<td>65%</td>
</tr>
</tbody>
</table>
Despite being the main urban centre, it is not a strong economic performer, nor the growth and vitality centre the region needs. With personal and household incomes below the national average, unemployment slightly above the average and home ownership rate that is below the average (despite modest house prices and rentals), it does not exude strength and purpose. Palmerston North needs to focus on its own development not only for its own sake but to become more of a powerhouse for the region.

Figures 46 and 47 reflect more growth areas than is evident in other parts of the region though most growth is in publicly funded areas – health and public sector. Education is significant in size, but is flagging in growth terms. Manufacturing, which could be associated with an urban centre, is modest in size and growth. The development of hi-technology businesses in and around the city is vital for the success of the region.

### Notes

- (1) employed share of working age population
- (2) unemployed share of labour force
- (3) labour force share of working age population
- (4) Owned or in trust share of total stated
- (5) Dec-2014, QVNZ average house price
- (6) Nov-2014, MBIE average rent
- (7) Annual rent share of house price. Does not assume vacancy or take any operating costs.
- (8) Household income less annualised weekly rent
- (9) Household income less mortgage payments assuming 20% deposit, 7% long term interest rate and 30 year term.

### Table

<table>
<thead>
<tr>
<th>Weekly rent</th>
<th>$299</th>
<th>$375</th>
<th>80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rental share of household income</td>
<td>27%</td>
<td>31%</td>
<td>87%</td>
</tr>
<tr>
<td>Gross rental yield</td>
<td>5.4%</td>
<td>4.0%</td>
<td>135%</td>
</tr>
<tr>
<td>Household income after housing costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After rent</td>
<td>42,938</td>
<td>44,318</td>
<td>97%</td>
</tr>
<tr>
<td>After mortgage payments</td>
<td>39,840</td>
<td>32,296</td>
<td>123%</td>
</tr>
</tbody>
</table>

*All data 2013 unless otherwise stated*
FIGURE 46: INDUSTRIES, SPECIALISATIONS, SIZE AND GROWTH – PALMERSTON NORTH CITY

Source: Statistics New Zealand, NZIER

FIGURE 47: REGIONAL COMPARATIVE ADVANTAGE – PALMERSTON NORTH CITY

Source: Statistics New Zealand, NZIER
Of the opportunities identified in this study distribution and transport is very important to the district. The application of technology and innovation to the agri-business sector is another significant area of potential development but this requires a committed and hard-edged strategy to its achievement which is so far not evident. Equally important is the “Outsourcing” opportunity in all its various facets.

Arguably the most important thing Palmerston North can be for the region is a social centre. The region requires a heart that attracts people and launches them into the local economy. This requires Palmerston North to see itself as the centre of the region and not as an isolated entity.

**OPPORTUNITIES IDENTIFIED BY LOCAL INFORMANTS**

**Encourage local spending** - as noted earlier in this report, Palmerston North is a large employer of public sector services including the health, education, defence and transport sectors. It also has a range of important medium scale manufacturing and processing plants. Informants stated that the biggest challenge for the city was to encourage persons employed in these sectors to make investments, grow businesses and spend their recreation in the city rather than taking advantage of the city’s central location and good transport network to go ‘elsewhere for the weekend.’

**Build on existing strengths** - Palmerston North also has some quite unique and highly successful manufacturers and processes of products and services. These businesses provide resilience and diversity to the local economy and a base from which aligned component supply industries can grow. Opportunities exist to continue to build like-minded or synergistic businesses from the success of those which already exist. A related need is to find business leaders who are committed to the growth of Palmerston North and then establish a way to get the sparks flowing between them. Those mentioned by informants as being particularly relevant to the above opportunities included:

- NZ Pharmaceuticals – manufacturer of bio-chemicals from by-products of the meat industry.
- Ashurst Engineering – focused on fabrication for energy generation.
- Prepared Foods – New Zealand’s largest processor of abalone and processor of ready to eat meals.
- Steelfort Engineering - New Zealand’s last manufacturer of lawn mowers.
- EziBuy – supplier of internet ordered goods.
- Noske Kaeser – provider of air conditioning, firefighting and refrigeration systems.
- Integration Technologies – supplier of oil industry retail automation systems.

**Palmerston North is the heart of the Manawatū** - A consistent message received from a wide range of key informants was that not only Manawatu, but the region as a whole needs a heart. The city needs to attract and keep more talent in the region. More effort is required to make the city more attractive and exciting. Suggestions included urging the Council to invest more in street works and public recreational, cultural and art facilities and amenities.

**Defence** - Government policy will result in the consolidation of defence training facilities, services and people from other centres to both Linton and Ohakea. Support industries
located in Palmerston North will benefit from this growth, as will the hospitality industry. The challenge for the hospitality sector will be to make Palmerston North the preferred location for defence personnel to spend their discretionary dollars. A further challenge, as mentioned earlier in this document, will be to provide employment opportunities for partners of those employed in the defence industry.

Secure existing businesses - another message shared by Palmerston North informants (of equal relevance in other districts) was the importance of public agencies, including those from both local and central government, recognising the value of existing large and important private sector employers by seeking out ways to enable them to grow and by making their lives as easy as they can be. Examples included: streamlining regulatory demands; providing robust infrastructure (water and transport) and; keeping rate demands and other local authority costs down.

Education opportunities - Palmerston North has been a long term supplier of education and training services for international students. Some of this has been supplied by Massey University. Other services have been supplied by the Universal College of Learning or UCOL. UCOL has three campuses in the lower half of the North Island of New Zealand and also provides on-line learning. Interest in New Zealand from international students waxes and wanes. Informants have suggested that a more courageous marketing campaign would realise growth opportunities.

Air freight - the presence of EziBuy in the city, as well as manufacturers of shelf-ready, short run or light weight precision products for international markets, have been important in sustaining a daily air freight service from Palmerston North to Auckland. Such a service will continue to be important. It is understood that an upgrade of this air freight fleet is planned. This provides a base for consideration of expansion in both volume and weight – to the benefit of both the transporter and the businesses needing to transport their products to market. Expanded market opportunities may follow.

TARARUA

Tararua is a small, largely rural district with a shrinking population. Its population is also ageing. Incomes are below the national average.

The largest employers in Tararua are farming and processing-related:

- Sheep and beef sector employment is stagnant, but dairy hiring is growing slightly. Agriculture support services, meat and dairy processing are all shedding labour.

- Retail is large (by district standards) and growing, but residential care and school education are in decline.

- It has suffered from the closure of the Oringi Freezing Works in 2008 although the abandoned plant is being used for a number of small scale business developments.
### TABLE 30: SUB-REGIONAL PROFILE – TARARUA

<table>
<thead>
<tr>
<th></th>
<th>Tararua district</th>
<th>NZ</th>
<th>% of NZ</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>17,450</td>
<td>4,442,100</td>
<td>0.4%</td>
</tr>
<tr>
<td>Population density (per km²)</td>
<td>4</td>
<td>16</td>
<td>24.7%</td>
</tr>
<tr>
<td>Age composition (% of regional total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>22%</td>
<td>20%</td>
<td>0.4%</td>
</tr>
<tr>
<td>15-24</td>
<td>11%</td>
<td>14%</td>
<td>0.3%</td>
</tr>
<tr>
<td>25-64</td>
<td>50%</td>
<td>51%</td>
<td>0.4%</td>
</tr>
<tr>
<td>65+</td>
<td>17%</td>
<td>14%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Māori share</td>
<td>22%</td>
<td>16%</td>
<td>0.6%</td>
</tr>
<tr>
<td>- Of which aged under 25</td>
<td>52%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Aged dependency ratio</td>
<td>28</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td><strong>Skills, income and work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary educated (% of population)</td>
<td>17%</td>
<td>29%</td>
<td>57%</td>
</tr>
<tr>
<td>Personal income</td>
<td>25,100</td>
<td>28,500</td>
<td>88%</td>
</tr>
<tr>
<td>Household income</td>
<td>47,500</td>
<td>63,800</td>
<td>74%</td>
</tr>
<tr>
<td>Employed</td>
<td>7,857</td>
<td>2,001,009</td>
<td>0%</td>
</tr>
<tr>
<td>Employment rate(1)</td>
<td>63%</td>
<td>62%</td>
<td>101%</td>
</tr>
<tr>
<td>Unemployment rate(2)</td>
<td>6%</td>
<td>7%</td>
<td>86%</td>
</tr>
<tr>
<td>Participation rate(3)</td>
<td>67%</td>
<td>67%</td>
<td>100%</td>
</tr>
<tr>
<td>Average firm size (excl. zero sized)</td>
<td>6</td>
<td>11</td>
<td>54%</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home ownership rate(4)</td>
<td>67%</td>
<td>65%</td>
<td>104%</td>
</tr>
<tr>
<td>House price(5)</td>
<td>$150,712</td>
<td>$488,674</td>
<td>31%</td>
</tr>
<tr>
<td>House price to household income ratio</td>
<td>3.2</td>
<td>7.7</td>
<td>41%</td>
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</table>
### Weekly Rent

<table>
<thead>
<tr>
<th>Source</th>
<th>Nov-2014 MBIE Average Rent</th>
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<tbody>
<tr>
<td>$179</td>
<td>$375</td>
</tr>
<tr>
<td>48%</td>
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</tr>
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</table>

### Rental Share of Household Income

<table>
<thead>
<tr>
<th>Source</th>
<th>20%</th>
<th>31%</th>
<th>64%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

### Gross Rental Yield

<table>
<thead>
<tr>
<th>Source</th>
<th>6.2%</th>
<th>4.0%</th>
<th>155%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Household Income after Housing Costs

<table>
<thead>
<tr>
<th>Source</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>After Rent</td>
<td>38,174</td>
</tr>
<tr>
<td>After Mortgage Payments</td>
<td>37,784</td>
</tr>
<tr>
<td>86%</td>
<td></td>
</tr>
</tbody>
</table>

### All data 2013 unless otherwise stated

Taraua suffers severely from the loss of young people, the only benefit of which is that it has a good unemployment rate (below the national average) and a high employment rate. The result of this loss of young people is a lack of labour in key industries. House prices are very low, as are rents. As is evident from Figure 51, there are almost no industries in the growth segment and the only activity of some scale is agriculture, which is losing employment and is below the growth threshold. Primary activity is also the only area of activity that could be described as a comparative advantage. The one-dimensional nature of the district’s economy is a major difficulty when it comes to achieving growth.

The key question is: how will the opportunities and enablers identified in this report assist Tararua? There are modest opportunities in tourism, Mānuka honey and potential for productivity improvements in sheep and beef farming. There is significant activity aimed at boosting the local economy amongst some locals (for example, projects at the old Oringi Freezing Works) and it is this enthusiasm and commitment from groups and individuals that is going to make the difference in the long run. Arguably, another comparative advantage, besides the primary sector is this small number of committed people.

There are a number of small to medium-sized businesses located in Pahiatua, Dannevirke, Norsewood and other small towns which need to build on the networks and leverage the associated skills contained within like-minded businesses. These collaborations are capable of adding to the efficiency and reducing the cost of the supply chain. This is particularly pertinent to clothing manufacture lines.
FIGURE 48: INDUSTRIES, SPECIALISATIONS, SIZE AND GROWTH - TARARUA

Source: Statistics New Zealand, NZIER

FIGURE 49: REGIONAL COMPARATIVE ADVANTAGE – TARARUA

Source: Statistics New Zealand, NZIER
OPPORTUNITIES IDENTIFIED BY LOCAL INFORMANTS

Super fund - informants suggested that several Tararua businesses had market opportunities and capacity to grow but were short of equity. The recommendation was that the managers of the New Zealand Superannuation Fund be encouraged to chunk down investment packages to enable them to back smaller scale regional investment opportunities. The size of package of most interest to businesses located in places like Tararua was $2-5 million.

Iwi settlement funds - with recent good progress with Treaty Settlement negotiations, iwi key informants noted their willingness to partner with business entrepreneur – for learning and leverage of skills and to achieve the best return on new capital. Land development was viewed as a priority given that it can be held in perpetuity.

Cracking the export market - of particular interest were opportunities in the clothing market noting the strength of existing Tararua businesses in the manufacture of safety clothing, uniforms, sports attire and clothing using merino wool and other natural fibres. Interventions such as the “Growing Business” enabler outlined in this report are applicable to this district.

Internet marketing - some Tararua businesses are growing by increasingly becoming the broker or middle-man in a supply chain rather than simply a manufacturer. The example was quoted of a clothing manufacturer who was sourcing materials from NZ, organising product manufacture in China or Philippines and then marketing and selling the product via the internet, with the New Zealand brand and provenance given due emphasis. Distribution was then carried out with the help of NZ Post. The model was viewed as a good one to set up as a case study for others to emulate.

Tourism - it was of concern to Tararua informants that the tourism attractions in their area sometimes get overlooked by domestic and international visitors in favour of better known attractions in Hawke’s Bay and Ruapehu. Attention was drawn to the comparative attractiveness of the uncrowded outdoor recreation opportunities provided in the northern Tararua and Ruahine Ranges including hunting, trekking and fishing. Attention was also drawn to the mountain biking and walking opportunities associated with upgraded tracks and facilities around the Manawatū Gorge and the eastern part of the region. The suggestion was made that the District needed to establish better links to the tourism marketing initiatives established to promote southern Hawke’s Bay attractions and to grow packages of related multi-day activities.

Skilled labour - some Tararua clothing manufacturers noted the difficulties they were experiencing recruiting skilled machinists and other staff. Options suggested to address this situation included training New Zealanders and supporting the migration of experienced machinists from the Philippines and elsewhere. The preferred path was to do both with an emphasis towards using local people for local jobs through programmes such ‘youth pathways’, designed to match school leavers to training and then to job opportunities.

Local government regulation - businesses everywhere referenced the challenges they faced in dealing with local government regulatory requirements. One informant noted the near loss of a new business suited to Dannevirke simply because it was all made too difficult. Reference was also made to the challenges now faced in converting land to
dairying because of nutrient loss limits. The suggested interventions to overcome these challenges have been well canvassed in the Productivity Commission’s report ‘Towards Better Local Government Regulation, Productivity Commission, May 2013’ Informants wanted the recommendations of this report implemented.

**Better use of stranded assets** - the Oringi Business Centre near Dannevirke is an outstanding example of how stranded assets may be used to create new employment opportunities. The original Oringi Freezing Works closed in 2008. Water and waste disposal, refrigeration and chilling, storage, rail, stable power, space to expand, good truck access and the ability to manufacture goods in premises which can be made sterile all remain as assets capable of expanded use by new businesses. The facility was taken over by Scanpower Customer Trust which has actively marketed the benefits of the site and has now established six separate substantial businesses on the site with more to come. The essential ingredients for success were: motivated and activated leadership; good governance; extensive marketing and; price competitiveness. The site has additional capacity to expand.

**Road infrastructure** - Tararua informants urged that investment in upgrading the Saddle Road and Pahiatua Track connections between the east and west of the Tararua divide continue. This was viewed by informants as a sensible contingency measure and also as a means of transporting agricultural product and workers between different parts of the region.

**Attractiveness of small towns** - a challenge for the Tararua District is to encourage the 50 extra people needed to operate the expanded Fonterra plant at Pahiatua to live in the local area. Informants suggested this may be best achieved by promoting the comparative low cost and general attractiveness of rural and small town living.

**Best use of land use capability** - Tararua District Council has completed an extensive assessment of the match between location, land and climate requirements and the likely ability to grow niche products such as feijoa. This was known as the ‘Go Project’. The approach adopted by the Council may have value for adoption in other districts. One of the big opportunities identified within the report and in ancillary research was that of expanding all aspects of the flax industry. Potential uses included use in bio-composite materials, gels, seed oil, pulp and paper and for phyto-medical purposes. Environmental benefits, including the water quality benefits associated with the use of flax in planting riparian strips, were also identified. Current constraints included market development and the construction of efficient harvesting and processing equipment.
Horowhenua has a modest-sized population, which is barely growing at 0.2%pa compared to 1.1% nationally\textsuperscript{106}. The population is relatively old (23% over 65, compared to 14% nationally).

Horowhenua is larger than Ruapehu, Rangitikei and Tararua. It has a large and growing over 65 age group and significant deficits in the youth and income earning age-groups.

The demographics and industry structure mean that the labour market is relatively weak. Compared to New Zealand as a whole, the population is less likely to be in employment and earns less. In fact, the district has a surprisingly high unemployment rate, indicating some availability of labour. Housing is not sufficiently cheap to alleviate low regional incomes.

The two largest employers are schools (for young people) and residential care (for older people). Farming is the backbone of the district — although in relatively unique offerings:

- School education is a large employer, but it is not growing.
- Residential care and allied health services are growing strongly. This is consistent with an ageing population.
- Farming and processing are important parts of the economy. Dairy, horticulture (mushroom and vegetable growing), poultry farming and meat processing are the largest employers.

Its proximity to Wellington is a key strength in its economy and this will be aided with the completion of the Transmission Gully and Kapiti Expressway roading projects in the area over the next few years. Capital injection is also expected from two impending Treaty of Waitangi settlements.

Of the opportunities identified in this study, those most relevant to Horowhenua are care of older people and retirement living which we believe is a potential game-breaker for the district and the enabler “Growing Businesses”. Fresh vegetables and poultry are also significant opportunities but as both involve major effort on developing export markets they have to be seen as longer term. There is a significant foundation of manufacturing in the district which, with improved performance, could strengthen the local economy, but these industries (such as textiles) are always going to struggle with their lack of critical mass.
### TABLE 31: SUB-REGIONAL PROFILE - HOROWHENUA

<table>
<thead>
<tr>
<th></th>
<th>Horowhenua district</th>
<th>NZ</th>
<th>% of NZ</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>31,200</td>
<td>4,442,100</td>
<td>0.7%</td>
</tr>
<tr>
<td>Population density (per km²)</td>
<td>29</td>
<td>16</td>
<td>181.2%</td>
</tr>
<tr>
<td>Age composition (% of regional total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>19%</td>
<td>20%</td>
<td>0.7%</td>
</tr>
<tr>
<td>15-24</td>
<td>11%</td>
<td>14%</td>
<td>0.6%</td>
</tr>
<tr>
<td>25-64</td>
<td>46%</td>
<td>51%</td>
<td>0.6%</td>
</tr>
<tr>
<td>65+</td>
<td>23%</td>
<td>14%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Māori share</td>
<td>23%</td>
<td>16%</td>
<td>1.1%</td>
</tr>
<tr>
<td>- Of which aged under 25</td>
<td>52%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Aged dependency ratio</td>
<td>41</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td><strong>Skills, income and work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary educated (% of population)</td>
<td>16%</td>
<td>29%</td>
<td>55%</td>
</tr>
<tr>
<td>Personal income</td>
<td>21,800</td>
<td>28,500</td>
<td>76%</td>
</tr>
<tr>
<td>Household income</td>
<td>39,200</td>
<td>63,800</td>
<td>61%</td>
</tr>
<tr>
<td>Employed</td>
<td>11,760</td>
<td>2,001,009</td>
<td>1%</td>
</tr>
<tr>
<td>Employment rate (1)</td>
<td>51%</td>
<td>62%</td>
<td>82%</td>
</tr>
<tr>
<td>Unemployment rate (2)</td>
<td>10%</td>
<td>7%</td>
<td>142%</td>
</tr>
<tr>
<td>Participation rate (3)</td>
<td>56%</td>
<td>67%</td>
<td>84%</td>
</tr>
<tr>
<td>Average firm size (excl. zero sized)</td>
<td>8</td>
<td>11</td>
<td>72%</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home ownership rate (4)</td>
<td>69%</td>
<td>65%</td>
<td>106%</td>
</tr>
<tr>
<td>House price (5)</td>
<td>$203,725</td>
<td>$488,674</td>
<td>42%</td>
</tr>
<tr>
<td>House price to household income ratio</td>
<td>5.2</td>
<td>7.7</td>
<td>68%</td>
</tr>
</tbody>
</table>
Weekly rent (6) | $218 | $375 | 58%
---|---|---|---
Rental share of household income | 29% | 31% | 95%
---|---|---|---
Gross rental yield (7) | 5.6% | 4.0% | 140%
---|---|---|---
Household income after housing costs
- After rent (8) | 27,846 | 44,318 | 63%
---|---|---|---
- After mortgage payments (9) | 26,066 | 32,296 | 81%

*All data 2013 unless otherwise stated*

Notes:
(1) employed share of working age population
(2) unemployed share of labour force
(3) labour force share of working age population
(4) Owned or in trust share of total stated
(5) Dec-2014, QVNZ average house price
(6) Nov-2014, MBIE average rent
(7) Annual rent share of house price. Does not assume vacancy or take any operating costs.
(8) Household income less annualised weekly rent
(9) Household income less mortgage payments assuming 20% deposit, 7% long term interest rate and 30 year term.

**FIGURE 50: INDUSTRIES, SPECIALISATIONS, SIZE AND GROWTH – HOROWHENUA**

Source: Statistics New Zealand, NZIER
Connectivity is the key to market opportunity - market opportunities in the District will expand with the completion of Transmission Gully and the Expressway projects. These are part of the ‘Roads of National Significance’ programme. Informants noted this will provide a market of 700,000 people within an hour’s drive of Levin. This will enable more goods and services to be supplied to a wider market e.g. joinery or aluminum windows to be supplied for house construction in Wellington. It will also bring the Horowhenua area ‘closer’ for Wellington residents for the purchase of holiday homes or as a place to retire.

Input costs - in terms of enablers, the region has land and labour at rates which are very competitive when compared to Auckland and Wellington. There is very little knowledge outside Levin of these comparative costs. More information and marketing is required, for example, marketing the fact that house prices are half those of the average price in New Zealand together with the marketing of other district attributes would seem to be a priority.

Other advantages of the area include the stable workforce, reduced living costs, good soil, good schools, good health facilities and proximity to accessible tertiary education facilities. Marketing needs to change external perceptions about the District, as an informant said “to see the comparative benefits of the opportunity for business set up, holiday home purchase or retirement in the Horowhenua”.

Modernising and reinvigorating family companies - informants suggested that the Horowhenua area has a high proportion of family-owned companies which were established in the 1960s and 1970s. These companies were said to be sometimes insular in their outlook and have been slow to embrace the tools which characterise companies established more recently. These tools include ICT, HR management skills, methods to...
protect unique IP, collaboration with partner industries and the use of external advisors. In particular, it was suggested there is a big gap in the web-readiness of many of these smaller businesses, with some not having a website at all, and others applying outdated technology. Assistance was said to be required to create a more ‘wired community’. One suggested intervention was to bring in a team of ICT-savvy graduates with formal training in website development and online selling, and then send them out to improve the websites and web-readiness of local businesses as a shared resource (note: this wouldn’t necessarily need to be funded by central government, though perhaps an opportunity for cost sharing between central government, local government and local businesses would be an advantage).

Local supply chains and cluster opportunities - businesses in the district don’t appear to be well linked to each other, meaning that opportunities to reduce transport or logistic costs or to reduce the cost of input products are sometimes missed. These clusters of businesses cover engineering, food processing, fabric and clothing manufacturing and retirement and healthcare providers. Informants suggested that these supposed “like-minded businesses” don’t talk to each other enough – particularly to other businesses upstream and downstream in their supply chains. Informants suggested there was a need for a skilled individual or platform to help them build a more collaborative approach. In more particular terms, possible interventions to support better supply chain integration might be:

- Refresh the local business networking institutions in order to get more businesses alongside each other and improve supply chain knowledge or, as one informant put it – “energise our own backyard”.
- Encourage industry and the District Council to collaborate in establishing a new industrial or manufacturing park to enable like-minded companies to co-locate
- Employ a coordinator or facilitator to seek out and foster networking opportunities and to promote ‘clusters’ of like-minded people who can leverage synergies e.g. small engineering, manufacturing, textile industries working together
- Take advantage of a new NZTE ‘coalition programme’ which looks to establish better connection between different but like-minded players in a supply chain

External focus (or lack of it) - informants suggested some Horowhenua businesses tended to be inward looking rather than market focused. The lack of a Board of Directors in many of the companies to provide strategic guidance was said to contribute to this problem. The classic ‘working in the business rather than on the business’ was said to apply to many of these businesses. As a result, these businesses were said to lack the strategy and drive to grow beyond the SME level. As one informant said: “they are afraid to grow and they need help to build the courage to go there” and that this sometimes implies “taking the family hands off the reins by pulling in external expertise”. Interventions to overcome this challenge may include working with the Institute of Directors to develop a ‘shared’ Board of Directors (or Advisory Board) that a number of businesses might tap into. The focus of such advice should be toward strategy development, growth and marketing.

Scale for export success - many Horowhenua businesses were said to lack the scale necessary to address export opportunities. Instead businesses were said to sometimes undercut each other in an attempt to gain a greater domestic market share. Possible interventions to overcome issues related to a lack of scale and also to improve export opportunities identified by informants included:
Better linking to NZTE to crack the export opportunity barrier noting this is a distinct limiting factor affecting the growth of both the horticultural – particularly asparagus – and manufacturing sectors.

Cost-sharing around market development initiatives, perhaps modelled off the ‘Seafood into China’ initiative applied a few years ago. This could be something for NZTE to assist with. The objective would be to reduce the average fixed cost of exporting for small firms.

Better using the region’s people-connections, for example by inviting existing current Chinese market gardeners in the district to build marketing opportunities through and with the Chinese relatives of existing market gardeners to boost international linkages.

Water storage and reticulation - some informants suggested agricultural productivity in the Horowhenua area could be improved by working harder to establish irrigation opportunities, including further exploring local deep ground water sources and tapping into the water storage capacity at the Mangawhero Dam near Shannon.

Elderly care sector - 36% of the population living in the lower North Island in 2030 will be over the age of 65. Horowhenua will be extremely accessible to the larger population base of Wellington. The location, particularly with the benefit of current road improvement projects will also enable children living and working in Wellington to travel with ease to see their parents. The comparative cost of elderly care services and homes in the Horowhenua may be particularly attractive to those with moderate incomes. (Note - more detail on this opportunity and the interventions which may help to unleash it is provided earlier in this report).
SECTION 9:
APPENDIX 1 – TECHNICAL ADVISORY GROUP (TAG)
# 9. APPENDIX 1 – TECHNICAL ADVISORY GROUP (TAG)

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rob Bartley</td>
<td>Bartley Group</td>
</tr>
<tr>
<td>Allan Benbow</td>
<td>Metalform</td>
</tr>
<tr>
<td>Anne-Marie Broughton</td>
<td>Te Ranga Tupua/Te Kaahui o Rauru</td>
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<td>Mark Cleaver</td>
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<tr>
<td>Dennis Emery</td>
<td>Ngāti Kauwhata, Ngati Raukawa</td>
</tr>
<tr>
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<td>Higgins Group Ltd</td>
</tr>
<tr>
<td>Grant Huwyler</td>
<td>Te Ranga Tupua</td>
</tr>
<tr>
<td>David Lanham</td>
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<td>Michael McCartney</td>
<td>Horizons Regional Council</td>
</tr>
<tr>
<td>John Signal</td>
<td>Venison Packers Feilding</td>
</tr>
<tr>
<td>Andrew Watters</td>
<td>MyFarm</td>
</tr>
<tr>
<td>Cam Lewis</td>
<td>Lewis Dairies and Tendertips</td>
</tr>
</tbody>
</table>
10. APPENDIX 2 – REFERENCES


New Zealand Cycle Trail Design Guide

prepared for

Ministry of Business Innovation and Employment

February 2015 (4th edition)
This design guide was prepared by a team led by ViaStrada Ltd for the Ministry of Business, Innovation and Employment (MBIE). The assistance of the following reviewers in preparing or updating this guide is greatly appreciated:

- Anita Middlemiss (Department of Conservation)
- Calvin Cochrane (Department of Conservation)
- James Hughes (New Zealand Transport Agency)
- John Dunn (Ministry of Economic Development)
- Jonathan Kennett (Kennett Brothers Ltd)
- Mark Edwards (New Zealand Transport Agency)
- Tim Hughes (New Zealand Transport Agency)
- Gerry Dance (New Zealand Transport Agency)

This is the fourth edition of the design guide. The first edition was published in March 2010. The considerable efforts of Jonathan Kennett in revising the design guide are greatly appreciated.

### Quality Assurance Statement

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<thead>
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<td>Date:</td>
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### Disclaimer:

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Any person, including, without limitation, their respective consultants, employees and agents, referring to or relying on this document do so at their own risk in all respects. Every person referring to or relying on this document must satisfy themselves that cycle trails are designed and constructed in accordance with sound and acceptable engineering standards and in compliance with all laws.

Cover photo: Hawke’s Bay Trails (photographer: Jonathan Kennett)
Explanatory Note to Cycle Trail Design, Fourth Edition

The New Zealand Cycle Trail Design Guide was first published in February 2010 to assist people involved in planning, designing or building cycle trails that would make up the New Zealand Cycle Trail (NZCT).

During the construction of the "Great Rides" lessons have been learnt along the way and this fourth edition updates and clarifies key technical information, particularly relating to trail grades. A list of significant amendments is provided below.

Schedule of Amendments

Second edition (August 2011)

- Simplified and more consistent guidance on gradients (Sections 3 and 4);
- Introduction of a Grade 5 on-road trail type (Section 4);
- Amended guidance on gravel roads (Section 4.4);
- Guidance for audio tactile profile road markings and raised reflective pavement markers (Section 4.5);
- Information on seasonal traffic volume variations (Section 4.6); and
- Provision of an appendix summarising trail gradient information (Appendix 1).

Fourth edition (February 2015)

- Gradient table (Table 4) amended to include greater slope.
- Further guidance added to section on chipseal (section 3.9.3) and amalgamated with section on asphaltic concrete
- Inclusion of framework to assess viability of open roads to accommodate NZCT routes (section 4.7), and associated updates to other tables and figures.
- Addition of "squeeze barrier" specifications to prevent motorcycle use of cycle trails (section 6.7.4).
- Various photo updates
Executive Summary

The New Zealand Cycle Trail Design Guide draws on a wealth of trail design and construction techniques from New Zealand and around the world. It will help you and your team build the best possible trail with the resources available.

This guide compiles information from a number of existing guides, referring directly to them for more detail if needed. These other guides provide specific information relating to different components of the NZCT, whether they be mountain bike tracks, rail trails, urban cycle paths or sections of quiet country roads.

The basis for trail design is the selection of a trail grade, and recognition of the trail criteria that define that grade. This selection will reflect the chosen target audience, from "renaissance riders" seeking easy Grade 1 trails to mountain biking enthusiasts looking for higher grade trails to test their fitness and skill.

Consistency is the key to the NZCT’s success. The NZCT comprises trails throughout the country and cyclists will form their impression of the NZCT based on their experiences of individual trails. On a well-designed trail, users will enjoy the beautiful scenery and riding experience, without being distracted by design flaws, such as a gap in signage or uncharacteristically difficult sections. Their memories will be of the scenery, the camaraderie and the sense of accomplishment, not whether the trail was too hard for them in places, or they got lost along the way. The Cycle Trail Design Guide explains the how to avoid these pitfalls, and plan a trail that will be consistent, not only from one end to the other, but also within the whole NZCT network.

Many trails are in remote parts of New Zealand, allowing access to pristine environments and iconic landscapes. The cycle trails in these locations need to be designed, built and maintained appropriately to fit into their natural surroundings.

This guide streamlines the design process and provides an invaluable range of criteria and techniques to ensure you build sustainable trails that meet the expectations of the target audience, and require minimum ongoing maintenance. It includes chapters on:

- Route planning
- Off-road trails
- On-road trails
- Crossings and intersections
- Structural design
- Signage
- Supporting facilities
- Path and road maintenance
- Monitoring and evaluation

The Cycle Trail Design Guide also encourages collaboration amongst trail builders and will be updated periodically. Suggestions for amendments should be sent to: info@nzcycletrail.com
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## Glossary

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<th>Definition or explanation</th>
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</thead>
<tbody>
<tr>
<td>AC</td>
<td>Asphaltic concrete, a relatively-expensive road surface usually used for higher-volume roads. Because it provides a smooth and durable riding surface it may be suitable for high-volume or more urban cycle trails.</td>
</tr>
<tr>
<td>Austroads</td>
<td>The association of Australian and New Zealand road transport and traffic authorities. It aims to promote improved road transport outcomes.</td>
</tr>
<tr>
<td>Berm (or superelevation)</td>
<td>Term used by mountain bike trail designers for a slope across a trail provided to assist cornering on bends. An inwards slope or berm on a bend allows higher speeds of travel than would otherwise be possible with a flat track. See also “superelevation”.</td>
</tr>
<tr>
<td>Carriageway</td>
<td>The portion of road where vehicles travel (i.e. the width of seal or gravel of a formed road).</td>
</tr>
<tr>
<td>Clearance</td>
<td>The distance (vertical or horizontal) between a trail and an obstruction (e.g. overhead bridge, fence, tree).</td>
</tr>
<tr>
<td>Climbing turn</td>
<td>A curve in a trail located on a sloped section.</td>
</tr>
<tr>
<td>Cycle lane</td>
<td>A type of on-road trail for cyclists, delineated by paint, where motor vehicles are not permitted.</td>
</tr>
<tr>
<td>Cycle route</td>
<td>A course of direction for cyclists between two key locations or connecting a series of key locations. May comprise on-road and / or off-road sections.</td>
</tr>
<tr>
<td>Cycleway</td>
<td>A route for cyclists.</td>
</tr>
<tr>
<td>DOC</td>
<td>Department of Conservation</td>
</tr>
<tr>
<td>Gateway</td>
<td>A feature used to provide an attractive threshold at the start of a trail.</td>
</tr>
<tr>
<td>Gradient reversal</td>
<td>Deliberately-designed section of trail where long slopes are interrupted by short sections where the gradient reverses.</td>
</tr>
<tr>
<td>Grade separation</td>
<td>Where a cycle trail crosses a road at a different elevation by way of a bridge or underpass.</td>
</tr>
<tr>
<td>Greenway</td>
<td>See path. This term is commonly used in the UK.</td>
</tr>
<tr>
<td>Ground Effect</td>
<td>A company specialising in cycle clothing and accessories that will generally provide copies of the IMBA guide to non-profit trail-building groups.</td>
</tr>
<tr>
<td>IMBA</td>
<td>International Mountain Biking Association</td>
</tr>
<tr>
<td>Intervisibility</td>
<td>The ability of two road or trail users to see each other as they approach each other.</td>
</tr>
<tr>
<td>Key attraction</td>
<td>An “iconic” location that will generate cycle tourism</td>
</tr>
<tr>
<td>Level of Service</td>
<td>The quality of use experienced by someone on a trail.</td>
</tr>
<tr>
<td>Midblock</td>
<td>A section of road between (not at) intersections.</td>
</tr>
<tr>
<td>Mode</td>
<td>A form of transport e.g. cycling, walking, motor vehicle.</td>
</tr>
<tr>
<td>New Zealand Cycle Trail (NZCT)</td>
<td>An initiative started by the New Zealand government and managed by the Ministry of Economic Development to create a series of iconic cycle routes throughout the country.</td>
</tr>
<tr>
<td>NZTA</td>
<td>New Zealand Transport Agency</td>
</tr>
<tr>
<td>Term</td>
<td>Definition or explanation</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Path</td>
<td>An off-road trail for cyclists and or pedestrians. This is the official engineering term, as opposed to &quot;track&quot;. See also &quot;trail&quot;.</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>Any person on foot or using a powered wheelchair or scooter or a wheeled means of conveyance propelled by human power, other than a cycle.</td>
</tr>
<tr>
<td>Pinch point</td>
<td>A localised section of a trail where width provision for cyclists is substandard.</td>
</tr>
<tr>
<td>Rail trail</td>
<td>A path formed along a railway corridor (the railway may be either active or disused).</td>
</tr>
<tr>
<td>Route</td>
<td>A link between two key locations or connecting a series of key locations. In the NZCT context “routes” are provided specifically for cyclists, although they may also be used by pedestrians.</td>
</tr>
<tr>
<td>RRPM</td>
<td>Raised reflective pavement marker.</td>
</tr>
<tr>
<td>Segregated path</td>
<td>A type of off-road trail for cyclists and pedestrians where the two modes are designated their own sections through use of “soft” measures (e.g. paint markings) rather than physical separation.</td>
</tr>
<tr>
<td>Separated path</td>
<td>A type of off-road trail for cyclists only, running parallel and adjacent to a similar facility for pedestrians only.</td>
</tr>
<tr>
<td>Shared path</td>
<td>A type of off-road trail for cyclists and pedestrians without separation or segregation of the two mode groups.</td>
</tr>
<tr>
<td>Singletrack</td>
<td>A mountain biking path designed for cyclists to ride single file, sometimes in one direction only.</td>
</tr>
<tr>
<td>Superelevation</td>
<td>A slope across a trail often used to assist cornering on bends. An inwards slope allows higher speeds of travel than would otherwise be possible with a flat track. See also “berm”.</td>
</tr>
<tr>
<td>(or berm)</td>
<td></td>
</tr>
<tr>
<td>Sustrans</td>
<td>UK charity that administers its national cycle trail.</td>
</tr>
<tr>
<td>Switchback</td>
<td>A curve in a trail on level ground, even if the approach and departure to the curve are on sloped sections.</td>
</tr>
<tr>
<td>Track</td>
<td>This term is commonly used for natural surface cycle paths or mountain biking trails. See also &quot;path&quot; and &quot;trail&quot;.</td>
</tr>
<tr>
<td>Trail</td>
<td>This term is used for the NZCT and, at a broad level, technically includes on-road cycle routes as well. In general NZ use, “trail” is usually associated with paths aimed at a broad cross-section of cyclists and potential cyclists, e.g. “Rail Trails”. See also &quot;path&quot;.</td>
</tr>
</tbody>
</table>
1 Introduction

1.1 Cycle Trail Design Guide Purpose

This cycle trail design guide is intended to help anyone planning, designing or building parts of the New Zealand Cycle Trail (NZCT). It is also useful for those applying for NZCT funding.

Consistency is the key to the NZCT’s success. The NZCT comprises multiple routes throughout the country and cyclists form their impression of the NZCT (and even of New Zealand) based on their experiences on individual routes. On a well-designed route, users will not be distracted or endangered by design flaws or the task of riding and will be able to enjoy the iconic scenery and riding experience. Their memories will be of the scenery, the camaraderie and the sense of accomplishment, not whether the surface was too rough, the gradients too steep or the trail too narrow.

1.2 Related Documents and Design Guides

Besides this design guide, designers are also likely to require access to other manuals and design guides as outlined below. These sources contain useful information related to design and construction of NZCT routes but none of them provides comprehensive, stand-alone guidance for the NZCT. This design guide aims to tie together the relevant parts of various existing manuals. It also supplements and advises on their use where necessary. These manuals are cited throughout this guide, with full references and web-links, where appropriate, given at the end of the document. This guide is intended to represent best practice and should be used for guidance where other documents indicate different advice or values for design parameters. Designers should always use “sound engineering judgement” in their designs and seek external qualified advice where necessary.

1.2.1 NZCT Funding Process Guide

This design guide is intended to be used in conjunction with the NZCT Funding Process Guide (Ministry of Tourism, 2009) which, amongst other things, specifies certain design requirements for different grades of trail so that routes meet the NZCT objectives. Well-designed routes are more likely to obtain NZCT funding.

The NZCT Funding Process Guide (Ministry of Tourism, 2009) is freely available online from the Ministry of Economic Development website.

1.2.2 DOC Track Construction and Maintenance Guidelines

Designers of off-road trails should also use the Department of Conservation's (DOC) Track Construction and Maintenance Guidelines (2008) in conjunction with this guide. The DOC guide gives a comprehensive account of all major steps in the development of an off-road trail, including landscape considerations, design, construction, water management and maintenance. It is intended principally for trails used by walkers but sometimes includes advice for mountain bike trails. Not all sections in the DOC guide are considered relevant to the NZCT, for example steps (covered in Chapters 19 and 33) are not recommended on the NZCT.

The DOC Track Construction and Maintenance Guidelines (DOC, 2008) are freely available online from the DOC website.
1.2.3 IMBA Trail Solutions
Designers of off-road trails may also find the International Mountain Bicycling Association’s (IMBA) Trail Solutions (2004) guide useful. The IMBA guide provides appropriate guidance for NZCT trails in some circumstances, however the important concepts are all covered in the DOC Track Construction and Maintenance Guide (Section 1.2.2) which is freely available and tailored to the New Zealand context. The IMBA guide principally covers the design of mountain bike tracks but is less useful for less “technical” or demanding off-road trails (such as rail trails), or on-road facilities.

Ground Effect (a company specialising in cycle clothing and accessories) supplies the IMBA guide free of charge to “worthy” non-profit trail developers.

1.2.4 Connect2 and Greenways Design Guide (Sustrans)
The Connect2 and Greenways Design Guide (Sustrans, 2009) was developed by Sustrans, the organisation responsible for the 20,000 km national cycle network in the UK, to aid in the design, construction and ongoing use of both off-road and on-road trails. It is a useful guide with direct applications for NZ and is referenced throughout this guide.

The Connect2 and Greenways Design Guide (Sustrans, 2009) is freely available from the Sustrans website.

1.2.5 Standards New Zealand HB 8630:2004
The discussion on design of structures on off-road trails in Chapter 6 is based on the New Zealand Handbook for Tracks and Outdoor Visitor Structures – SNZ HB 8630:2004 (Standards New Zealand, 2004) but only designers requiring a more detailed understanding need to purchase the standard. HB 8630 is due to be updated in the near future.

Structural design for on-road structures (including “clip-on” paths to road bridges) should follow NZS 4121:2001 (Standards New Zealand, 2001), AS/NZS 1170 (Standards NZ, 2004) and the Transit NZ Bridge Manual (2003) with geometric features of cycle trails designed according to the Austroads Guide to Road Design (2009) (primarily parts 3, 4 and 6), modified where appropriate by the NZ Supplement to Austroads Part 14: Bicycles (Transit, 2008a).

HB 8630 and other standards are available for purchase from Standards New Zealand. MOTSAM and the Transit NZ Bridge Manual are freely available through the NZTA website.

1.2.6 Austroads guides
Austroads Guide to Road Design Part 6A: Pedestrian and Cyclist Paths (2009) is a useful reference and is referred to in this design guide, particularly for easier (Grade 1 and 2) trails. For on-road facilities, the Guide to Road Design, Parts 3 and 4 (including sub-parts) and the superseded Austroads Guide to Traffic Engineering Practice Part 14: Bicycles (1999) with the accompanying NZ Supplement to Austroads Part 14: Bicycles¹ (Transit, 2008a) should be referenced.

The Austroads guides are available for purchase through Austroads.

¹ Austroads GTEP Part 14 has been superseded by the Austroads Guide to Road Design (GRD) series, however the advice on cycle design within the associated NZ Supplement, is considered more appropriate than the GRD series for New Zealand conditions in some contexts.
1.3 Terminology

This design guide uses many terms specific to designing for cyclists. The glossary gives descriptions of important terms.

Some terms can have different meanings associated with them by people of different disciplines. Types of off-road cycle provision in particular can be called by many different names. In the traffic engineering industry, the usual name for an off-road cycle route is “path”. This term covers both urban and rural routes that are usually (but not always) shared with pedestrians. It applies to the flat, wide paths built on railway corridors (“rail trails”) as well as paths built on more adventurous terrain for mountain biking, which are often termed “tracks”.

In the UK, paths are called “greenways” and in the USA they are called “trails”. The use of the word “trail” in the New Zealand Cycle Trail, however, is not limited to off-road paths as the NZCT includes on-road routes also.

This guide uses the term “path” to describe an off-road route, unless quoting another source or a commonly used term such as “rail trail” or “mountain biking track”.

Thus "trails" in the NZCT can be either off-road paths or roads.
2 Route Planning

2.1 Identifying Key Attractions

For a cycle route to be acknowledged, branded and funded as an NZCT route, it should give access to “iconic” locations that will generate cycle tourism. One of the objectives of the NZCT project is “to provide high-quality assets that offer a world-class cycling experience and enhance New Zealand's competitiveness as a visitor destination.”

Routes should be developed to include key attractions. These key attractions should be chosen to showcase New Zealand’s:

- Environment;
- Iconic natural landscapes; and
- Heritage and culture.

Some key attractions may be specific locations, for example, a historic settlement, a lake viewing point or a wildlife sanctuary. Some key attractions may be continuous features along a large part of a route, for example, a view of a mountain range, a coastline, river or native forest.

![Image](image.png)

Figure 2: NZCT routes can showcase our heritage - Galloway shed, Otago Central Rail Trail (courtesy of Otago Central Rail Trail Trust)

It is important to determine:

- The type, variety, quality and number of key attractions on a route;
- The cyclist types to which these key attractions will most appeal;
- How the route can provide access to or through these key attractions; and
- The “spacing” of key attractions along a route (i.e. if attractions are clustered around a particular part of a route, the rest of the route may not be seen as “iconic”).
2.2 Leg and Route Distances

The lengths of NZCT routes (or individual segments of them) should not be so long that they discourage cyclists who may be considering riding them. The most important consideration is the distance between accommodation facilities; i.e. the distance that must be cycled in one day.

An NZCT route takes one of two main formats, as described in Table 1:

<table>
<thead>
<tr>
<th>Description</th>
<th>Single trip</th>
<th>Multi-trip</th>
</tr>
</thead>
<tbody>
<tr>
<td>A route (either generally linear or circular) made up of a series of “legs” (i.e. sections of the route between successive accommodation locations)</td>
<td>A series of individual routes centred around a specific accommodation location and used by location-based cyclists (the “hub and spoke” model)</td>
<td></td>
</tr>
</tbody>
</table>

For single trip routes, those that have frequent opportunities for accommodation and services (such as shops, cafés and public toilets) along their length offer more flexibility for cyclists to choose their daily trip distances. Novice or less energetic cyclists may choose to cycle the minimum distances and stay overnight at each successive location that provides accommodation. More experienced or stronger cyclists, on the other hand, may choose to pass by some accommodation locations (perhaps stopping for refreshments) in favour of longer daily cycling distances.

Similar principles apply for multi-trip routes. At least some of the route options should be of appropriate lengths for novice or less energetic cyclists. Experienced or stronger cyclists may choose to complete several routes in one day, so it is important to provide multiple trips to encourage cyclists to spend multiple nights in the location.

Accommodation opportunities may come in many forms, ranging from motels and hotels in towns or cities to rural bed and breakfast locations. Before individual routes become well established it is likely that the only accommodation opportunities will be those already existing. In some cases, the relative locations of accommodation opportunities and key attractions may result in desired route legs being longer than the maximum daily distances some cyclists can easily travel. In such cases, measures should be taken to ensure the routes are still accessible to a broad cross-section of cyclists. Possible measures include:

- Establishment of a new bed and breakfast provider in a desirable location (for example, a farm stay, perhaps with initial financial and planning assistance);
- Provision of optional shuttle services to transport trail users to the nearest accommodation provider; and
- Establishment of a camp site with huts or shelters and cooking facilities between accommodation locations. This is the least desirable option as it will generate less revenue for the local community and will prohibit cyclists who do not wish to carry the required equipment or prefer the comfort of commercial accommodation.

NZCT route lengths are designed to ensure the trails provide multi-day cycling trips and therefore generate accommodation revenue.

Preferably, NZCT routes are 150 km or longer to ensure multi-day trips. The Market Research report (Tourism Research Consultants, 2009) commissioned by the Ministry of Tourism, identified an average cycle tourism stay of four nights for domestic visitors and 45 nights for international visitors. No single route will cater for the average international trip length but it is likely that visitors will prefer to spread their time among a few longer routes than travel between a large number of short routes.
2.3 Links with Towns and Cities

Some NZCT routes may pass through towns or cities which do not have accommodation opportunities exactly located on the route. In such cases, subsidiary routes that are appropriately signposted and link the main route with services and accommodation are desirable.

The entire trip made by cyclists needs to be considered in the planning and design of NZCT routes, not just on the route itself but also travel through towns or cities on their way to or leaving the NZCT. It is likely that completely off-road solutions will not be available through existing urban areas. But novice cyclists in particular are likely to be uncomfortable transferring from an off-road route to busy roads. It is not advisable to lead cyclists, via an off-road route, to the edge of an urban area and then expect them to “fend for themselves” to reach their accommodation or to continue on the route beyond the urban area. This would be potentially unsafe and may deter cyclists from visiting the route in the first place, returning for a second trip, visiting other NZCT routes or recommending NZCT routes to others.

All cycle trails (both off- and on-road) used for subsidiary links between main routes and accommodation locations should be designed according to the same standards used for the main route. It is likely that some on-road links will be located within busier road environments than the main routes themselves. Therefore, further guidance for on-road routes in particular may be required. Sources such as MOTSAM (Transit NZ, 2008b), and the NZ Supplement (Transit NZ, 2008a) to Austroads GTEP part 14: Bicycles (Austroads, 1999) should be used in association with the Austroads Guide to Road Design series.

Small towns are not likely to pose as much of a problem as it is likely that cyclists will only need to travel on-road for short distances on roads with low traffic volumes and urban speed limits.

Larger towns or cities, however, will offer more accommodation choices that require cyclists to travel longer distances on roads with higher traffic volumes. It should not be assumed that cyclists will want to stay at locations in the immediate vicinity of the NZCT but it will not be possible to improve facilities for routes leading to all possible accommodation locations.

If the road network of a town or city is likely to be seen as a major barrier to cyclists it may be useful to develop an arrangement with accommodation providers to transport cyclists and their bikes to and from an appropriate location with links to the main route. A trip end facility with appropriate vehicle access, parking, phone booths and an area for cyclists to rest and wait for shuttles could assist such an arrangement. This kind of facility also serves as a “gateway” to the NZCT route and could take the form of a recreational park.

2.4 Links with Existing Cycle Networks

Components of some NZCT routes are parts of, or connect to, existing cycle networks. Consideration should be given to whether these existing components satisfy the required cyclist target markets if they are to be billed as NZCT routes. Most existing cycle networks have been designed for local users with some cycling experience rather than the novice or less energetic cycle tourists being targeted for the NZCT. This is especially the case for on-road trails. It may be necessary to improve existing network components, including signage.

If an NZCT route is developed in a location near an existing major off-road trail the opportunities for linking the two should be considered. This would give cyclists on the NZCT route more opportunity regarding the length and coverage of their trip and may open up more opportunity to stimulate local business.
2.5 Off-Road and On-Road Trails

The NZCT will consist of off-road and on-road cycle trails. These two categories provide differently for cyclists and have different design requirements:

- Off-road trails (“cycle paths”) are discussed in Chapter 3; and
- On-road trails (including “quiet roads, cycle lanes and road shoulders”) are discussed in Chapter 4.

Chapter 4, which discusses crossings and intersections, is also particularly important as it examines the interactions of trails (both off- and on-road) with roads.

2.6 Choice of Provision

The decision as to whether a trail with the NZCT brand should be on-road or off-road (and if off-road, its degree of separation from roads) is based on the cyclist and trip types to be catered for by the route.

The vast majority of NZCT routes are off-road. The market research performed by Tourism Research Consultants (2009) indicates that off-road routes are preferred by most types of cyclists being targeted by the NZCT. Therefore, the higher the degree of separation between paths and road carriageways, the better.

If on-road trails are included in NZCT proposals, the traffic speeds and volumes and available road widths should be carefully considered and discussed in applications and feasibility studies. Further advice is contained in Chapter 4.

![Figure 3: Cyclist on Little River Rail Trail, Canterbury](image)

2.7 Identification of Road Crossings

There are four main road crossing types that occur on NZCT routes (both off-road and on-road) crossing roads:

- "Uncontrolled" crossings;
- "Stop" or "Give Way" crossings;
- Signalised crossings; and
- Grade-separated crossings such as bridges or subways.
In practice, gravel roads have relatively low traffic volumes (typically averaging under 250 vehicles per day, although peak daily volumes may be significantly higher if the road leads to a popular recreational area) and cycle crossings are fairly easy for adult cyclists, so long as good visibility exists.

In some circumstances, priority may be given to cyclists on the trail as opposed to road traffic. These instances are likely to be rare and would generally occur in large urban areas where there are already significant numbers of cyclists. Examples of such crossings can be found in Nelson.

Crossings and intersections are discussed further in Chapter 5. At the planning stage, it is important to identify locations where NZCT routes will cross roads and have an idea of the type of crossing provision that will be required at each location.

The NZCT must be safe and be perceived as safe. Road crossings are critical locations as they involve potential conflict between cyclists and motor vehicles. Road crossings are intersections, either between a cycle path and a road or between two roads (at least one of which being a cycle route). For urban, on-road cycling networks, the majority of crashes involving cyclists occur at intersections as opposed to “midblock” (in the middle of a block, i.e. not at an intersection) locations.

For many NZCT routes, the majority of the route will consist of off-road trails and therefore cyclists will only encounter motor traffic at road crossings. This exaggerates the distinction between the midblock and intersection situations even further than what is experienced for urban on-road cycling networks. Therefore it is imperative that road crossings are designed to a high level of safety for both cyclists and motorists.

While being such a small component of the overall route in terms of distance, crossings have the potential to tarnish an NZCT route. The market research report (Tourism Research Consultants, 2009) identified traffic safety as one of the main barriers to cycle tourists in New Zealand. If cyclists perceive a road crossing to be unsafe it may unfavourably colour their impression of the rest of the route or NZCT routes in general. Thus it may be necessary to modify an NZCT route from that initially intended to avoid creating a road crossing in a certain location. Careful planning at the early stages of route development can help prevent expensive retrofits later.
3 Off-Road Trails

3.1 Preliminary Considerations

3.1.1 Sharing with Pedestrians

It is common in New Zealand that off-road provision for cyclists is combined with pedestrian provision. The term “pedestrian" is used in New Zealand to cover all people travelling by foot (e.g. walkers and runners) or on small wheeled devices such as skateboards, push-scooters or mobility scooters, plus wheel chair users and people pushing baby "prams".

Most trails on the NZCT will be available for people walking, although in many of the more rural trails the numbers of pedestrians is expected to be low. In general, with good design for cyclists, no particular provisions for pedestrians will be needed on the NZCT.

There are four general off-road trail types that cater for cyclists:

1. Shared (the most common type);
2. Segregated (by mode or by direction);
3. Separated; and
4. Exclusive

Shared paths are available to both cyclists and pedestrians, without any form of segregation of users. This is a common type of path on the NZCT. An example of a shared path is the Nelson unsealed path shown in Figure 4.

Segregation can occur in two distinct forms: by mode or by direction. Paths segregated by mode allocate different spaces for pedestrians and cyclists by signs, markings or guidance measures such as varied surface types. Path users are supposed to remain in their allocated section but are not physically prevented from crossing over to the other section.
Generally segregation by mode has a poor level of compliance as users tend to travel where best suits them in terms of their course of travel or scenic opportunities and often prefer to keep left. Segregation by mode can also be confusing for some users, for example those on roller skates or parents walking beside small children on bikes who don’t know whether to walk on the side of the path for pedestrians or the side for cyclists.

Segregation by direction of travel is a more effective mechanism that divides the path in two and requires users to keep to the side on their left, similar to a two-lane road operation. This minimises conflicts between users by fostering a more orderly approach.

Segregation by direction of travel is a suitable treatment for paths of high volume but it is generally not necessary to specify it for rural paths. Segregation by direction may be a useful localised treatment for sections leading up to intersections, for example the Nelson Rail Reserve shown in Figure 5. Designers should not assume that the keep left principle will come naturally to users; many overseas users will be from countries where they drive on the right side of the road and need to be reminded that we use the left in New Zealand.

Separated paths are similar to segregated paths in that they allocate different spaces for pedestrians and cyclists. However separated paths divide pedestrians and cyclists by physical measures so that it is difficult or impossible for users to cross to the other mode’s path. Separation can be achieved through use of physical structures such as kerbs or even fences, or by wide gaps between the two paths, with grass berms or plantings in between. An example of a separated path is Christchurch’s Tennyson Street path, as shown in Figure 6. The cycle path (coloured red) is adjacent to the carriageway and separated from the footpath (next to the property boundary) by a grass berm with trees.
Exclusive cycle paths, as the name suggests, cater solely for cyclists without any nearby pedestrian path. Such paths are rare as pedestrians are generally provided for in some way, even for purely recreational trails.

3.1.2 Sharing with Equestrians

It is not recommended that NZCT routes be designed to accommodate equestrian use. Horses can damage track surfaces, requiring more intensive maintenance or reducing surface quality from a cycling perspective. Sharing the trails with horses requires a much wider track and can have safety issues if horses are spooked by approaching cyclists.

The path specifications in this guide are not intended to accommodate horses and horse-riding. In particular, paths designed to include equestrians would require wider widths, higher overhead clearances, increased loadings for structural design and alternative gateways for horses at cattle stops.

If a path is already established, or terrain allows for dual cycle and equestrian paths, accommodation of horses is at the discretion of trail designers, owners and operators.

There are fewer complications for on-road trails as roads are strong enough to accommodate horses and equestrians are legally allowed to ride on-road shoulders.

3.1.3 Sharing with Motor Vehicles

NZCT off-road trails should be designed to exclude public motor vehicle access along the trails – this includes motorbikes and four wheel drive vehicles – as motorised vehicles result in increased path maintenance costs, safety issues due to greater speed differential of users, and noise pollution. However, at some points it will be necessary for off-road trails and roads to cross, as discussed in Chapter 4. The design of access points will need to consider how to exclude motor vehicles.
3.1.4 Relationships to Roads

There is a spectrum regarding how “off-road” an off-road trail really is. There are two main levels of “off-road” trails:

1. Adjacent to the road carriageway (whether within or adjacent to the legal road); and
2. Completely separate from any roads.

Where cyclists are expected to use the road or road shoulder, this is classified as an on-road trail and is dealt with in Chapter 4.

An off-road trail within the road corridor is similar to a footpath. An example of an off-road trail within the road corridor is the Birchs Road pathway in Selwyn District which forms part of the Little River Rail Trail, as illustrated in Figure 7. This path is shared with pedestrians and is separated from the adjacent road carriageway by a grass verge.

![Figure 7: Off-road trail within road corridor - Little River Rail Trail (photo: Jonathan Kennett)](image)

An off-road trail adjacent to (but not within) the road corridor follows the same general alignment of the road corridor. However, it will have greater separation from the carriageway (and perhaps fewer opportunities of accessing the carriageway) than a path within the road corridor. An example of an off-road trail adjacent to the road corridor is Palmerston North’s Pioneer Highway, as shown in Figure 8; note the separation of cyclists and pedestrians.
If an unsealed or poorly-surfaced cycle path is provided beside a quiet, rural sealed road and it has little or no separation from the road, it will be unlikely to be used by cyclists (refer Figure 9). Most cyclists will prefer to use the sealed road, as it has an easier riding surface. Therefore, if a cycle path is to be built right beside a sealed road, the path should also be sealed. Alternatively, the path could be well separated from the road or the road itself could be used for the trail (so long as the conditions identified in Section 4 are met).

Alternatively, an off-road trail may be completely separate from any road corridors. Such paths provide cyclists and pedestrians with the ability to access locations where motorists cannot drive. They may provide shortcuts or access to scenic attractions. An example of an off-road trail separate from roads is the New Plymouth coastal pathway, as shown in Figure 10.
3.1.5 Aesthetics

To be iconic, a route should “fit” naturally with the surrounding landscape, emphasise the local scenic attractions and, in some cases, provide additional visual stimulation. For example, placement of artwork, vegetation or a viewing platform can emphasise the surrounds. Path alignment and width should be developed with respect to natural attractions and historic structures.

DOC (2008, Chapters 5 and 6) describes the important components of landscapes and different types of landforms. It also details how landscape features such as “anchors”, “edges”, “gateways” and historic features can be used to produce a more aesthetically
pleasing path and more enjoyable riding experience. Landscape is an important component of initial route planning.

Trails should always include some curvature as curved trails look better than long straight lines across a landscape; however, they should not be so convoluted that cyclists create shortcuts from one section to another and damage the trail surface and surrounding landscape.

“Gateways” are features used to provide an attractive threshold at the start of a trail. Sustrans (2009) outlines useful techniques for establishing gateways (in its Chapter 10) and important considerations for the “travelling landscape” (Chapter 13).

Figure 12: Curvature on the Around the Mountains Cycleway, Garston (photo: Jonathan Kennett)

Figure 13: Sculptures adjacent to Nelson Rail Reserve pathway

Figure 14: Railway hut and wagon on Little River Rail Trail, Canterbury (photo: Chris Freear)
3.2 General Design Specifications

Six grades of off-road trail relating to level of difficulty are presented in Table 2. These grades have been derived from the International Mountain Bike Association’s trail rating system. Guidelines from the Department of Conservation, and Mountain Bike New Zealand were used when developing these criteria and characteristics.

The grade system is important for distinguishing between users’ abilities and desired ride characteristics. From an economic point of view, it may be best to design routes for less experienced or less energetic riders to maximise market potential (Grades 1 and 2). Additional challenges can be built in for more advanced riders to ensure their appreciation of the trails (Grades 3 and higher).

DOC’s Track Construction and Maintenance Guidelines (2008) provides a comprehensive account of the various stages of producing off-road trails. Designers are directed to sections of the DOC guide for subsequent considerations.

It is most important that the trail’s grade does not change more than one grade over the course of the route. It is acceptable to have short sections of a trail one grade more difficult than the intended grade, but it is generally undesirable to have harder sections of trail as some riders are likely to be forced to walk these sections. There is no point building a path that incorporates Grades 2 to Grade 4, as the Grade 4 sections will be impossible to negotiate by those riders whose level of experience and skill is suited for a Grade 2 trail. It will be necessary to improve the Grade 4 sections to Grade 3 standard, or it will not be necessary to build Grade 2 sections, as Grade 3 features will suffice.

Table 2: Design specifications for off-road trails

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1.    | **Description**: Flat, wide, smooth, trail. Trail feels safe to ride. Ideal as a first ride for non-cyclists, and those wanting an easy gradient 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 of the trail without dismounting for obstacles.  
**Gradient**: 0-2 degrees for at least 98% of trail; between 2 and 3 degrees for no more than 100 metres at a time, and between 3 and 4 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 4 degrees for up to 100 m). Sealed trails can be steeper (same as the equivalent grade of on-road trail; see Table 11).  
**Width**: ‘Double trail’ preferred = 2.5 m to 4 m for 90% of trail, where cyclists may ride side by side. ‘Single trail’ width of 1.5 m, with 1.2 m minimum. Horizontal clearances as in Section 3.5.  
**Radius of turn**: 6 m minimum to outside of turn.  
**Surface**: Compacted/stabilised base course or similar, with maximum top course aggregate of 20 mm.  
**Watercourses**: All water courses bridged  
**Bridge Width**: Recommended bridge width of at least 1.5 m, absolute minimum width of 1.2 m.  
**Obstacles**: None. No stiles. Cattle stops should preferably be at least 1.5 m wide, and minimum 1.2 m wide.  
**Length**: 3.5-4.5 hours/day (30-50 km/day).  
**Barriers/Guard rails**: Areas such as bluffs or bridges where a fall would result in death or serious harm require hand rails. |
| 2. | **Description**: 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.  
**Gradient**: 0-3.5 degrees for at least 95% of trail; between 3.5 and 5 degrees for no more than 100 metres at a time, and between 5 and 6 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 6 degrees). Sealed trails can be steeper (same as the equivalent grade of on-road trail; see Table 11).  
**Width**: Between 0.9 m and 1.5 m for single trail and minimum 2.2 m for double trail sections with adequate clearances. Horizontal clearances as in Section 3.5.  
**Radius of turn**: 4 m minimum with at least 5 m desirable to outside of turn.  
**Surface**: Compacted/stabilised base course, with maximum top course aggregate of 30 mm.  
**Watercourses**: Watercourses bridged, except for fords with less than 100 mm of water in normal flow which can be easily ridden. Surface should be as smooth as adjacent trail.  
**Bridge Width**: Recommended bridge width at least 1.5 m, minimum width of 1.2 m.  
**Obstacles**: Some rocks/roots/ruts that can either be avoided, or are less than 50 mm high. No stiles. Cattle stops should be minimum 1.2 m wide.  
**Length**: 4-5 hours/day (30-50 km/day).  
**Barriers/Guard rails**: Areas such as bluffs or bridges where a fall would result in death or serious harm require hand rails. |
| 3. | **Description**: 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.  
**Gradient**: 0-5 degrees for at least 90% of trail; between 5 and 7 degrees for no more than 100 metres at a time, and between 7 and 8 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 8 degrees). Sealed trails can be steeper (same as the equivalent grade of on-road trail; see Table 11).  
**Width**: 0.9 m for 90% of the trail, 0.6 m minimum with adequate clearances. Horizontal clearances as in Section 3.5.  
**Radius of turn**: 2.5 m minimum, with at least 4 m desirable to outside of turn.  
**Surface**: Generally firm, but may have some muddy or loose sections.  
**Watercourses**: Watercourses bridged, except for fords with less than 200 mm of water in normal flow, which can be easily ridden.  
**Bridge Width**: Recommended at least 1.2 m; minimum 1.0 m.  
**Obstacles**: Occasional rocks/roots and ruts may be up to 100 mm high/deep and may be unavoidable.  
**Length**: 4-6 hours/day (30-50 km/day for an intermediate cyclist).  
**Barriers/Guard rails**: Areas such as bluffs or bridges where a fall would result in death require hand rails. Areas where a fall would likely result in serious harm require either hand rails or sight rails or a warning sign, depending on the nature of the drop off and likelihood of a fall. |
| 4. | **Description:** Steep climbs, with unavoidable obstacles on a narrow trail, and there will be poor traction in places. Possibly some walking sections. Suitable for intermediate and advanced riders.  
**Gradient:** 0-6.5 degrees for at least 90% of trail; between 6.5 and 8 degrees for no more than 100 metres at a time, and between 8 and 10 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 10 degrees). Sealed trails can be steeper (same as the equivalent grade of on-road trail; see Table 11).  
**Width:** 0.6 m average, 0.4 m minimum. Horizontal clearances as in Section 3.5.  
**Radius of turn:** 2 m minimum, with 3 m desirable to outside of turn.  
**Surface:** Firm and loose.  
**Watercourses:** Watercourses bridged, except for fords with less than 300 mm of water in normal flow, which can be easily ridden.  
**Bridge Width:** Recommended 1.0 m; minimum 0.8 m.  
**Obstacles:** Many rocks/roots and ruts up to 200 mm high/deep. Also some purpose built obstacles to liven things up, such as sea-saws and jumps.  
**Length:** 4-8 hours/day for advanced cyclists.  
**Barriers/Guard rails:** Areas such as bluffs or bridges where a fall would result in death require hand rails. Areas where a fall would likely result in serious harm require either hand rails or sight rails or a warning sign, depending on the nature of the drop off and likelihood of a fall. |
|---|---|
| 5. | **Description:** Technically challenging, and suitable for advanced/expert riders. Physically tough. Big hills, lots of rocks, some walking likely.  
**Gradient:** 0-8 degrees for at least 90% of trail; between 8 and 10 degrees for no more than 100 metres at a time, and between 10 and 14 degrees for no more than 10 m at a time. Sealed trails can be steeper (same as the equivalent grade of on-road trail; see Table 11). If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 14 degrees).  
**Width:** 0.4 m average, 0.25 m minimum. Horizontal clearances as in Section 3.5.  
**Radius of turn:** 1.5 m minimum, with more desirable.  
**Surface:** Huge variety of surfaces.  
**Bridge Width:** Recommended 0.8 m; minimum 0.6 m.  
**Obstacles:** Many rocks, roots and ruts, up to 0.6 m high/deep. If there are not obstacles then they are likely to be added afterwards (i.e. jumps, and wooden structures).  
**Length:** 4-12 hours/day. |
6.

**Description:** Purpose built extreme Downhill/Free ride trails. Extremely steep and dangerous jumps and obstacles. Fear factor is essential. High risk of injury. Suitable for extreme riders.

**Gradient:** 0-10 degrees for at least 90% of trail; between 10 and 15 degrees for no more than 100 metres at a time, and between 15 and 20 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 20 degrees).

**Width:** Minimum of tyre width.

**Radius of turn:** 1 m absolute minimum, but the more the better.

**Surface:** Anything – likely to be unsustainable.

**Obstacles:** ‘North Shore’ wooden obstacles, big jumps, etc

**Length:** Trail may take less than a minute to ride, but will be ridden over and over again.

**Notes:**

1. Any sections of trail that are harder should only be one grade harder, but only in short sections of no more than 100 m.
2. Maximum downhill gradient applicable only if trail is designed and promoted to be ridden in one direction.
3. If a short section of a trail is steeper than that recommended for the trail grade, this may be compensated for by making the trail wider, easing the turns, improving the surface or other compensatory measures. Other criteria can be similarly compensated for to allow the trail to meet the requirements for a lower trail grade.
4. The widths given are minimum widths. If the terrain beside a track is rideable for the target market (i.e. flat mown grass beside a concrete path for grade 1), then the minimum width can be reduced if need be (e.g. from 2.5 m down to 2.2 m for grade 1). In some cases it will be possible to provide wider paths. However, care should be taken to not make the path too wide as cyclists will feel they are on a road rather than a cycle trail – see Section 3.11. In natural environments overly wide trails also impact on the scenic values that are sought by visitors.
5. An acceptable alternative to barriers, guardrails or handrails at bluffs, steep drop-offs or water bodies is adequate horizontal clearance of at least 1.5 m for grade 1 from the edge of the trail.
3.3 Gradients

Gradient requirements from Table 2 for off-road unsealed trails (and gravel roads) are summarised in Table 3:

Table 3: Gradient requirements for off-road trails

<table>
<thead>
<tr>
<th>Trail Grade</th>
<th>Main uphill gradient range</th>
<th>Steeper slopes up to 100 m long</th>
<th>Steeper slopes up to 10 m long</th>
<th>Maximum Downhill Gradient for slopes up to 100 m long</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 – 2 degrees for 98% of length</td>
<td>2 – 3 degrees</td>
<td>3 – 4 degrees</td>
<td>4 degrees</td>
</tr>
<tr>
<td>2</td>
<td>0 – 3.5 degrees for 95% of length</td>
<td>3.5 – 5 degrees</td>
<td>5 – 6 degrees</td>
<td>6 degrees</td>
</tr>
<tr>
<td>3</td>
<td>0 – 5 degrees for 90% of length</td>
<td>5 – 7 degrees</td>
<td>7 – 8 degrees</td>
<td>8 degrees</td>
</tr>
<tr>
<td>4</td>
<td>0 – 6.5 degrees for 90% of length</td>
<td>6.5 – 8 degrees</td>
<td>8 – 10 degrees</td>
<td>10 degrees</td>
</tr>
<tr>
<td>5</td>
<td>0 – 8 degrees for 90% of length</td>
<td>8 – 10 degrees</td>
<td>10 – 14 degrees</td>
<td>14 degrees</td>
</tr>
<tr>
<td>6</td>
<td>0 – 10 degrees for 90% of length</td>
<td>10 – 15 degrees</td>
<td>15 – 30 degrees</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. This table applies to off-road unsealed trails and gravel roads.
2. Uphill sections of trail that are steeper than these gradient criteria should only be one grade harder and only in sections of up to 100 m length. It is undesirable to have harder sections of trail as some riders are likely to be forced to walk these sections.
3. Maximum downhill gradient applicable only if trail is designed and promoted to be ridden in one direction.
4. IMBA recommends a maximum gradient of 10% (5.7 degrees) to ensure a trail is sustainable. Steeper trails will require more maintenance due to skidding tyres and water scour.

This table is repeated in Appendix 1 along with the comparable table for on-road trails.

One of the key factors that determines whether a route will suit less experienced and less energetic cyclists is the gradient. Disused railways are ideally suited to conversion to cycle trails (coined “rail trails”) and are especially popular because the gradients are gentle. Rail trails typically have gradients less than 2 degrees. It is also possible to form rail trails along live rail corridors adjacent to the railway line; this requires fencing and the greater the separation distance between the path and the railway line the better.

Clinometers (instruments to measure the gradient) are essential for track design and construction, especially for Grade 1 and 2 trails. Gradient is one of the most important distinguishing characteristics for the different grades of trail so it is important to assess and maintain appropriate trail grades accurately, and advise riders accordingly.
Designers typically use degrees, percent or slope to indicate gradient; this guide uses degrees. The relationship between degrees, percent and slope with the corresponding off-road grades is shown in Table 4. Table 5 and Figure 15 provide further methods of converting between the three gradient measures.

### Table 4: Relationship between off-road grade, degrees, percent and slope

<table>
<thead>
<tr>
<th>Indicative off-road trail grade</th>
<th>Degrees</th>
<th>Percent</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>0º</td>
<td>0%</td>
<td>0%</td>
<td>NA</td>
</tr>
<tr>
<td>1º</td>
<td>1.7%</td>
<td>1:57</td>
<td></td>
</tr>
<tr>
<td>2º</td>
<td>3.5%</td>
<td>1:29</td>
<td></td>
</tr>
<tr>
<td>3º</td>
<td>5.2%</td>
<td>1:19</td>
<td></td>
</tr>
<tr>
<td>4º</td>
<td>7.0%</td>
<td>1:14</td>
<td></td>
</tr>
<tr>
<td>5º</td>
<td>8.7%</td>
<td>1:11</td>
<td></td>
</tr>
<tr>
<td>6º</td>
<td>10.5%</td>
<td>1:10</td>
<td></td>
</tr>
<tr>
<td>7º</td>
<td>12%</td>
<td>1:8</td>
<td></td>
</tr>
<tr>
<td>8º</td>
<td>14%</td>
<td>1:7</td>
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<td>9º</td>
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<td>20º</td>
<td>36%</td>
<td>1:3</td>
<td></td>
</tr>
<tr>
<td>30º</td>
<td>58%</td>
<td>1:2</td>
<td></td>
</tr>
</tbody>
</table>
Table 5: Conversion between degrees, percent and slope

<table>
<thead>
<tr>
<th>Percent</th>
<th>Degrees</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>0.6º</td>
<td>1:100</td>
</tr>
<tr>
<td>2%</td>
<td>1.1º</td>
<td>1:50</td>
</tr>
<tr>
<td>3%</td>
<td>1.7º</td>
<td>1:33</td>
</tr>
<tr>
<td>4%</td>
<td>2.3º</td>
<td>1:25</td>
</tr>
<tr>
<td>5%</td>
<td>2.9º</td>
<td>1:20</td>
</tr>
<tr>
<td>6%</td>
<td>3.4º</td>
<td>1:17</td>
</tr>
<tr>
<td>8%</td>
<td>4.6º</td>
<td>1:13</td>
</tr>
<tr>
<td>10%</td>
<td>5.7º</td>
<td>1:10</td>
</tr>
<tr>
<td>12%</td>
<td>7º</td>
<td>1:8</td>
</tr>
<tr>
<td>15%</td>
<td>9º</td>
<td>1:7</td>
</tr>
<tr>
<td>20%</td>
<td>11º</td>
<td>1:5</td>
</tr>
<tr>
<td>30%</td>
<td>17º</td>
<td>1:3</td>
</tr>
</tbody>
</table>

Figure 15: Relationship between degrees, percent and slope

Example – Gradients on Otago Central Rail Trail

The Otago Central Rail Trail is a 150 km off-road trail created along a disused rail corridor in Central Otago. It is popular among a wide cross-section of cyclists and is used by around 20,000 people per year. Situated on a previous rail route, its gentle gradients make it accessible to most.

The Otago Central Rail Trail has a maximum gradient of 1.1 degrees (2%) over a 6 km stretch. This trail satisfies the criteria for a Grade 1 off-road trail. Figure 17 shows the elevation of the trail.
3.4 Pinch Points

It may not always be practicable to provide the required width for the entire path length. Large trees, rocks, bluffs, steep cross slopes or other geographic features may produce "pinch points" on a path. These features can be tolerated as long as there is adequate visibility leading to them or advance signage and safe opportunities for path users to stop before the pinch point and give way to oncoming users or wheel their cycles. Particular care should be taken to avoid pinch points on Grade 1 or 2 paths.

However, pinch points can be specifically incorporated in the design to enhance safety by slowing down cyclists at approaches to hazards such as road crossings or blind corners. These deliberate pinch points are termed “chokes” and are covered also in Section 3.8.

3.5 Horizontal Clearances

Figure 18 shows the operating space required for cyclists. An important aspect of the operating space is the angle between the pedals and handlebars; the handlebars protrude further than the pedals and are more likely to catch on adjacent objects. This is why banks should be "battered" (i.e. sloped, not vertical) and fences should ideally slope away from the path.

![Figure 18: Bicycle operating space](image-url)
When travelling on a lean (for example when travelling around a banked corner) the relationship between the cyclist's head and shoulders is also important. Cyclists may hit their heads or shoulders on trees placed too close to the inside of a curve. This can also be a conflict issue between cyclists and pedestrians on banked curves, as cyclists will be leaning while pedestrians are walking upright.

Cycle travel is dynamic. It is difficult to ride exactly in a straight line and less experienced users, in particular, require a fair amount of “wriggle room” or manoeuvring space.

If a path is restricted horizontally, for example by fences, bridge rails or discrete features such as trees or large rocks, an additional “shy space” is required. Shy space is needed because cyclists are physically unable to ride on the edge of the path due to their handlebars and pedals extending further than their tyres. Cyclists also need space to allow for a certain amount of wobble and to ensure that they do not need to focus so hard on keeping to the trail that they are unable to appreciate their surroundings. Slower and less experienced cyclists wobble more than faster and more experienced ones.

As it is expected that the majority of cyclists will not choose to ride in the "shy space", the clearance does not necessarily need to be constructed from the same materials as the actual path itself. Depending on the context, the shy space could be a grass verge or strip of compacted aggregate. In an urban area, maintenance requirements (e.g. mowing of grass verges) will generally make it more appropriate to create the shy space from the same material as the path. However in rural areas, there is no point in building a trail right beside a fence as the native ground cover will need no special maintenance.

Horizontal constraints to a path also limit the ability for path users to deviate from the path in extreme circumstances where the path is not wide enough to accommodate all users.

Thus, in addition to the path width given in Table 2, further width should be added for situations where at least one side of the path is constrained by adjacent elements. These elements may be either continuous or discrete and examples are given in Table 6, along with the required clearances:
Table 6: Off-road trail horizontal clearance requirements

<table>
<thead>
<tr>
<th>Feature Type</th>
<th>Continuous</th>
<th>Discrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fences</td>
<td></td>
<td>Trees</td>
</tr>
<tr>
<td>Walls</td>
<td></td>
<td>Large rocks</td>
</tr>
<tr>
<td>Bridge handrails</td>
<td></td>
<td>Bridge abutments</td>
</tr>
<tr>
<td>Guard rails</td>
<td></td>
<td>Sculptures</td>
</tr>
<tr>
<td>Steep slopes</td>
<td></td>
<td>Power and light poles</td>
</tr>
<tr>
<td>Rock faces</td>
<td></td>
<td>Sign posts</td>
</tr>
<tr>
<td>Parallel drains</td>
<td></td>
<td>Perpendicular drains</td>
</tr>
<tr>
<td>Lakes, rivers and coastlines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hedges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>1.0 m</strong></td>
<td><strong>0.3 m</strong></td>
</tr>
<tr>
<td></td>
<td><strong>0.5 m</strong></td>
<td><strong>0.15 m</strong></td>
</tr>
</tbody>
</table>

Note: Extra space should be allowed on bends, where cyclists will lean into the corner.

Note that the clearances presented in Table 6 relate to each side of the path. That is, if the path is constrained on both sides, double the width prescribed in Table 6 should be added to the total path width. For example, on a path with fences (i.e. continuous features) on either side the width between the fences should be the width of the path plus 1.0 m. Clearances for continuous or discrete features in Table 6 should be measured at handlebar and shoulder height relative to the path edge.

**Bridge handrails** are considered as continuous features in Table 6. However it is often not practical to achieve this clearance plus the path width for a bridge structure and thus the minimum bridge widths presented in Table 2 govern. A way of increasing the effective width of a bridge is to provide flared handrails. This is discussed further in Section 6.3.1.

**Fences** need to be carefully considered when designing cycle trails. It is impossible to ride within 0.5 m of a fence and requires unnecessary concentration to ride close to a fence (especially at speed, such as on a downhill track), reinforcing the need for ample clearances as shown in Table 6.

Where fences are used on both sides of an off-road trail (for example on a rail trail adjacent to farmland) it is preferable to locate them as far from the path as possible, ideally 5 m away or more. If the path must be built next to a fence on one side, it should be at least 1.0 m away so that there is room for manoeuvre when passing other cyclists and to allow for clearances as discussed above. Experience from the Otago Central Rail Trail shows that fences placed immediately adjacent to the path make some cyclists feel like they are being channelled down a stock route. Fences placed at the extent of the corridor (which is generally 40 m wide in Otago Central), however, contribute to a more spacious feeling and allow cyclists more opportunity to enjoy the surrounding views.
If a trail is built on hill with a side slope it is preferable to situate the trail with trees on the downhill side rather than close to the uphill side. This means cyclists are more likely to naturally keep clear of the drop at the edge of the path.

3.6 Vertical Clearances

Overhead hazards can include tree branches, overbridges, tunnel soffits, signs, wires and cables. A minimum vertical clearance of 2.4 m to overhead hazards is recommended for all trail grades. However, a 2.0 m vertical clearance may be used for “discrete” overhead hazards, such as tree branches. Users should be advised of such hazards in advance.

3.7 Horizontal Alignment

When a path must bend or turn a corner there are four main methods that can be used; standard bends, switchbacks, climbing turns and superelevated (“insloped” or “berm”) turns. These are summarised in Table 7. Switchbacks, climbing turns and super-elevated turns are discussed in Chapters 20-22 of DOC’s Track Construction and Maintenance Guidelines (2008).

Table 7: Types of curve

<table>
<thead>
<tr>
<th>Corner Type</th>
<th>Description</th>
<th>Application and Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard bend</td>
<td>The curve and its approaches are on level ground, no specific treatment is required.</td>
<td>Flat sections of trail. Most common on Grades 1 and 2.</td>
</tr>
<tr>
<td>Superelevated (“insloped” or “berm”) turn</td>
<td>The outer edge of the curve is banked to allow for faster travel around the corner.</td>
<td>Curves where a high speed is required. Especially important for Grades 4-6.</td>
</tr>
<tr>
<td>Switchback</td>
<td>The curve of the path is on level ground while the approach and departure to the curve are on sloped sections.</td>
<td>The most appropriate method of providing turns on steeply sloped trails. Especially important for Grade 1 and 2 where gradients are involved.</td>
</tr>
<tr>
<td>Climbing turn</td>
<td>The curve itself is located on a sloped section of path (which possibly includes superelevation / a berm). DOC (2008) recommends a curve radius of at least 6 m and a maximum gradient of 4 degrees (6%) for a climbing turn.</td>
<td>Can be applied to gently sloping hills. Easier to construct but may require more maintenance than switchbacks.</td>
</tr>
</tbody>
</table>

Gradient reversals are deliberately-designed features of trails where long slopes are interrupted by short sections where the gradient reverses, ideally for 2-4 metres length and 0.5-1 metre high. Gradient reversals should be provided on either side of all superelevated turns, switchbacks and climbing turns to aid drainage and improve the trail’s sustainability. On natural surface trails, grade reversals are the best possible insurance against water scour, and if well built, they are also fun to ride.

Berms In some cases, trail users or designers mistakenly refer to superelevated turns as switchbacks. Technically switchbacks do not have banked corners.
Generally a “berm” or superelevated turn has a curved (rather than straight) cross sectional profile, as illustrated in Figure 19; this allows slower, less confident cyclists to ride on the flat part near the inside of the curve and faster, more experienced cyclists to ride on the outer sloped sections. The slope of berm should be dictated by the grade of the trail. For example: Grade 1 berm slope of 2-5 degrees; Grade 2 berm slope of 3-10 degrees; Grade 3 berm slope of 4-15 degrees, Grade 4 berm slope of 5-30 degrees, Grade 5 berm slope of 5-45 degrees; Grade 6 berm slope of 5-60 degrees.

A superelevation of 30 degrees is generally appropriate for Grade 4 off-road trails. Superelevation on bends also keeps water off the track, as it will run around the inside of the corner.

![Figure 19: Cross section for Grade 4 superelevated turn](image)

### 3.8 Sight Distances and Visibility

Path safety depends on users being able to detect a potential hazard and either stop safely before encountering it or manoeuvre safely around it. The required distance is called “stopping sight distance” (SSD). A stopping sight distance of at least 15 m should be achieved on NZCT off-road trails.

If visibility is limited around corners it may be necessary to set back vegetation or fences so that cyclists can maintain the appropriate line of sight around the corner. However, it may be difficult to achieve this and the result might damage the trail’s aesthetics. An alternative is to provide two separate trails around a blind corner, with signs advising users to keep to the left (or in some cases, the right), of the trail. Or, if a trail is reasonably wide, keep left signage in itself may be sufficient.

“Chokes” (localised narrowings) or gradient reversals can be used to slow cyclists down on approaches to blind corners, intersections or other potentially dangerous locations.

For mountain bikers part of the enjoyment comes from the challenge of having to react quickly rather than having plenty of warning before encountering a path feature. This should be balanced with the likelihood of two cyclists (or a cyclist and a walker or jogger) encountering each other head on without sufficient warning.

In urban areas, visibility of trails by the public is also important for personal safety and security.

### 3.9 Surface Materials

#### 3.9.1 Compacted Gravel or Crushed Limestone

These paths are formed by laying a compacted gravel layer and thus have a semi-loose surface. It is imperative that the gravel is relatively fine and crushed, as round stones do not "bind" to make a firm surface and will result in a difficult riding surface.
Uncrushed river gravels, or any other material with round stones, should not be used. Often “dirty rock” with a range of aggregate sizes from a local quarry can be a cheap, effective trail-building material.

A component of fine material (limestone or clay) is required in compacted gravel to aid binding. Limestone has the advantage of having natural cement properties but will not be cost-effective unless it available locally.

The top layer of these surfaces is generally constructed with a crown at the centre and very little material at the sides. Over time, as cyclists generally ride on the centre of the trail, the trail flattens out.

Users of off-road NZCT routes are expected to be using mountain bikes, which have wider tyres than road bikes, so compacted gravel can be one of the more cost-effective and appropriate surfaces. Coarse or loose gravel surfaces are unsuitable for bicycles with narrow tyres such as road cycles, which are favoured by most touring and long-distance, multi-day cyclists. Designers should determine what type of bike (and therefore tyre) will be used on the trail and specify materials accordingly.

Gravel is often a cheap option, especially if rocks excavated on-site can be crushed and used to surface adjacent sections of trail. Another advantage of using naturally-occurring surface materials is that the surface looks natural and fits into the environment. However, the low capital cost required for these trails can be offset by high operational costs to maintain them. It is important that compacted gravel paths are cleared of vegetative matter during construction and plants are prevented from growing in them. The aggregate is likely to spread and thus it may be necessary to sweep loose aggregate back onto the path where it spreads onto drainage features, roads, driveways, or other critical locations.

Gravel should be at the optimum moisture content when compacted. If it is too wet it will stick to the plate compactor machinery and hinder the process. If it is too dry it will not bind. Gravel should be of mixed size to facilitate “binding” into an dense and firm riding surface.

The material beneath the surface is also important. Gap graded aggregates (like railway ballast used on rail trails) form a good structural base with excellent drainage properties and can provide surplus water storage if there is a known flooding problem in the area. However, too much drainage in dry environments can also cause problems. Experience on the Otago Central Rail Trail (OCRT) shows that a very dry surface can prevent the establishment of a firm, cohesive surface. To counter this, the OCRT operators use a

Figure 20: Compacted gravel section of Little River Rail Trail at Catons Bay
consolidated AP 40\(^2\) layer between the railway ballast and surface material (well-graded AP 20 with a high clay content).

There is no single formula that provides the solution for all trail surfaces. The appropriate surface for a section of a trail will depend on underlying substrate, topography, trail grade and climate. Solutions that may give the best maintainability and surface longevity may be prohibitively expensive for the number and type of users on a given trail. Over the length of a trail there is likely to be a variety of substrates so the trail surface and underlying layers will need to vary as well.

3.9.2 Natural Surface

Low volume farm roads with natural (i.e. uncovered soil) surfaces, where motor vehicles provide compaction and prevent vegetation from growing, may also be appropriate for off-road trails. In most cases, natural soil surfaces are likely to be only applicable to mountain biking paths of higher grade. More detail regarding the properties of natural surfaces and construction and maintenance of paths formed on them can be found in Chapter 7 of the Track Construction and Maintenance Guidelines (DOC, 2008).

The natural surface may be a more rocky surface, such as gravel or even large rocks. Such surfaces can be appropriate for paths of higher grade trails where riders are experienced in riding on loose surfaces. Figure 21 shows an example of a path with a natural gravel surface.

![Figure 21: Natural surface, Great Lake Trail, Taupo (photo: Jonathan Kennett)](image)

Natural surfaces can also include the volcanic soils commonly found in the central North Island. Regardless of the soil type, all organic matter should be removed and only mineral material used. Organic matter decreases a soil's strength and promotes vegetation growth.

Stabilising products can be used on natural surfaces in critical areas to strengthen the trail and provide higher skid resistance for cyclists. Figure 22 shows a "geomat" applied on a steep track with loose surface in Tongariro National Park. Geotextiles are useful at sites

\(^2\) A specification for medium-sized gravel – "all passing 40 mm" sieve. Will ideally contain a mix of stone sizes, including clay.
with high use, extreme weather conditions and erodible soil. More information can be found in Chapter 16 of DOC (2008).

A more natural alternative to surface stabilisation is to apply “rock armouring” or “stone pitching” whereby rocks are used to pave the ground surface. Finer gravel or sand can be applied on top of the rocks to produce a smoother surface, depending on the target skill level of riders. This is, however, generally a labour intensive treatment. Figure 23 shows an example of a rock armoured path. Additional guidance on this technique can be found in Section 15.2 of DOC (2008).
3.9.3 Chipseal and Asphaltic Concrete (AC)

Chipseal and Asphaltic Concrete (AC) are two surface types that are commonly used for paving roads and can be appropriate for NZCT routes. They have similar construction methods and requirements for underlying base courses.

Chipseal will generally provide a much superior ride compared with gravel and costs much less than an asphaltic concrete surface. Figure 24 shows a path where a suitable grade of chipseal has been applied to produce a high quality and natural looking riding surface.

![Figure 24: Chip seal path in Queenstown](image)

When providing a chipseal surface, attention should be paid to the evenness and strength of the underlying surface and the size of chip (a smaller chip allows for a smoother ride). The chip used should be at least a grade 3 chip with a grade 5 fill. For an even smoother surface (which is also suitable for road bike tyres) a grade 4 chip with a grade 6 fill can be used.

Asphaltic concrete (AC) is a common-road surface which contractors are familiar with. It is faster to construct than concrete or pavers and has a lower capital cost. It is also suited to paths with limited space or constrained topography, or paths in urban areas with utilitarian trips by local residents (to work or school, for example). It may be suitable for urban trails but generally not for most NZCT rural trails.

For both chipseal and AC paths, the design of the underlying surface, a metal (aggregate) course, is generally dependent on the size of the construction or maintenance vehicles that will travel along the path. Heavy duty paths (those likely to cater for maintenance vehicles) also require a sub base layer of a larger aggregate. This is an important consideration that is often overlooked, and can result in significant damage, as shown in Figure 25.

![Figure 25: Heavy truck causing edge break on new pathway during construction](image)
Where ground material is either wet or soft (e.g. swamp or peat), then a filter fabric should be added to stop the construction metal course from mixing with the ground and thus achieve a long-lasting path. Where a high proportion of clay is present and vehicles cross the pathway (e.g. at driveways), construction depth needs to be increased. Advice from a roading engineering should be sought in these situations, to avoid high construction and maintenance costs.

Table 8 shows the required AC thicknesses or chip sizes and aggregate types for footpaths and cycle paths.

<table>
<thead>
<tr>
<th>Path Type</th>
<th>Surface type</th>
<th>Metal course</th>
<th>Sub base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footpath</td>
<td>20 mm AC</td>
<td>75 mm AP 20</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Grades 3&amp;5 chip</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(rounder) or grades</td>
<td>125 mm AP 40</td>
<td>NA</td>
</tr>
<tr>
<td>Light duty cycle path</td>
<td>20 mm Chipseed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy duty cycle path</td>
<td>20-25 mm Chipseed</td>
<td>125 mm AP 40</td>
<td>150 mm AP 65</td>
</tr>
<tr>
<td></td>
<td>Grades 4&amp;6 chip</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(smoother)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 26 shows an example of an asphaltic concrete path. Note that this path is not bordered by timber battens along the grassy edge.

Figure 26: Asphaltic concrete path on the Little River Rail Trail (photo: Jonathan Kennett)

Treatment with timber edging battens has been traditionally used on AC paths (as shown in Figure 24), but a new methodology has recently been developed without timber battens whereby a base course is laid and the AC surfacing is set on top. The base course should extend 200 mm wider than the intended path width with edges battered at a 1:3 gradient. The contractor will square up the edges of the AC (with a spade or temporary timbers) to achieve an even thickness of surfacing. This treatment provides adequate
strength to the edge of seal and allows topsoil to be placed right to the edge of the path. Experience shows that this technique is cheaper to construct, requires less maintenance, and is less prone to vegetation sprouting through the surface. This method could also be applied to a chipseal path. An indicative cross-section of this is shown in Figure 27:

![Figure 27: Cross section for chipseal or AC path without timber edging battens](image)

3.9.4 Concrete
Concrete paths are strong and highly durable. The construction and capital costs are however typically higher than for other path types. Construction joints from one panel to the next can produce an uncomfortable, bumpy ride. Concrete is unlikely to be cost-effective for NZCT routes.

3.9.5 Paving Stones
Paving stones provide a high quality, durable and attractive surface for paths. They can be easily removed and reinstated for access to sub-surface services. Maintenance is still required for clearing the path of debris and spraying weeds that may grow between the pavers.

The high cost of this treatment is likely to make it an unsuitable option for most NZCT routes. It may however be appropriate for small sections where aesthetics are particularly important, for example end treatments at urban locations. Some trails may be able to make use of wide, flat stones found locally to serve as paving stones.

3.9.6 Recommended Surface Types for Path Grades
Table 9 outlines the recommended surface types for various path grades. The appropriateness of natural surfaces also depends on site and user characteristics; stabilising materials may be required.
### Table 9: Recommended surface types for off-road trails

<table>
<thead>
<tr>
<th>Grade</th>
<th>Recommended Surface Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EASIEST</td>
<td>Compacted gravel / limestone</td>
</tr>
<tr>
<td></td>
<td>Chipseal</td>
</tr>
<tr>
<td></td>
<td>Paving stones (even surface essential)</td>
</tr>
<tr>
<td></td>
<td>Asphaltic concrete</td>
</tr>
<tr>
<td></td>
<td>Concrete</td>
</tr>
<tr>
<td>2. EASY</td>
<td>Compacted gravel / limestone</td>
</tr>
<tr>
<td></td>
<td>Chipseal</td>
</tr>
<tr>
<td></td>
<td>Paving stones</td>
</tr>
<tr>
<td></td>
<td>Asphaltic concrete</td>
</tr>
<tr>
<td></td>
<td>Concrete</td>
</tr>
<tr>
<td>3. INTERMEDIATE</td>
<td>Compacted gravel / limestone</td>
</tr>
<tr>
<td></td>
<td>Natural surface (except loose gravel)</td>
</tr>
<tr>
<td>4. ADVANCED</td>
<td>Natural surface</td>
</tr>
<tr>
<td></td>
<td>Compacted gravel / limestone</td>
</tr>
<tr>
<td>5. EXPERT</td>
<td>Natural surface</td>
</tr>
<tr>
<td></td>
<td>Compacted gravel / limestone</td>
</tr>
<tr>
<td>6. EXTREME</td>
<td>Natural surface</td>
</tr>
<tr>
<td></td>
<td>Compacted gravel / limestone</td>
</tr>
</tbody>
</table>

### 3.10 Drainage

It is best practice to design gradient reversals into trails from the very start. Gradient reversals reduce the watershed of each section of the trail so that less rain water is collected. Water can then be drained across the trail more easily, rather than running down the trail and causing erosion.

Gradient reversals should mimic the natural water run-off. They enhance long-term asset management, as they will work to stop water running down a track for decades into the future, even if maintenance is not done on culverts. Also, gradient reversals can be fun to ride if they are designed well (i.e. long and shallow).
When a trail crosses a stream, it should drop into the stream and then climb out. This is, in effect, a gradient reversal. When crossing a spur, a trail should climb over it. If the trail drops down to a spur and then climbs out, water will pond on the track and a bog will develop.

Grade 1 and 2 off-road cycle trails need particular attention to drainage beyond what is required for more conventional mountain bike trails, because these trails have greater widths, higher geometric standards and higher user expectations. In particular, ponding and flooding need to be prevented by careful consideration of surface types, longitudinal and transverse gradients, camber, culverts and bridges.

Chapter 8 of DOC’s Track Construction and Maintenance Guidelines (2008) describes the erosion, displacement and compaction processes that damage tracks and Chapter 9 describes the methods of predicting water volume and how to design tracks to withstand effects of water. This is useful information to understand how and why tracks become damaged and why drainage is important.

Designers of off-road trails, particularly those of Grade 3 and above, are encouraged to read Chapter 10 of DOC’s guidelines (2008) for a more comprehensive discussion of cycle trail drainage issues, solutions and approaches. Chapter 14 of DOC (2008) should also be used for design and construction of drainage systems. For Grade 1 or Grade 2 paths, designers are also encouraged to read sections 7.3-7.5 of the Connect2 and Greenways Design Guide (Sustrans, 2009) with regards to drainage.

Use of conventional open cross drains is not advised. These drains may be easy to construct and initially effective, but will soon block with material flowing down the track.

3.11 Construction

DOC (2008) outlines ten useful guiding principles for track construction. These are discussed in Chapter 4 of the Track Construction and Maintenance Guidelines and summarised below:

1. Keep water away from the track surface
2. Construct sustainable gradients
3. Make the track flow
4. Provide a suitable surface
5. Maintain a good surface
6. Maintain when required
7. Be environmentally astute
8. Protect your investment
9. Train staff
10. Respect and keep historic values

Chapter 13 of DOC (2008) outlines methods of constructing tracks of various formation types.

The Connect2 and Greenways manual (Sustrans, 2009, Chapter 7) also contains useful design and construction guidance. This includes consideration of cut and fill materials used to achieve the required path gradients and alignments. Excess cut material can be used creatively to create landscape features or “viewing mounds” that add to the aesthetic attraction while minimising transport or disposal of waste soil.
Cyclists on the Otago Central Rail Trail have indicated that they like to feel as if they are exploring the “wilderness” but not as if they are biking on a country road. It is important to communicate this message to contractors who may be tempted to provide extra but unnecessary width. Contractors normally involved in road construction may not understand the specific requirements of Grade 3 and above trails; whereas roads are built to be smooth, straight, level and consistent, mountain bikers appreciate some challenges in the form of curves, gradient reversals, slopes and changes in path alignment.

The best way to communicate the trail requirements to a contractor may be to ask them to ride a trail of a similar grade with a trail designer and then discuss the trail’s characteristics and desirable aspects from a design perspective.

### 3.12 Livestock

It is recommended that, to the extent possible, sheep, cattle and other farm animals be excluded from off-road trails. Experience from the Otago Central Rail Trail shows that stock damage the path surface by walking and defecating on it. They also trample watertables and increase the amount of rock and stone pushed onto the trail in cuttings. The presence of stock on a trail leads to increased maintenance costs.

If stock are allowed to use the trail, in winter especially, livestock may prefer to stay on the path surface (rather than adjacent verges) which can intimidate cyclists, especially overseas visitors who may not be accustomed to large farm animals. Winter stock access should also be discouraged because stock will dirty the track surface, which makes it unpleasant to ride across.

### 3.13 Markings and Delineation

Painted markings can be used on permanent solid path surfaces (e.g. asphalitic concrete, concrete or paving stones) to:

- Segregate users (e.g. logos used to identify separate areas for cyclists and pedestrians)
- Segregate directions of travel (e.g. by using painted line and arrow markings)
- Convey instructions (e.g. keep left, warn when approaching – see Figure 28)
- Delineate intersections (e.g. “Give Way” limit lines)

![Figure 28: Shared path markings, Nelson](image)

Such treatments are not required on most NZCT paths, and the nature of most path surfaces precludes the possibility. Painted markings are, however, useful on sealed paths with higher user volumes, especially paths near urban areas and for paths of lower grades where users may require more guidance.
Coloured surfacing treatments are also useful to emphasise large areas of trail, particularly for on-road situations. Coloured surfacing can be used either to attract users’ attention or serve as a warning to motorists or conflict zones in on-road trails or crossings. MOTSAM (Transit, 2008b) gives further guidance on the application of coloured surfacing.

### 3.14 Path End Treatments

Path end or “terminal” treatments are used at ends of off-road trails (paths) to warn cyclists of the approaching transition to on-road trails (or simply a road, without cycle provisions) and to prevent motor vehicles from accessing the paths.

Path end treatments should not necessarily be designed with the aim of slowing cyclists down and should not provide an “obstacle” that distracts cyclists’ attention from the impending transition to the roadway. Circumstances where cyclists should be required to dismount are rare so route end treatments should allow cyclists to comfortably ride through without awkward manoeuvring.

Bollards and staggered fences or U-rails are preferred path end treatments. These devices can be designed to prevent access by motor vehicles, including motorbikes. It is recommended that designers seeking further guidance in this area read VicRoads Cycle Note No. 17: Terminal Treatments for Off-Road Paths (2005) which is freely available online.

![Figure 29: Path end treatments, Hawkes Bay Trails (photo: Jonathan Kennett)](image)

### 3.15 Environmental Considerations

Trail designers and builders should consider the environmental impact of the trail construction (for example vegetation clearance, rare plants, wildlife, siltation of streams and wetlands). This is particularly important for natural surface or compacted trails (i.e. those not covered with “hard” surfaces such as asphalt or concrete – see Section 0 for more discussion on various surfacing types). For a natural surface trail to be sustainable it should incorporate the principles of sustainable gradients (as discussed in Section 3.2), frequent gradient reversals (to aid drainage – as discussed in Section 3.10) and weed control (as discussed in Chapter 9).
In areas of native forest the environmental values should be assessed first. Also, mitigation can enhance a track and the users' experience. At Makara Peak Mountain Bike Park in Wellington a native tree is planted for every metre of track built. This mitigation measure is very popular as it results in a combination of recreation and conservation that people appreciate. The Otago Central Rail Trail Trust and DOC have planted trees along the rail trail for amenity value.

Tree planting provides shade, bird habitat and wind breaks. Over time, native trees also replace undesirable introduced plants such as gorse and blackberry.

The danger of cut branches and stumps on or near trails cannot be overstated. Potential injuries include stab wounds, broken bones, facial lacerations and lost eyes. All trimmed branches near trails should be cut flush with the main branch or tree trunk. Stumps should be dug out of the ground or cut at or below ground level.

It is preferable to fill between roots rather than digging them out. It is inevitable that roots will be uncovered and ruts will form throughout a trail’s life. Regular maintenance will be required to improve these features, as discussed in Chapter 9.

As discussed in Section 3.1.5, the natural landscape is an important factor that should be considered during initial design stages. There are often opportunities to “recycle” local materials (e.g. crushing excavated rocks to be used as basecourse or surfacing) when building trails. This adds continuity to the trail, decreases environmental impact and can cost less than importing materials.

Councils have rules restricting the amount of earth that can be removed and the maximum cross slope of terrain that a track can be built on. Trail designers and builders need to become familiar with these rules which make sense from both environmental and track sustainability standpoints.

Opening a natural surface trail to light can encourage weed growth. The natural tree canopy should not be disturbed if possible. Some weeds (for example African Clubmoss and Dydimio) are easily transferred from one trail to another by bicycle tyres. At the design and construction stage, these weeds need to be identified and eradicated or controlled. If infestations occur after the trail has been built, on-going control techniques will be required.
4 On-Road Trails

4.1 Introduction

On-road trails (quiet roads, cycle lanes or sealed road shoulders) provide for cyclists within the road “carriageway” (i.e. that portion of the road where motor vehicles travel). In urban areas, the carriageway is often defined by kerbs; in rural areas the carriageway is either the sealed area or the gravel area available for vehicles.

In urban areas, no special physical measures are needed if motor vehicle operating speeds and traffic volumes are low. At higher speeds and volumes, the main type of on-road provision that caters for urban cycle travel is a cycle lane. Although there are several different ways of distinguishing a cycle lane from adjacent general traffic lanes (e.g. painted line or coloured surfacing) cycle lanes are, by definition, on-road. Cycle paths, conversely, are off-road. Cycle lanes are given legal weight by the presence of white bicycle logos painted at frequent intervals along the lane.

Sustrans (2009, Chapter 11) gives an excellent description of how to create cycle-friendly urban on-road provisions such as green streets and home zones.

On rural roads, no special cycling provisions are needed if motor vehicle operating speeds and traffic volumes are below 1000 AADT. Otherwise, sealed shoulders are the main type of provision for cycling on country roads. It is essential that good intervisibility between cyclists and motorists is achieved, particularly for higher speed locations.

It may be sufficient for cyclists to use low volume, low speed rural roads without any specific form of provision. In some cases it will be necessary to provide marked cycle lanes or wide shoulders so that cyclists have a designated cycling space. Many cyclists on the NZCT will be inexperienced cyclists, from New Zealand, Australia or North America. Others, especially those from continental Europe are likely to be experienced cyclists used to off-road paths, but not experienced in on-road rural cycling.

Figure 30: Cyclist on rural road with wide shoulder, OTT Trail, Taihape (photo: Jonathan Kennett)
## 4.2 General Design Specifications

Table 10 presents the design specifications for on-road trails according to the first five trail grades. These grades are designed to correspond to the off-road grades but no on-road facilities will be designed for an “extreme” (Grade 6) level as this level would not be conducive to the NZCT “brand” in the on-road context. If a route involves both on-road and off-road sections, the grades of the two components should be consistent.

### Table 10: Design specifications for on-road trails

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade Description</th>
</tr>
</thead>
</table>
| **1.** | **Description:** On-road route suitable for cyclists with little on-road cycling experience and low level of fitness. Mostly flat.  
**Traffic conditions:** Low motor traffic volumes and speeds and high quality trails, as shown in Figure 33.  
**Width:** As shown in Section 4.4.  
**Gradient:** 0-2.5 degrees for at least 98% of trail; between 2.5 and 3.5 degrees for no more than 100 metres at a time, and between 3.5 and 4.5 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 4.5 degrees). Unsealed trails should be less steep (same as the equivalent grade of off-road trail; see Table 3).  
**Surface:** Gravel roads in low volume, low speed situations. Asphaltic concrete or concrete is smoother than chipseal.  
**Road requirements:** No multi-lane roundabouts. Cyclist provision at signalised intersections. Crossing facilities if cyclists required to cross roads.  
**Length:** 3.5-4.5 hours/day (30-50 km/day) |
| **2.** | **Description:** On-road route suitable for cyclists with little on-road cycling experience but reasonable level of fitness. Some gentle climbs.  
**Traffic conditions:** Low motor traffic volumes and speeds and high quality trails, as shown in Figure 33.  
**Width:** As shown in Section 4.4.  
**Gradient:** 0-4 degrees for at least 95% of trail; between 4 and 5 degrees for no more than 100 metres at a time, and between 5 and 7 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 7 degrees). Unsealed trails should be less steep (same as the equivalent grade of off-road trail; see Table 3).  
**Surface:** Gravel roads in low volume, low speed situations. Asphaltic concrete or concrete is smoother than chipseal.  
**Road requirements:** No multi-lane roundabouts. Cyclist provision at signalised intersections. Crossing facilities if cyclists required to cross roads.  
**Length:** 4-5 hours/day (40-60 km/day) |
### 3. Intermediate

**Description:** On-road route suitable for cyclists at least 12 years old with some on-road cycling experience and reasonable level of fitness. Moderate exertion levels expected. Some steep climbs.

**Traffic conditions:** As shown in Figure 34.

**Width:** As shown in Section 4.4.

**Gradient:** 0-6 degrees for at least 90% of trail; between 6 and 8 degrees for no more than 100 metres at a time, and between 8 and 10 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 10 degrees). Unsealed trails should be less steep (same as the equivalent grade of off-road trail; see Table 3).

**Length:** 4-6 hours/day (50-80 km/day)

### 4. Advanced

**Description:** On-road route suitable for cyclists at least 12 years old with some on-road cycling experience and reasonable level of fitness. Considerable exertion levels expected. Some steep climbs.

**Traffic conditions:** As shown in Figure 34.

**Width:** As shown in Section 4.4.

**Gradient:** 0-8 degrees for at least 90% of trail; between 8 and 10 degrees for no more than 100 metres at a time, and between 10 and 13 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 13 degrees). Unsealed trails should be less steep (same as the equivalent grade of off-road trail; see Table 3).

**Length:** 4-8 hours/day (60-100 km/day)

### 5. Expert

**Description:** On-road route suitable for cyclists at least 12 years old with considerable on-road cycling experience and reasonable levels of fitness. Considerable exertion levels expected with some steep climbs. The speed and volume of adjacent motor vehicle traffic will be considered unpleasant and/or unsafe by many Grade 1 and Grade 2 trail users.

**Traffic conditions:** As shown in Figure 35.

**Width:** As shown in Section 4.4.

**Gradient:** 0-10 degrees for at least 90% of trail; between 10 and 15 degrees for no more than 100 metres at a time, and between 15 and 18 degrees for no more than 10 m at a time. If the track is designed and promoted to be ridden predominantly in one direction then the downhills can be steeper (up to 18 degrees). Unsealed trails should be less steep (same as the equivalent grade of off-road trail; see Table 3).

**Length:** 4-8 hours/day (70-120 km/day)
4.3 Gradients

Gradient requirements from Table 10 for sealed on-road and off-road trails are summarised in Table 11:

<table>
<thead>
<tr>
<th>Trail Grade</th>
<th>Main uphill gradient range</th>
<th>Steeper slopes up to 200 m long</th>
<th>Steeper slopes up to 20 m long</th>
<th>Maximum Downhill Gradient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 – 2.5 degrees for 98% of length</td>
<td>2.5 – 3.5 degrees</td>
<td>3.5 – 4.5 degrees</td>
<td>4.5 degrees</td>
</tr>
<tr>
<td>2</td>
<td>0 – 4 degrees for 95% of length</td>
<td>4.5 – 5 degrees</td>
<td>5 – 7 degrees</td>
<td>7 degrees</td>
</tr>
<tr>
<td>3</td>
<td>0 – 6 degrees for 90% of length</td>
<td>6.5 – 8 degrees</td>
<td>8 – 10 degrees</td>
<td>10 degrees</td>
</tr>
<tr>
<td>4</td>
<td>0 – 8 degrees for 90% of length</td>
<td>9 – 10 degrees</td>
<td>10 – 13 degrees</td>
<td>13 degrees</td>
</tr>
<tr>
<td>5</td>
<td>0 – 10 degrees for 90% of length</td>
<td>12 – 15 degrees</td>
<td>15 – 18 degrees</td>
<td>18 degrees</td>
</tr>
</tbody>
</table>

Notes:
1. This table applies to on-road sealed trails and off-road sealed (concrete or asphalt) trails.
2. Uphill sections of trail that are steeper than these gradient criteria should only be one grade harder and only in sections of up to 100 m length. It is undesirable to have harder sections of trail as some riders are likely to be forced to walk these sections.
3. Maximum downhill gradient applicable for 100 m and only if trail is designed and promoted to be ridden in one direction.

This table is repeated in Appendix 1 along with the comparable table for off-road trails.
Example – Gradients for Christchurch to Akaroa Cycle Route

To understand the suitability of the on-road gradients presented in Table 10, consider “Le Race”, a popular road cycle race which covers 100 km from Christchurch to Akaroa. It has several steep sections (as illustrated in Figure 32) and is generally ridden by cyclists of at least intermediate ability and experience.

Short sections of the course have gradients of up to 7 degrees (12%), which is within the Grade 4 on-road specification. This suggests that the Grade 4 and 5 on-road categories offer the right amount of challenge for serious road cyclists. Note that the gradients shown in Figure 32 have been calculated over long sections and larger localised gradients exist.

4.3 On-Road Trail Types

Figure 33 shows the motor vehicle traffic speed and volume characteristics for Grade 1 and 2 on-road trails. At low combinations of traffic volume and speed, no special provisions for cyclists, other than NZCT signage and branding, are required. At higher levels, a cycle lane or wide shoulder is required. Figure 34 gives the equivalent values for Grade 3 and 4 trails. Figure 35 covers Grade 5 on-road trails. Where cycle lanes or wide shoulders are required these should be provided according to Table 12.

Gravel roads can be considered appropriate if their characteristics fit in the "mixed traffic" areas of the figures.

These figures should also be read in conjunction with the notes that follows them. Note that the Y-axes are at different scales.

Traffic volumes in the figures are two-way. As traffic volumes increase, so do the chances of cyclists meeting two cars from opposite directions at the same time. This is when road space is at a premium; thus two way traffic volumes are just as important to cyclist safety and perception of safety as the traffic volume on the adjacent lane.
Figure 33: Trail type for Grade 1 and 2 on-road trails

Figure 34: Trail type for Grade 3 and 4 on-road trails
Notes:

1. Where the 85th percentile operating speed is known it should be used (on the X-axis) in Figure 33 to Figure 35, otherwise the speed limit should be used.

2. Traffic volumes (Y-axis) are two-way motor vehicle traffic volumes, per day.

3. A road with a motor vehicle volume and speed combination outside the shaded areas in Figure 33 is not suitable as a Grade 1 or 2 trail on an NZCT route. Likewise, a road with a motor vehicle volume and speed combination outside the shaded areas in Figure 34 is not suitable as a Grade 3 or 4 trail.

4. Where necessary, measures should be taken to reduce the motor vehicle speeds or volumes to achieve a combination appropriate to the desired trail type. If this cannot be achieved an alternative route should be considered.

5. Paint marking cannot be applied to unsealed (gravel) roads and therefore unsealed roads cannot include cycle lanes or shoulders suitable for cycling. Gravel roads satisfying the "mixed traffic" requirements in the figures may be used for the appropriate on-road trail grade.

6. Grade 5 trails are typically links between "Great Rides" and will not necessarily be iconic rides in their own right.

4.4 Gravel Roads

Some NZCT routes will include gravel roads; these may be appropriate under the mixed traffic category in Figure 33 to Figure 35. There must be a commitment by road controlling authorities and their contractors that these gravel road sections will be maintained to a standard that is suitable for cycling, consistent with the route grade. This may require changes to design, construction and maintenance practices, including the selection, application, compaction and maintenance of road metal, and to inspection frequencies. The road camber, especially at bends, may need to be reduced to improve cycle stability.

Regular maintenance should be undertaken to ensure the edge of the road where cyclists ride does not experience a build-up of loose gravel. This can occur as gravel migrates to the side of the road and can result in an unstable, uncomfortable and potentially dangerous surface.
This can be a particular problem where uncrushed graded river gravels are used for road metal. Excessive gravel build-up on parts of the carriageway (such as dips and the inside of bends) should be removed. Crushed or stabilised gravels bind much better and provide a more stable riding surface, for motor vehicles and cycles alike.

Trail designers, operators and roading authorities will need to consider the surface quality of gravel roads both immediately after resurfacing and after the road surface is worn. It is preferable for gravel roads to be bordered by a flat, mown or grazed grass verge where cyclists can pull over if necessary.

4.5 On-Road Shoulder or Cycle Lane Widths

Where shoulders are provided on sealed roads for NZCT trails, their widths and the widths of adjacent general traffic lanes should be as described in Table 12. In determining how much width is available for cycling in a shoulder on an existing road, or on a road redesigned to accommodate cyclists, the effective shoulder width should be considered. This is exclusive of raised reflective pavement markers (RRPMs), and should be measured from the centre of the edge line to the edge of seal. If RRPMs exist or are planned, then the available width should be measured from the RRPMs to the edge of seal.

Table 12: Shoulder or cycle lane widths

<table>
<thead>
<tr>
<th>Grade</th>
<th>Shoulder or cycle lane width</th>
<th>Speed Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>50 km/h</td>
</tr>
<tr>
<td></td>
<td>Minimum adjacent width</td>
<td>3.0 m</td>
</tr>
<tr>
<td>1 and 2</td>
<td>Desirable minimum width</td>
<td>1.5 m</td>
</tr>
<tr>
<td></td>
<td>Acceptable range</td>
<td>1.2 – 2.2 m</td>
</tr>
<tr>
<td>3 and 4</td>
<td>Desirable minimum width</td>
<td>1.2 m</td>
</tr>
<tr>
<td></td>
<td>Acceptable range</td>
<td>1.0 – 1.5 m</td>
</tr>
<tr>
<td>5 (Narrow shoulder for 2000-10,000 AADT)</td>
<td>Desirable minimum width</td>
<td>1 m</td>
</tr>
<tr>
<td></td>
<td>Acceptable range</td>
<td>0.6 – 1 m</td>
</tr>
<tr>
<td>5 (Intermediate width shoulder for 5000-15,000 AADT)</td>
<td>Desirable minimum width</td>
<td>1.2 m</td>
</tr>
<tr>
<td></td>
<td>Acceptable range</td>
<td>1.0 – 1.5 m</td>
</tr>
<tr>
<td>5 (Wide shoulder for 8000-30,000 AADT)</td>
<td>Desirable minimum width</td>
<td>1.5 m</td>
</tr>
<tr>
<td></td>
<td>Acceptable range</td>
<td>1.2 – 2 m</td>
</tr>
</tbody>
</table>

Notes:

1. The speed limit is used unless the 85th percentile speed is significantly higher.
2. Interpolation for different speed limits is acceptable.
3. Wider cycle lane or shoulder widths than the minima are recommended.
4. When greater than 2.5 m of shoulder or cycle lane exists, chevron pavement markings should be provided to suggest a cycling area of between 1.5 m and 2.0 m in width and to separate the cycling area from the general traffic lane. In such cases, the chevron markings should be at least 1.0 m wide.

5. Additional shoulder or cycle lane width is required if on-road parking is present. NZTA (Transit NZ (2008b)) Table 4-2 applies for both the desirable minimum width as well as the acceptable range, instead of the values given in Table 12.

6. Adequate shoulder or cycle lane width is required if on-road audio tactile profile (ATP) road marking is present. Ideally a shoulder width of at least 1.5 m (but a minimum 1 m) should be present before ATP road markings are used. Whichever is the greater requirement (Table 12 or this note to the table) should be applied.

7. Where RRPMs (raised reflective pavement markers) are present in or near the shoulder, the shoulder width should be measured from the road edge to the RRPMs, rather than to the edgeline, whichever is less.

8. The lower end of the acceptable shoulder or cycle lane ranges may be used for NZCT on-road cycle trails where it is not practicable to provide the desirable minimum width shoulder or cycle lane. Where the full width of the shoulder or cycle lane is not available (e.g. next to a kerb), then the desirable minimum width should be used.

9. The lower end of the acceptable range should only be used when motor vehicle traffic volumes are relatively low. These shoulder widths do not comply with "best practice" for cycle lanes or sealed shoulders but may be all the width that is available on some NZCT routes. Designers should use sound engineering judgement to satisfy themselves that such shoulder widths will be safe.

10. For Grade 5 trails, different shoulder widths are specified depending on the traffic volume and operating speed environment. The wider shoulder width should be considered for uphill sections of the trail to allow for "wobble" factors.

11. Where minimum traffic lane width requirements are not met, the desirable minimum cycle lane / shoulder width should be increased accordingly.

12. Where compromises from desirable minimum width are necessary, consider providing more shoulder width in the uphill direction, to accommodate cyclist "wobble".

13. Heavy vehicles (trucks, buses and camper vans) are wider than cars and cause more discomfort to cyclists in terms of side drafts, noise and vibration. Additional width allowance should be made on roads with a significant proportion of heavy vehicles, with considerable effort expended where necessary to ensure that desirable minimum widths according to Table 12 are provided.

14. Where the surface beside the shoulder is easily rideable (i.e. flat mown grass, or compacted gravel) for mountain bikes, and the cycle route is one for which mountain bikes are required (e.g. Mountains to Sea) then the minimum shoulder required can be reduced for short pinch points.
4.6 Seasonal Traffic Volume Variations

All roads experience uneven traffic volume distributions over time. Some roads at some times of day or year may be unsuitable for most cyclists (because of the intensity of traffic), but may be perfectly acceptable at other times of the day or year. If potential NZCT trail users are made aware of the normal traffic variations and patterns, they may be able to safely and enjoyably, simply by choosing a quieter time of day.

The following methodology is applicable to Grade 5 routes only and takes account of traffic conditions experienced by cyclists. An Average Annual Daily Traffic volume (AADT) can be used in conjunction with Figure 35, but what matters to cyclists is the volume of traffic experienced at the time of riding a route. There are two considerations to take into account:

- Cyclists themselves can have an influence on the traffic volume by avoiding busy times on the road. For this to be realistic, they need to have the appropriate information.
- Some roads have a distinctly seasonal nature. Where this is the case, the busy times to be avoided may be longer during the holiday period than for the rest of the year. That is, an AADT may not necessarily be sufficient when determining what advice to give to cyclists.

Figure 36 shows an example of seasonal road traffic volumes.

![Figure 36: Hourly traffic volume distribution in January and the remainder of the year](image)

In this example, a trail operator may decide that cyclists should be advised to avoid using the road when traffic volumes exceed 1,000 vehicles per hour (roughly equivalent to 10,000 vehicles per day). The blue bars show that cyclists should thus avoid the road between 12 noon and 3 pm.

It can be seen that being aware of hourly volume distributions, and how these may vary during peak times of the year, can possibly be an important management tool.
4.7 Assessing Cycle Routes on Open Roads (100 km/h speed limit)

The chart presented in Figure 37 below provides some initial guidance for assessing the viability of roads with a 100 km/h speed limit for accommodating on-road cycle routes for the New Zealand Cycle Trail (NZCT) network.

The volume of traffic (Average Annual Daily Traffic or AADT) and shoulder width are key factors in determining the suitability of roads for the NZCT. These have been discussed in the preceding sub-sections of Chapter 4.

**Important points to note:**

- This chart is for assessing cycle routes using open roads with a 100 km/h speed limit. Where the speed limit is lower than 100 km/h the required shoulder width will reduce (refer to section 4.5).
- Gravel roads and many minor sealed roads have no shoulder. If such roads are to accommodate an NZCT route, the AADT must be less than 2,000 veh/day to fit the NZCT criteria.
- Roads that have an AADT over 18,000 veh/day are not acceptable for NZCT routes.
- **This chart is an outline only.** There are a number of factors that determine the final grade assigned to an on-road cycle route, in addition to the AADT and shoulder width. The other considerations outlined in this *Cycle Trail Design Guide* should be considered in decision making.

![Figure 37: determination of viability of cycle routes on open roads](image)

4.8 Pinch Points

A pinch point is a localised narrowing of a trail due to physical features restricting the width. These can occur on- or off-road. Off-road pinch points can cause conflict between users travelling in different directions; generally this is not a great problem especially if visibility is sufficient to recognise the pinch point and take action before encountering other users.

For on-road pinch points, the greatest danger to cyclists is that of passing motor vehicles. Narrow bridges are common on-road pinch points. If it is not possible to provide the appropriate cycling width on-road (as outlined in Section 4.5) then off-road alternatives should be considered.

However, mitigation treatments may be applied to short sections of on-road trails where the required standard is not met and it is not feasible to provide off-road alternatives (in
the immediate future). These are good short term improvements while a more permanent solution is developed.

Such treatments may include active warning signs, such as those shown in Figure 38 and Figure 39. These signs may be activated either by a push button which the cyclist must ride up to or an inductive loop sensor in the pavement which must be positioned so that the cyclist will ride over it. Inductive loop detectors are preferred as they do not require cyclists to stop, however the loop positioning must be carefully determined and detection equipment must be able to detect cyclists but not motor vehicles.

![Push button activated warning sign at vertical crest, SH 60 near Nelson (photo: NZTA)](image)

**Figure 38: Push button activated warning sign at vertical crest, SH 60 near Nelson (photo: NZTA)**

![Inductive loop activated warning sign on narrow Appleby bridge, SH 60, near Nelson (photo: NZTA)](image)

**Figure 39: Inductive loop activated warning sign on narrow Appleby bridge, SH 60, near Nelson (photo: NZTA)**

Active warning signs can also be useful at complicated on-road sites where there are many demands on motorists’ attention and cyclists might not otherwise be noticed, such as at locations where cyclists cross the open road, or at intersections. Figure 40 shows an active warning sign used at the Ngauranga interchange on State Highway 2, near Wellington. Cyclists cross the motor vehicle on-ramp but motorists are warned to look out for cyclists by the sign, which is activated by inductive loops on the cyclist approach plus a push button option at the crossing.
Reducing the motor vehicle speed limit can also mitigate the effect of on-road pinch points although this requires a thorough technical and legal process. It may suitable on some rural roads, however, where traffic operating speeds are already well below the 100 km/h rural limit and an 80 km/h limit may be more appropriate for motor vehicle (as well as cyclist) safety.

While “chokes” may be used on off-road trails (as outlined in Section 3.8) pinch points should not purposefully be designed into on-road trails as this will put cyclists into danger from motor vehicles.

### 4.9 Markings and Delineation

Markings and delineations for on-road cycle trails and road shoulders should be designed according to MOTSAM (Transit NZ, 2008b). This includes specifications for line styles, cycle logos, application of coloured surfacing and intersection treatments. It also has advice on raised reflective pavement markers (RRPMs) and audio tactile profile (ATP) markings.

Draft advice from NZTA for audio tactile profile (ATP) markings notes:

- Attempt to maintain a 1 m clear shoulder width outside of ATP wherever possible. This shoulder width needs to be clean, clear and well maintained. Where a 1 m shoulder width cannot be achieved then clear reasons for installing the ATP need to be well documented (includes consideration of cycle use and the crash history).
- 150 mm wide ribs at 250 mm centres to be laid either on or immediately outside of the edgelines, depending on the available shoulders.
- Maintain a 3.35 m minimum clear traffic lane between any centreline and edgeline ATPs.
- Edgeline ribs are to be stopped well in advance (preferably 30 m minimum) of any shoulder narrowing, bridge structures, intersections etc.
- It is strongly recommended that consultation is undertaken with local cycle advocacy groups where ATP is being laid, particularly when the shoulder width is less than 1m. This will also help to determine the cycle frequency on these corridors and whether or not ATP should be laid.
5 Crossings and Intersections

5.1 Introduction

For the purposes of this guide, a “crossing” is a junction between an off-road cycle path and a road. An “intersection” is either a junction between two off-road cycle trails or a junction between two roads (one or both of which may be an NZCT on-road cycle trail). Crossings are the most common form of junction on the NZCT.

"At grade" crossings are the most common crossing type, where cyclists cross the road surface. More expensive crossings are "grade separated", where the cycle path is at a different elevation to the road, as in a bridge or underpass.

In practice, gravel roads have relatively low traffic volumes and cycle crossings are fairly easy for adult cyclists, so long as good visibility exists.

5.2 Crossings

5.2.1 “Uncontrolled” Crossings

Uncontrolled (i.e. without Stop or Give Way signs or other traffic controls) crossings of roads by cycle trails are usually safe for all users if the traffic volumes are low (under 1,000 vehicles per day) and visibility is good. Where these conditions do not exist, crossings should be controlled. Some trails, for example in forests, have poor visibility of approaching road crossings and may thus need to be controlled, even when traffic volumes are low.

5.2.2 “Stop” or “Give Way” Crossings

At "Stop" or “Give Way” crossings, cyclists on the trail will either have to give way to traffic on the intersecting road or vice versa. The situation where cyclists have to give way gives the lowest level of service to cyclists. Yet “Stop” and “Give Way” crossings are likely to be common given the low costs required and that they generally provide adequate safety levels and levels of service.

Median islands will be required at some “Stop” or “Give Way” crossings where the road traffic volume is too high to provide sufficient opportunities for cyclists to cross the entire road in one movement. They will also be required at some “Stop” or “Give Way” crossings where high traffic speeds may make it difficult to judge a gap in both directions of traffic. Median islands allow cyclists to cross half of the road then wait in safety at the centre for a gap in the traffic on the other side of the road. The median should include a cycle holding rail to aid cyclists waiting in the median.

Median islands should be designed to allow cyclists ample room to wait at the centre of the road. Designers may consider using a group of five cyclists as the design standard; this will mean there is also ample room for tandem cycles or cyclists towing trailers.

Additional treatments may also be required to ensure cyclists are aware of the presence of opposing traffic and their obligations to give way. Some international cyclists (especially continental Europeans) will be unfamiliar with this arrangement as in some countries it is uncommon for roads to have priority over major cycle paths. Therefore it is important that the message is clear. Treatments where users of off-road trails must give way to traffic on intersecting roads, especially where traffic speeds and / or volumes are high, should include:
• A change in path alignment leading up to the crossing that requires cyclists to slow down (i.e. combination of curves of decreasing radii);
• “Give Way” (or “Stop”) signs and limit lines; and
• Adequate intervisibility between cyclists and motorists.

Treatments may also include:
• A change in path surface texture and / or colour;
• Introduction of a centreline on path approaches to separate directional flows;
• Introduction of a bollard or gateway on path approaches to assist separation of directional flows and prevent motor vehicles from accessing the trail; and
• Kerb extensions on the road to reduce the crossing distance.

Paths should cross roads at right angles (90°) to minimise the crossing distance and ensure appropriate visibility in each direction.

In most cases it will not be necessary to force cyclists to dismount at a crossing. If there is sufficient visibility then cyclists should be given the opportunity to ride across a crossing. However, in some circumstances (for example, at the bottom of downhill slopes) cyclists may not easily judge the safety implications and the trail design should require them to slow down to check for motor vehicles. This can be done by providing bollards, gradient reversals or curves on the crossing approaches.

Situations where “Give Way” or “Stop” crossings with and without median islands are recommended, based on motor vehicle volumes and speeds, are outlined in Section 5.2.5.

The case of a crossing where road users must give way to trail users will be rare in urban areas and is not recommended on roads with speed limits over 50 km/h, as motorists will have difficulty seeing cyclists about to cross in sufficient time to stop. If designers are considering this type of crossing for a rural road, preference should be given to providing “grade separation” (a bridge or underpass).

If the trail has priority over the road (by requiring motorists to give way or stop at the trail crossing) cyclists have a better level of service (theoretically they will face no delay) but the crossing may have compliance and therefore safety issues. This treatment is likely to be acceptable only if the volume of cyclists using the trail is comparable to (or higher than) the volume of motor vehicles on the road. It is uncommon in New Zealand for roads to give way to cycle paths and thus the message should be clearly communicated to motorists.

The frequency of use of the crossing by cyclists is also an important factor in considering giving a trail priority over a road at a crossing. Like zebra crossings for pedestrians, crossings where the trail has priority over the road are likely to have poor motorist compliance if they have a low rate of use.

5.2.3 Signalised Crossings

Signalised crossings may be safer than “Give Way” or “Stop” crossings in some locations. However, signalised crossings should not be used in locations with speed limits greater than 80 km/h (Austroads, 2003) because of the high risk and potential severity of crashes if signals are not complied with at these speeds. Signalised crossings are therefore not appropriate for a large number of NZCT road crossings.

In rural settings, even where speed limits are 80 km/h or less, traffic signals may be inconsistent with surrounding intersection controls and thus may take drivers by surprise which can result in poor compliance. Signals in rural locations require a high degree of
There is a danger that low numbers of trail users at signalised crossings will result in motorists becoming “conditioned” to green lights and not stop when they (rarely) receive a red light to allow users to cross.

Signalised crossings will be most appropriate in or near large urban areas, where motorists are used to experiencing traffic signals and the surrounding infrastructure supports their installation. In these circumstances, signalised crossings can improve the level of service for cyclists, especially in situations with high traffic volumes that would offer few gaps for crossing opportunities under a scenario where road users have priority. Cyclists can be detected by inductive loops positioned prior to the crossing so that the crossing phase can be called as they arrive. A good example of this is seen on Christchurch’s Railway Cycleway, as illustrated in Figure 41.

Alternatively, a push button arrangement or inductive loop detector can be provided for cyclists at the crossing location. Advanced detection via inductive loops is recommended but it is also advisable to provide detection at the crossing as a back-up.

Situations where signalised crossings are recommended, based on motor vehicle volumes and speeds, are outlined in Section 5.2.5.

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**5.2.4 Grade Separated Crossings**

Grade separation (bridges or underpasses) are useful techniques for crossing busy or high-speed roads but they are expensive. Most crossings of the NZCT will be "at grade" (i.e. cyclists and motorists share the same surface), but in some circumstances grade separation can be justified.

Grade separation can take two main forms:

- Underpass for cyclists; or
- Overpass (or bridge) for cyclists.

Underpasses for cyclists require less vertical deviation than overpasses due to the height required for overpasses to clear large trucks. Cyclists also generally prefer the geometric characteristics of underpasses as they can gain momentum on the initial downward slope.
which aids in climbing the subsequent upwards slope. In contrast, overpasses require cyclists to first cycle uphill.

Recent advances in design and installation of stock underpasses can be applied to providing cost-effective underpasses for cyclists. However underpasses may be more expensive to construct than overpasses if the water table is high. If flooding is not an issue there may be opportunities to convert existing culverts into trail underpasses.

Security issues are more prevalent for underpasses than overpasses. Underpasses should have clear visibility from end to end and on the approaches. It may be necessary to provide lighting within the underpass. Provision of ample width is also important so that cyclists feel comfortable and shy space due to the walls is accounted for (see Section 3.5).

If an NZCT route is intended to provide for commuter cyclists in urban settings it is important that the deviation imposed on cyclists is minimised, otherwise cyclists may choose to forgo the route and cross the road at-grade. This is less important for cycle tourists who are generally willing to travel longer distances for the sake of the journey and favour safety over directness. What is more important for those cyclists is the gradient of the slopes involved in a structure. Section 4.2 gives more guidance on suitable gradients for isolated sections such as underpasses and overpasses as well as the trail generally.

The structural design aspects of bridges and underpasses are discussed further in Section 6. Situations where grade separated crossings are recommended, based on motor vehicle volumes and speeds, are outlined in Section 5.2.5.

5.2.5 Selection of Crossing Type

When determining the type of crossing provision, the following factors should be taken into account:

- Traffic volumes;
- Proportion of heavy vehicles;
- Speed environment;
- Intervisibility;
- Crossing distances (width of road);
- Surrounding environment (e.g. urban / rural); and

Figure 42: Otago Central Rail Trail underpass (courtesy of OCRT Trust)
• Crossing provision at other nearby locations along the trail and intersection controls along the road.

Figure 43 shows the suggested crossing types for trails according to various combinations of traffic volume and speed limit. This should be applied to Grade 1 and 2 trails in particular. At existing intersections it can be assumed that the current provision is suitable for Grade 3-5 users. New crossings for Grade 3-5 uses will have to be designed on a case-by-case basis. The appropriateness of the treatments shown in Figure 42 may vary with site-specific factors, especially those listed above. The boundaries between the various treatments are not rigidly defined and a 10% tolerance either side is considered acceptable. The minimum level of provision possible for an NZCT crossing is to have “Give Way” signs on the trail approaches without any additional treatments.

Figure 43 does not include the situation where road traffic must give way to cyclists. These situations will be uncommon and should only occur in locations where the speed limit is 50 km/h or less and cycle volumes are equal to or greater than motor vehicle volumes and there are at least 50 cyclists per hour in the peak hour of traffic each day, throughout the year.

![Figure 43: Crossing types (for Grade 1 and 2 trails)](image)

**Notes:**
- A 10% tolerance either side of the boundaries shown can be used.
- Speed limit is specified, however if the operating speed is known, the 85th percentile speed should be used instead.
- The maximum crossing distance to a median island is 4.5 m at up to 60 km/h; 5.0 m at 80 km/h and 5.5 m at 100 km/h.
5.3 On-Road Intersections

Where cyclists remain on-road at intersections the markings and delineations should be designed according to MOTSAM (Transit NZ, 2009). The Austroads Guide to Road Design (Parts 4, 4A, 4B and 4C) provide guidelines for the treatment of a wide range of intersections and interchanges.

The type of crossing provision will be governed by the motor vehicle interactions on the intersecting roads and therefore on-road NZCT routes are likely to have intersections controlled by “Give Way” or “Stop” signs (the route may have priority over or may have to give way to the intersecting road traffic) or by traffic signals. Small roundabouts are also acceptable but intersections with high volume or multi-lane roundabouts should be avoided for NZCT routes.

It may be necessary to provide separate cycle facilities at the intersection, for example creating an off-road section that takes cyclists around the corner of the intersection and provides a midblock crossing facility with median island or grade separation.

Where cycle trails are on a road that does not have priority over an intersecting road, the guidelines outlined in Section 5.2.1 for off-road trails also apply.

On-road cycle facilities at signalised intersections include advanced stop boxes, advanced stop lines, hook turn boxes and dedicated signals for cyclists. Design of these facilities is outlined in MOTSAM (Transit NZ, 2009).

5.4 Path Intersections

The key consideration for intersections between off-road trails is intervisibility between users. Even for rural paths with low volumes there will be situations where users approach the intersection from each path simultaneously. If they have sufficient warning of each other they can adjust their paths and negotiate the intersection safely. There is usually no need to specify which path must give way, but this may be a useful treatment for paths with higher volumes and particularly poor visibility. Figure 44 shows an example of a path with poor intervisibility between the approaches; this is compounded by the slope of the bridge which will increase cyclists’ approach speeds at the intersection.

![Figure 44: Poor intervisibility at path intersection – Auckland](image)
5.5 Railway Crossings

Where off-road trails cross railway lines and train traffic volumes are low (under 20 trains per day), a simple level crossing is likely to be the most cost-effective solution. An example of such a crossing (from Hastings) is shown in Figure 45.

![At-grade rail crossing installed in 2010 in Hastings (photo: Andrew Macbeth)](image)

It will usually be desirable to control the approach speeds of cyclists before an at-grade rail crossing. A gentle chicane is all that is needed. Indicative designs for two treatments are shown in Figure 46 and Figure 44.

![Chicane design; slows cyclists before crossing railway line](image)
Some trails on roads cross railway lines on bridges. If road traffic volumes are low (fewer than 1,000 vehicles per day), cyclists may be able to share the bridge comfortably and safely with motor vehicles if adequate visibility and width exist.

Where road crossings carry higher traffic volumes, separation from motor vehicles should be considered by providing a separate, off-road at-grade crossing (as illustrated in Figure 45) or by providing clip-on bridges alongside the main bridge.

Separation from motor vehicles will be especially important if the trail is Grade 1 or 2. Many existing rail over-bridges have inadequate width for safe cycling (see Figure 48).
6 Structural Design

6.1 NZ Handbook for Tracks and Outdoor Visitor Structures (HB 8630)

This section is designed to supplement the New Zealand Handbook for Tracks and Outdoor Visitor Structures – SNZ HB 8630:2004 (hereafter referred to as “HB 8630”) which is due to be updated in the near future. The Department of Conservation (DOC) was a major player in the development of this Standards New Zealand document.

HB 8630 is intended for off-road trails only and therefore should generally not be applied to on-road structures for cyclists. Structural design for on-road structures (including “clip-on” paths to road bridges) should follow the standard for design for access and mobility, NZS 4121:2001 (Standards New Zealand, 2001); structural design standard, AS/NZS 1170 (Standards NZ, 2004); and the Transit NZ (2003) Bridge Manual with geometric features of cycle trails and facilities (such as dimensions and gradients) designed according to the NZ Supplement to Austroads Part 14: Bicycles (Transit NZ, 2008a).

HB 8630 was developed principally for walking tracks and, while it mentions cycling as an allowable activity in some circumstances, it is not written primarily for cyclists. Some of the advice is inappropriate for cycling trails and the purpose of this section is to clarify when HB 8630 can be used and when other guidance is required.

Six track classifications are used in HB 8630 for six “visitor groups” (also referred to as “user groups”). They describe the various abilities and motivations of track users. A useful summary of HB 8630’s various track classifications and their design specifications is given in its Table 5. These track classifications and corresponding visitor groups are summarised for users of the NZCT in Table 13 below.

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3 There is also a seventh visitor group, “Overnighters” (“ON”) presented in HB 8630. This group includes both domestic and international visitors and local community visitors seeking an overnight experience in a predominantly natural setting. For the purposes of HB 8630 the DV (Day Visitors) category is used for ON visitors and ON itself does not feature in subsequent design tables. Therefore the ON category is not used for NZCT route design.
### Table 13: DOC track classifications from HB 8630

<table>
<thead>
<tr>
<th>HB 8630 Track Classification</th>
<th>User Group</th>
<th>Visitor Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path</td>
<td>1</td>
<td>Urban Residents (UR)</td>
<td>Paths shall be well formed and provide for easy walking suitable for all ages and most fitness levels. Access shall be provided on a durable surface such as concrete, chip seal, asphalt or compacted gravel. Many Paths shall cater for people with mobility difficulties or limitations and children in mountain buggies or prams.</td>
</tr>
<tr>
<td>Short Walk</td>
<td>2</td>
<td>Short Stop Travellers (SST)</td>
<td>Short Walks shall be well formed and provide for up to one hour’s easy walking suitable for most ages and fitness levels.</td>
</tr>
<tr>
<td>Walking Track</td>
<td>3</td>
<td>Day Visitors (DV)</td>
<td>Walking Tracks cater for those who want an extended walk that takes from a few minutes to one full-day return. These tracks are usually reasonably easy day trips and are required to be of a standard to enable use by relatively inexperienced visitors with a low level of backcountry skill and wanting a low level of risk. Some may be suitable for cyclists/ mountain-bikers as well as pedestrians.</td>
</tr>
<tr>
<td>Great Walk / Easy Tramping Track</td>
<td>4</td>
<td>Backcountry Comfort Seekers – Easy Tramping Track (BCC)</td>
<td>These tracks cater for less experienced trampers (DOC refers to them as Backcountry Comfort Seekers) expecting a low risk experience in the backcountry. The Great Walks and Easy Tramping Tracks will generally be multi-day tramping tracks. Some Easy Tramping Tracks may be suitable for mountain-bikers as well as pedestrians.</td>
</tr>
<tr>
<td>Tramping Track</td>
<td>5</td>
<td>Backcountry Adventurers (BCA)</td>
<td>These tracks cater for Backcountry Adventurers, including trampers, hunters, anglers and mountaineers. A few may be suitable for mountain-bikers as well as pedestrians. Tramping Tracks generally follow the lie of the land and are commonly not formed.</td>
</tr>
<tr>
<td>Route</td>
<td>6</td>
<td>Remoteness Seekers (RS)</td>
<td>Routes are generally unformed and lightly cut and cater for experienced backcountry users who have navigation and river-crossing skills.</td>
</tr>
</tbody>
</table>

The HB 8630 track classifications do not correspond directly with the NZCT off-road trail grades. Not all of the HB 8630 classifications will be appropriate for the NZCT, especially those intended for unformed tracks. Table 14 shows the relationship between NZCT trail grades and HB 8630 track classifications.
### Table 14: Relationship of NZCT grades to HB 8630 track classes and visitor groups

<table>
<thead>
<tr>
<th>NZCT Grade</th>
<th>Equivalent HB 8630 User Group and Track Classification</th>
<th>HB 8630 Visitor Group</th>
<th>Reasoning / comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EASIEST</td>
<td>2. Short walk</td>
<td>SST</td>
<td>Easiest non-urban category in HB 8630. All watercourses bridged. NZCT route distances will be longer than those suggested in HB 8630.</td>
</tr>
<tr>
<td>2. EASY</td>
<td>3. Walking track</td>
<td>DV</td>
<td>Similar experience level. Similar steps between adjacent categories.</td>
</tr>
<tr>
<td>3. INTERMEDIATE</td>
<td>4. Great walk/ easy tramping track</td>
<td>BCC</td>
<td>Similar experience level. Moderate exertion levels Similar steps between adjacent categories.</td>
</tr>
<tr>
<td>4. ADVANCED</td>
<td>5. Tramping track</td>
<td>BCA</td>
<td>Similar experience level. Considerable exertion levels HB 8630 specifies some tramping tracks may be unformed – unlikely for NZCT trails.</td>
</tr>
<tr>
<td>5. EXPERT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. EXTREME</td>
<td>6. Route</td>
<td>RS</td>
<td>HB 8630 specifies routes as unformed – may be appropriate for extreme NZCT trails.</td>
</tr>
</tbody>
</table>

Table 15 shows the components of the design process in HB 8630 which depend on the visitor group classification (rather than track classification directly). Some of these components are adopted for the NZCT; others are modified as outlined in the following sections.
Table 15: Use of HB 8630 categories that depend on visitor group in the Cycle Trail Design Guide

<table>
<thead>
<tr>
<th>HB 8630 category depending on visitor group</th>
<th>Cycle Trail Design Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of basic live load for ultimate limit state (Table 6 of HB 8630)</td>
<td>Adopted</td>
</tr>
<tr>
<td>Basic live loads for barriers (Table 10 of HB 8630)</td>
<td>Adopted</td>
</tr>
<tr>
<td>Re-inspection by engineer every six years (Table 16 of HB 8630)</td>
<td>Adopted</td>
</tr>
<tr>
<td>Minimum access widths (Table 17 of HB 8630)</td>
<td>Superseded by this guide – see Section 6.3.1</td>
</tr>
<tr>
<td>Maximum structure gradients (Table 18 of HB 8630)</td>
<td>Adopted</td>
</tr>
<tr>
<td>Stairway classification (Table 19 of HB 8630)</td>
<td>Superseded by this guide – stairways should be avoided on NZCT. See Section 6.7.3.</td>
</tr>
<tr>
<td>Barrier types (Table 22 of HB 8630)</td>
<td>Adopted. In addition, barriers / handrails should be 1.2 m high for Grades 1 and 2, or 0.8 m* for Grade 3 and above.</td>
</tr>
</tbody>
</table>

* Note that a 0.8 m high barrier is unlikely to prevent a cyclist from falling over it if hit as the cyclist’s centre of gravity will most likely be higher than this. It will however guide cyclists’ alignment and therefore provide some safety benefit.

6.2 Types of Structure

Several types of structure are required for NZCT routes, including:

- Bridges and boardwalks (see Section 6.3)
- Cattle stops (see Section 6.4)
- Underpasses and tunnels (see Section 6.5)

![Figure 49: Bridge on Little River Rail Trail, Canterbury (photo supplied by Chris Freear)](image-url)
The most obvious type of structure is bridges (crossing rivers or roads), but other types of water crossing include culverts and fords. Boardwalks are essentially a platform over a surface that is unsuitable for a track, for example sensitive alpine saddle environments, wetlands, or across areas prone to flooding.

Cattle stops are also common, relatively low-cost structures on rural cycle paths that allow cyclists to cross fences without needing to stop cycling to open a gate. They are not specified in other guides. Cattle stops are considered to be a form of bridge for geometric design purposes.

Underpasses or tunnels may be required in steep terrain or when crossing roads. Drainage will be particularly important in tunnels so that they do not become flooded and impassable.

### 6.3 Bridges and Boardwalks

#### 6.3.1 General Requirements

The majority of bridges on the NZCT will be short (i.e. 10 m long or less) and be made from timber or steel. Swing and suspension bridges (Section 6.3.2) are typically cost-effective only for longer spans.

The widths specified for structures in HB 8630 are generally inadequate for cycle paths and should not be used. They are too narrow in many cases to allow any but the most skilled riders to cycle across and they are also too narrow to comfortably walk across beside a cycle. If bridges are too narrow, cyclists may need to unload their bikes of panniers and luggage and do multiple trips across a bridge to continue their journey.

![Manuherikia Bridge, Otago Central Rail Trail (photo: DOC)](image)

There are six important considerations for bridges and boardwalks:

- Width;
- Handrails;
- Passing / viewing bays;
- Vertical Clearance;
- Drainage; and
- Skid resistance.
Ideally bridge and boardwalk widths should be consistent with the overall path and therefore designed according to the path width requirements outlined in Section 3.1.5 plus additional clearances for “shy space” due to handrails or walls etc as outlined in Section 3.5. However, this may not always be feasible, especially for long spans or constrained locations, in which case the minimum bridge widths outlined in Table 16 (reproduced from Table 2) can be used.

It is usually relatively cheap to provide additional width for a cycle bridge. A bridge that is 50% wider than the minimum width will generally be much less than 50% more expensive, yet provide a much more pleasant cycling experience.

Table 16: Bridge and Boardwalk Widths (reproduced from Table 2)

<table>
<thead>
<tr>
<th>Grades</th>
<th>Recommended Bridge Width</th>
<th>Minimum Bridge Width *</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>1.5 – 2.5 m</td>
<td>1.2 m</td>
</tr>
<tr>
<td>3</td>
<td>1.2 – 1.5 m</td>
<td>1.0 m</td>
</tr>
<tr>
<td>4</td>
<td>1.0 m</td>
<td>0.8 m</td>
</tr>
<tr>
<td>5</td>
<td>0.8 m</td>
<td>0.6 m</td>
</tr>
</tbody>
</table>

* If handrails are provided, they should be flared out if minimum bridge widths are used

It is preferable to slope handrails outwards (10-15 degrees from the vertical) to allow more space for handlebars and thus allow more of the bridge deck to be safely ridden on. Flaring the handrails in this manner increases the effective width of the structure at minimal cost and generally improves the appearance of the structure. As discussed in Section 3.5, the minimum bridge width (from Table 2) is required at the surface of the bridge but flaring the handrails allows more clearance at handlebar height (taken as 1.0 m) and therefore makes the experience more comfortable for riders.

If a bridge or boardwalk does not have handrails, cyclists will be wary of cycling too close to the edge for fear of falling and suitable clearances for “shy space” should be provided (see Section 3.5 – clearances). Table 2 indicates the recommended bridge width according to path grade. It may be appropriate to increase this width where possible, especially for bridges of length 20 m or longer or on curved sections as cyclists need more space when cornering. Passing / viewing bays should be provided at 50 m intervals on bridges (if feasible) and boardwalks; they should be 5 m long by 2.5 m wide and have handrails. It is not practicable to provide passing bays on suspension bridges and cyclists will need to ride in single file. If cyclists approach such a bridge from opposite ends, one direction will need to give way to the other.

Handrails should be used on significantly curved bridges or bridges 20 m or longer if only the minimum width is provided. If the bridge is 0.5 m or more wider than the minimum width, handrails are optional (unless the fall height governs). If a bridge or boardwalk is 0.5 m or more above the ground, handrails should be provided on Grade 1 and 2 trails. HB 8630 uses an equivalent value of 1.0 m but the risk and safety implications of falling off a bridge or boardwalk are likely to be more severe for cyclists than pedestrians. Cyclists travel at faster speeds and fall from a greater height (due to their position on the cycle) than pedestrians. Cycles can also complicate a fall by catching pedals or handlebars on a structure during the fall or hurting the cyclist on landing.
When designing these structures, consideration of the requirements for cyclists passing each other is needed. Similarly, the effects of cross-winds can make cycling unstable and this needs to be addressed when choosing appropriate widths and deciding whether or not to provide handrails.

A typical (although notably narrow) boardwalk is shown in Figure 51 – it would require handrails and passing bays for a Grade 1 or 2 trail.

![Figure 51: Boardwalk – Twizel River Trail (photo: Kennett Brothers)](image)

The vertical clearance of a bridge above a river should take into account the potential river flood height. In some cases it may be acceptable that a river level will occasionally rise above the bridge deck, but this risks the integrity of the structure. It is up to the trail owner to specify the appropriate design flood in this circumstance, to erect suitable warning signs and to ensure a suitable inspection and maintenance regime is in place.

NZCT path drainage guidance (Section 3.10) should be used for structures where appropriate, rather than HB 8630 track drainage standards which apply to natural surface walking tracks.

UV stable polymer mesh should be used on bridges and boardwalks to increase skid resistance. Wooden surfaces can be dangerously slippery when wet and make corners particularly difficult to negotiate. Wire netting is also a possibility but it tends to wear out quickly on wooden boardwalks. Boardwalks are very susceptible to frosts and can become hazardous for early morning users. Consideration should be given to surfacing treatments in frost sensitive areas to mitigate the effects of ice on the path surface.

### 6.3.2 Swing and Suspension Bridges

Swing bridges and suspension bridges mean different things to different people. In this design guide, a suspension bridge is a bridge suspended from cables with a fairly rigid deck and may be wide enough for two people to walk across side by side. A swing bridge is a lighter structure, also suspended from cables, but the deck is flexible and often made from steel cables and metal bars, perhaps with wire mesh. They are often used on tramping tracks and are just wide enough to walk across.
In some situations, the type of bridge to be used will be governed by physical features, financial considerations and possibly the logistics of getting construction materials to the site. A swing bridge is often the preferred bridge structure for walking tracks and may also be the best alternative for remote cycle trails of Grades 3 and 4, especially when crossing long spans.

![Figure 52: Swing bridge on the Old Ghost Road (photo: Jonathan Kennett)](image)

Due to their freedom of movement, swing bridges will generally not be suitable for cyclists to ride over. Some cyclists may try to ride over swing bridges, however, which could result in injury from impacts with the bridge sides. Thus, if swing bridges are used, they should be made as rigid as possible with signs to warn cyclists of the dangers of riding across.

Suspension bridges are more stable than swing bridges and can thus be used for all grades of trail. Suspension bridges are generally a cheaper option than solid timber or metal constructions for longer spans.
Swing and suspension bridges should comply with the requirements of HB 8630 (unless contrary guidance is provided in this guide).

### 6.3.3 Approaches
A bridge or boardwalk narrower than the path will require end treatments to ensure cyclists are channelled onto the structure rather than off the side. This can be achieved by guard rails on either side. A storage space for cyclists to pull over on the approach to the structure (to rest or avoid passing or overtaking inside the structure) would also be appropriate. If provided, this should be on the left side approaching the structure.

### 6.3.4 Aesthetics
Bridges provide the opportunity to add to a route’s iconic nature. Chapter 8 of Sustrans (2009) shows some excellent examples of iconic bridges developed as part of the Connect2 project in the UK.

## 6.4 Cattle Stops

### 6.4.1 Design
Cattle stops are generally short structures, used instead of gates in farm fences. Bars of 30 mm galvanised pipe are recommended for a cattle stop 1.4 m wide, with a central (longitudinal) support. To achieve a wider structure either stronger bars or more internal supports are required. The bars should be placed with a 70 mm gap between bars (i.e. at 100 mm centres). The length of the structure should be at least 2.2 m to ensure stock will not jump over it. Details for a cattle stop are shown in Figure 54.

Handrails should be used on all cattle stops on the NZCT. This aids cyclist safety by protecting them against falling off the cattle stop and onto the adjacent fence or into the ditch below. It also prevents stock from jumping diagonally across the cattle stop from one paddock to the next, at the gap in the fence.

Cattle stops should be raised 200 mm above ground level. This ensures there is a pit below the bars and reduces the risk of sediment or debris from building up to the level of
the bars, which would render the cattle stop useless. The pit should be at least 400 mm deep below the bars and the bars should be removable to allow the pit to be cleaned. The pit can include an internal ramp that provides an exit opportunity for hedgehogs or other wildlife that may walk into them.

An approach ramp should also be used to provide a smooth approach to the cattle stop deck and to provide an additional visual obstacle to stock, discouraging them from attempting to walk over the cattle stop. Approach ramps, however, should be relatively flat and meet the level of the cattle stop deck without an abrupt step. Ramps can be constructed out of timber or compacted trail material. The design should ensure that ponding does not occur at the bases of the ramps as this will lead to pot holes and undesirable path damage.

Figure 54: Cattle stop design – plan view (adapted from Christchurch City Council designs)
6.4.2 Positioning

The position of a cattle stop relative to the track is important. If a cattle stop is placed on a straight section of track it is possible for stock (sheep or cattle) to get agitated and achieve enough speed to jump over the cattle stop. Figure 55 shows an example of a cattle stop extending beyond a straight section of track. This is undesirable due to the risk of stock jumping the cattle stop and is compounded by the cattle stop being at ground level. Figure 56 shows a method taken to remove this risk after the cattle stop was installed – a gate placed at one end of the cattle stop. It is undesirable to use a gate in conjunction with a cattle stop as this requires cyclists to stop to open the gate.

This defeats the point of the cattle stop which is to allow cyclists to ride through a fence without having to stop. It also negates the need for a cattle stop as a gate alone would suffice to manage stock.

It is better, therefore, to place a cattle stop on a bend in the track. This makes the path less obvious to stock and prevents them from achieving a high enough speed to jump over the stop. Obviously the bend should not be so severe that it forces cyclists to stop or causes any safety issues. Figure 58 shows a correctly aligned cattle stop (which could be improved by fixing the rut on the approach ramp) and Figure 58 shows the standard cattle stop used for the Otago Central Rail Trail (which is level with the path).
Cattle stops should not be placed in areas where stock gather (for example near the corner of a paddock) otherwise it is possible that an animal will be stampeded onto the cattle stop.

Figure 59 shows how motorcycle access can be discouraged from a trail. This solution will somewhat inconvenience cyclists and prevent access by wheelchair users and wider prams.

![Figure 59: A central post and wing barriers help prevent motor-cycle access and reduce the likelihood of stock jumping the cattle stop (photo Jonathan Kennett)](image)

### 6.4.3 Gates instead of Cattle Stops

Cattle stops are much more convenient than gates for cyclists, as they don't need to be opened or closed. In some situations, however, gates may be required or preferred by trail designers or landowners.

A variety of different gate options exist. "Kissing gates", such as the one shown in Figure 60, may be easier for cyclists to traverse than conventional gates. They can however be inconvenient for cyclists with pannier bags (as they require more room) or groups of cyclists (as it is difficult for more than one cyclist to make the transition at a time). Kissing gates should be designed with ample room within the enclosure to allow cyclists to pass through. They also can be an effective way to exclude motor bikes from cycle trails, if designed sufficiently tightly to just allow passage by a cycle, however such designs are likely to pose difficulty for riders of tandem cycles, bikes with trailers and tagalong bikes.
A double gate system, such as that shown in Figure 61, provides extra security to prevent stock from moving between paddocks but is less convenient for cyclists.

Springs can be attached to standard gates and kissing gates to make them “self-closing”. This lessens the demand on cyclists to unlock the gate and lock it again after passing through and can be favoured by farmers worried about their stock getting through a gate accidentally left unlocked. Thus, for a variety of reasons, cattle stops are generally the preferred solution.

6.5 Tunnels and Underpasses

Tunnels and underpasses should comply with Section 3.6 and their gradients should match the requirements for the trail as specified in Section 3.1.5. The trail grade (which relates to target market) and length should be considered when determining the tunnel width. A longer tunnel feels more confined and is more likely to involve users passing each other than a shorter tunnel. The minimum recommended width of tunnels on trails of Grade 1 or 2 is 2.0 m but for trails of Grade 3 to Grade 5, tunnels are governed by the bridge widths given in Table 2.

Drainage is an important consideration for tunnels and underpasses, especially when they fall below the existing ground level. The water table level should be identified with respect to the planned underpass level; if the underpass is to be lower than the water table level water will need to be pumped out from the underpass. It is also important that surface
water runoff is properly diverted so that it does not collect at the bottom of the underpass without any way of draining.

Lighting may be required if an underpass does not receive enough natural light for cyclists to adequately distinguish the path, other trail users or obstacles. It may be impractical to provide a powered lighting source in a remote location and thus cyclists should be informed prior to starting on the track that they will need bicycle or head lights. If path lighting is provided it should be vandal resistant and powered by a reliable source.

![Figure 62: Tunnel on the Hauraki Rail Trail (photo: Jonathan Kennett)](image)

6.6 Retaining Walls

Retaining walls may be required on paths cut into a sloped section to reinforce the path or prevent the adjacent wall from caving onto the path. Chapters 23 and 24 of DOC’s Track Construction and Maintenance Guidelines (2008) provide information on stone and timber retaining wall construction and their construction.

6.7 Other Issues

6.7.1 Gradients and Crossfall

Structures should preferably be 0-3 degrees in gradient with a maximum of 5 degrees. Structures may have a gentle crossfall (up to 2 degrees) but may often be easier to construct without crossfall.
6.7.2 Visibility
The visibility requirements outlined in Section 3.8 also apply to structures. These requirements will have particular ramifications for underpasses, tunnels or bridges with high enclosed walls which may obscure views on crooked or curved path alignments. Safety and personal security are increased by being able to see all the way through an underpass or tunnel before entering. Thus there are benefits in having straight alignments for underpasses or tunnels.

6.7.3 Stairways
Stairways should not be used on the NZCT. Stairs require cyclists to dismount and carry their bikes (plus any luggage or panniers), increasing the difficulty and decreasing the enjoyment of the ride. Stairs can pose a hazard to cyclists travelling downhill in particular, especially if encountered unexpectedly. Some riders may be tempted to ride on stairs without understanding the risks and consequences involved; the first mountain biking related death in New Zealand occurred when a rider tried riding down steps.

6.7.4 Excluding Motorcycles
Motorcycles can be problematic on cycle trails. Various techniques exist to discourage this nuisance, including the positioning of central posts in trails and at gateways or cattlestops to discourage their use.

Another technique is illustrated in Figure 63, with the full design specifications given in Figure 64. Note that if this “squeeze barrier” arrangement is used on trails where many cyclists use panier bags, the horizontal bars should be installed at the maximum stated height of 870 mm.

Figure 63: “Squeeze barrier” to discourage motorcycles, Rimutaka Cycle Trail (photo: Jonathan Kennett)
Figure 64: Squeeze barrier and croquet barrier design
7 Signage

7.1 General Signage Principles

A comprehensive signage regime is required to make the NZCT successful. A sign’s size and level of information should be designed in accordance with the level of information that can be taken in by its viewer, given their travel speed and viewing distance. Providing too much information may serve as a distraction and therefore a hazard to the intended audience as well as surrounding road or path users. Conversely, it is sometimes necessary to convey a large amount of information to ensure route users are properly prepared for their journey; in which case signs should be placed in a location where viewers can stop and read them without inconveniencing other users.

Thus there are a variety of sign types that are used on NZCT routes for a number of different purposes. Guidelines for signage and the use of the New Zealand Cycle Trail brand will be issued when they are available.

7.2 Signs for Cyclists

7.2.1 Route commencement signs

These are used at the start of a route to describe the route’s location, distance, expected time for completion and level of difficulty or experience required. Generally a large sign including a map and qualifying text is used. Connections with other nearby routes should be identified. The sign may also include additional information on the features or attractions encountered along the route, facilities provided and opportunities available at its end.

Figure 65: Route commencement signs within shelter, Great Lake Trail (photo: Jonathan Kennett)
7.2.2 Wayfinding signs

These can be used away from a trail to direct users to the start of a trail or used partway along a trail where there are several different route options available. Figure 66 shows an urban wayfinding map example from Nelson that also incorporates information on the development of the walking and cycling networks and the history of cycling in the area.

![Figure 66: Nelson cycle and walk map](image)

7.2.3 Information signs

These are used along a route to describe various features, such as iconic scenery, historical attractions, wildlife or other points of interest unique to the route. Generally these signs will be situated in places where visitors can stop and take time to view them. There is an important balance between providing interesting information and providing too much information that takes too long to read. Pictures and diagrams are a useful way of making educational signs more interesting and grabbing the attention of route users.

![Figure 67: Information sign, Waikato River Trail](image)  
![Figure 68: Information sign in shelter, Otago Central Rail Trail (photo: DOC)](image)
Information signs can also be used to teach cycling techniques. This is particularly relevant to mountain biking tracks which tend to have various features that require technical expertise to ride effectively. Special tracks can be created that involve several mountain biking features and have an information sign at the start of each one explaining to cyclists how to best negotiate the feature.

7.2.4 Directional signs
These are used along a route to specify the route alignment when faced with a variety of options at an intersection or to confirm to cyclists that they are still on the route.

As well as specifying the route name, directional signs may direct cyclists to a particular location. Once a location has been indicated on a sign, all subsequent signs should include it until the location has been reached. Major locations such as towns, cities or important iconic features should be signposted for a greater distance than less important locations.

It is useful to include travel distances to the signposted locations. This gives cyclists an idea of how long they will have to travel to reach the destination and makes it easier to plan the journey. Cyclists can feel like they are “out in the middle of nowhere” and knowing how far it is until the next stop gives them peace of mind and improves their experience. Often it is the last hour that “makes or breaks” a cyclist’s impression of the entire journey; route information can go a long way in making this impression a favourable one.

Directional signs should be installed prior to a trail’s opening so that users do not get lost. It may be useful to also specify on a directional sign the amount of time expected for cyclists to take; however designers should be aware that cyclists’ travel speeds vary.
greatly according to their ability and the demands of the route. For longer trips, cyclists will also stop for breaks which increase the total travel time.

Generally it is best to predict travel times for a novice or less energetic cyclist, unless the route is specifically aimed at cyclists of higher abilities. The timing measures should be consistent throughout a trail so that individual users can gauge whether they are generally faster or slower than the stated times. A travel speed of 10 km/h is generally appropriate for slower cyclists travelling on a relatively flat route, but additional time is needed if cyclists are likely to take breaks or look at scenery, for example. However, it may be best to wait until the route has been established and monitor the journey times of route users to determine what values should be added to the directional signs.

Users should generally not have to stop to view a directional sign, consider the information it gives and make any necessary resulting decisions or actions. Therefore the information presented should be kept as simple as possible, with lettering legible from an appropriate distance.

Figure 70 shows a simple NZCT route marker that can be used along a route to confirm to users that they are still on the route. Where multiple routes exist in an area the marker should specify which route it belongs to; this can take the form of a route name, logo or specific colour. Figure 71 indicates the trail direction on the Waikato River Trail. Figure 72 is a good example of a directional sign that provides route length information.

7.2.5 Regulatory signs
Regulatory signs are used to convey the rules of the road or path on which the route is located. They include “Stop”, “Give Way” and speed limit signs which apply to both cyclists and motorists. There are also regulatory signs that apply only to cyclists such as “no cycling” (RG-24 – shown in Figure 73) “all cyclists must exit” (RG-26b – shown in Figure 74) and path signs which apply to pedestrians also and specify whether the path is
shared, segregated or separate. These signs are detailed in MOTSAM (Transit NZ, 2008b).

Figure 73: No cycling regulatory sign (RG-24) (Transit NZ, 2008b)

Figure 74: All cyclists must exit regulatory sign (RG-26b) (Transit NZ, 2008b)

Figure 75 shows a regulatory sign used at the Arapuni swing bridge on the Waikato River Trail. This sign also includes an informational aspect – historical facts about the swing bridge’s construction.

Figure 75: Regulatory sign, Waikato River Trail

7.2.6 Advisory signs
Advisory signs emphasise aspects that are not regulated but are suggested for safety or courtesy reasons. They include warning signs at dangerous locations (e.g. road crossings) and behavioural signs (e.g. keep left, warn when approaching). Figure 76 gives two examples of advisory signs on the Nelson Rail Reserve path – one to advise of
the low underpass (note that NZCT underpasses should have an overhead clearance of 2.4 m, as discussed in Section 3.6) and the other to warn that the path may be submerged due to tidal flows.

Land owners may also require signs voiding them of responsibility in case of accident, warning of the presence of stock or advising that water is unsafe for drinking.

7.3 Signs for Motorists

NZCT signs for motorists are largely regulatory or advisory. There are also some signs directing those accessing routes by vehicle to the start of the route; these should be designed according to MOTSAM (Transit NZ, 2008) in particular section 7 on guide signs. The most common sign for motorists regarding cycle trails is the PW-35 cyclist permanent warning sign (Transit NZ, 2008b) as illustrated in Figure 77. This is used at on-road locations where cyclists may be present but do not have dedicated cycle lanes or other provisions. It can also be used to draw motorists' attention to an NZCT trail road crossing location. It can also be used in the form of an active warning sign which is illuminated when cyclists are present, as shown in Section 3.4.
Some regulatory signs are also directed primarily at motorists. These include the “cycle lane” (RG-26 – shown in Figure 78) and “cycles only” (RG-26a – shown in Figure 79) signs used for on-road applications.

![Figure 77: PW-35 permanent warning sign for motorists](image)

---

**Figure 78:** Cycle lane regulatory sign (RG-26)  
(Transit NZ, 2008b)

**Figure 79:** Cycles only regulatory sign (RG-26a)  
(Transit NZ, 2008b)

### 7.4 Maps and Supplementary Information

Maps and supplementary information leaflets can be provided to assist cyclists in planning their journey and for reference along the route. This gives cyclists additional confidence as they can carry maps with them, rather than having to wait to encounter a directional or information sign. Maps should be accurate and consistent with the signage used. Ideally they will be specific to the NZCT.

All publicity for a particular NZCT route should be consistent and accurately convey the level of experience and fitness required to ride the route, as described in the grades referred to in Section 3.1.5. It is important to provide an indication of how long to allow for each leg of the journey. Service providers may be tempted to encourage anyone and everyone to ride the route but this may not always be appropriate. If a cyclist has a bad experience due to their fitness and competence levels not matching the demands of the trail it will decrease the likelihood of them or those they talk to of returning to an NZCT route and may tarnish the NZCT "brand". It may be useful to provide an example of a fitness test or training programme so that potential users can gauge a route’s suitability, plan the legs of their journey appropriately or prepare physically for the ride.
Maps can include information regarding the attractions at towns and cities along the routes. Local businesses may sponsor their production as an advertising opportunity. Any information necessary for the journey should be provided freely to all cyclists using the route. Brochures involving supplementary, non-critical information may be charged for.

The guidelines for signage and the use of the New Zealand Cycle Trail brand (due for issue in 2010) will include further guidance on maps and supplementary information.

Maps are also a useful tool for pre-planning and understanding journeys. Electronic media provide a useful interface to include additional information, for example the Otago Central Rail Trail interactive online map (Figure 81) which has links to information on each of the towns and attractions encountered along the trail. Trail descriptions developed on the hosts' websites can be referenced from the Ministry of Economic Development and other websites.
8 Supporting Facilities

8.1 Water Supplies

Cyclists need sufficient opportunities to replenish their water supplies while riding. A shortage of water can have extreme effects on a trail user's enjoyment of the journey and opinion of the NZCT experience.

At least one intermediate water station should be provided during a day's travel (see Table 2 for travel distances) and clear information should be given at the start of each leg regarding water supply. Taps or drinking fountains should be provided where there is no access en route to potable water. Drinking fountains should include water bottle fill stations as it can be difficult to fill bottles from standard water fountains.

8.2 Rest Areas

Providing rest areas along a route allows cyclists to stop, rest and enjoy the route's iconic scenery. In some locations, especially on remote routes, rest areas may allow for camping and thus facilities for cooking and toiletries may be considered.

Toilet opportunities should be provided according to Table 17; this is based on experience from the Otago Central Rail Trail and other similar trails. Designers should err on the side of over-provision rather than the opposite.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Distance between toilet facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>7.5 – 10 km</td>
</tr>
<tr>
<td>3-6</td>
<td>15 – 20 km</td>
</tr>
</tbody>
</table>

It can also be useful to provide opportunities for shelter, from heat, rain or wind, along a route. The Otago Central Rail Trail uses old “gangers’ sheds” or railway stations which provide shelter in an authentic and aesthetically pleasing way.

Figure 82: Shelter on Otago Central Rail Trail (photo: DOC)
Clearings and sheltered places for refreshment and lunch breaks are appreciated too. These could include picnic tables and toilets, as for roadside picnic areas. Opportunities for shade under existing or newly-planted trees are also valuable and contribute to users’ overall impressions of the trail. Trail users may wish to meet up with non-cycling companions (who may be walking part of the trail or simply visiting the region) and therefore value rest areas near road access.

![Volunteer built hut on the Old Ghost Road](image)

**Figure 83: Volunteer built hut on the Old Ghost Road (photo: Jonathan Kennett)**

### 8.3 Lighting

The rural, remote nature of most NZCT routes makes it difficult and cost-prohibitive to provide lighting along their lengths. In most cases visitors ride in daylight hours only.

However, it is advisable to provide lighting in locations where routes link to towns or cities if paths have low natural surveillance and little lighting gained from nearby sources (e.g. road lighting). Lighting will generally be impractical in tunnels (for example, refer to Figure 84), but opportunities for techniques for improving visibility in tunnels are provided in Section 6.5.

![Cyclists with headlamps in tunnel on Otago Central Rail Trail](image)

**Figure 84: Cyclists with headlamps in tunnel on Otago Central Rail Trail**
8.4 Rubbish Collection

It is up to trail operators to determine whether they want to provide and service rubbish bins along the trail or whether they will require users to carry all rubbish out with them. The first option may be more expensive but could possibly decrease the chance of litter along the trail. Either way, appropriate signage and forewarning will be required to properly communicate to users their responsibilities with regards to rubbish disposal.

8.5 Car-Parking Facilities and Transport Links

It is helpful for trails to start and finish near towns so that cyclists have access to accommodation, shops and service facilities. Many cyclists will drive to the trails and require somewhere to park their cars, preferably in a location with natural surveillance from nearby shops or houses. Other cyclists will rely on shuttle or bus services to drop them off and thus car parking areas should include locations for buses to park and manoeuvre.

In addition, some trail users will arrive or leave by cycle and so roads accessing trails should be safe for cycling.

It can also be advantageous to provide links with other transport modes. For example, it is popular among users of the Otago Central Rail Trail to journey on the train that runs between the Middlemarch end of the trail and Dunedin.

8.6 Off-Site Facilities

Cyclists travelling on NZCT routes and staying overnight along the way expect various services and provisions at their stops. Most of these requirements are satisfied by private business operators, but it can be useful for route designers to explain the various needs of cyclists to local businesses and accommodation providers to ensure that trail users are catered for from the route's launch.

Cyclists expect that their bicycles will be safely and securely stored during their stay when they are not riding. At smaller locations a simple bike stand will be sufficient to achieve this. In larger towns or cities, covered, secure parking will be preferred.

Cyclists also often need to purchase supplies and services for their trip, for example food, drink and bicycle maintenance and accessories.
9 Path and Road Maintenance

9.1 Introduction

The maintenance requirements for NZCT routes are highly site-specific and depend on a number of factors including the type of surface used, geographical features, weather conditions (especially rainfall), conditions of motor vehicle access and user volumes. Therefore this chapter aims to identify maintenance considerations but does not specify associated frequencies or costs for these items.

Regular maintenance makes trails more sustainable. A proactive approach in recognising and diagnosing problems and preventing them from recurring, rather than repeatedly reacting to problems, saves time and money over the life of a trail. Chapters 25 to 34 of DOC’s Track Construction and Maintenance Guidelines (2008) should be referenced for maintenance issues, including:

- The principles of sustainable maintenance;
- Vegetation maintenance;
- Drainage system maintenance;
- Track surface maintenance; and
- Switchback maintenance.

Experience from existing off-road trails, such as the Otago Central Rail Trail and the Little River Rail Trail, testify that the quality of initial construction is a major factor in the amount of ongoing maintenance required. The lowest bidder for new trail construction will not necessarily provide the same quality of workmanship as other contractors; this can be avoided by constructing initial trial sections to determine these specifications and using the experience from these to develop detailed construction specifications. Experienced trail builders (at the grade and quality sought) will also generally be more cost-effective in the long run.

9.2 Maintaining Natural and Compacted Surfaces

Without maintenance, off-road trails built on natural surfaces will, over a year or two, deteriorate into a harder grade (e.g. change from Grade 3 to Grade 4). This is mainly due to the forces of compaction and displacement. Compaction is where the centre of the track is worn more frequently than the sides and thus sinks. Displacement is where material from the centre of the track is moved out to the sides. Both of these processes are due to people riding and walking along the centre of the track and both result in the development of a “dish” profile where the centre of the track is lower than the sides.

The problems of compaction and displacement can all be reduced, but not eliminated, through good trail design and construction (e.g. building a trail with a crowned profile, adding gradient reversals, ensuring good drainage and plate compacting the surface, etc). Displacement also exposes rocks and roots at the surface. These apparently growing rocks and roots need to be dug out or covered with compacted basecourse. In the case of roots, it is generally better to cover them as they actually do a very good job of providing a type of “armouring” that stops ruts from forming. Also, some trees can die after having roots removed.

Water is the foremost destroyer of natural and compacted surfaces; it magnifies the problems of compaction and displacement by moving loosened material and wearing away at weak areas. Thus the level of drainage provided and its interaction with the path’s geometry will have a big effect on the amount of material displacement and therefore the amount of maintenance required.
Trails in locations with high rainfall will generally require more maintenance than trails in low rainfall areas. The best time to inspect tracks for drainage issues is during rain. At this time it is apparent where the water is coming from and it can be directed off the track at strategic locations.

Motor vehicle access has a major influence on path stability. While none of the NZCT paths have public vehicle access some motor vehicles do still travel over them. These can be service vehicles related to path maintenance or adjacent facilities (e.g. railway trucks or farm vehicles on private farm roads). Vehicle access to paths should be minimised and restricted to smaller vehicles wherever possible. Heavy vehicles damage pavements much more than light vehicles.

On a natural surface trail, the ruts and berms that develop will need to be removed. A good way of doing this is to completely fill the central riding rut with a suitable basecourse. The rut should be overfilled by up to 100 mm and then compacted using a plate compactor.

If it is not practical to have basecourse delivered to site, then it may be possible to quarry some from beside the track in places. If on-site quarrying is not practical then the berms (high sides) of the track should be dug out to below the level of the centre of the track. It may be tempting to use the removed material to fill the centre rut, but this will not last long, as the material from the sides is lacking in strength.

9.3 Maintaining Hard Surfaces

Hard surfaces such as asphaltic concrete are more durable than natural or compacted surfaces and thus require less maintenance. However, underlying vegetation and tree roots can grow and damage asphaltic concrete surfaces and measures to prevent such occurrences should be taken during construction. Figure 85 shows a newly constructed asphaltic concrete path that was not properly prepared and now (within weeks of construction) has vegetation growing through its surface. Hard surfaces will also require regular sweeping of detritus that may come from the sides of the path, nearby roads or intersecting gravel driveways.

Figure 85: Vegetation growing through new asphaltic concrete path; good construction specifications and contract supervision are required
Sealed paths may have painted markings that will require remarking.

While on-road trails should be maintained according to existing road maintenance contracts, the specific maintenance requirements of new cycle trails may need to be written into maintenance contracts. Road debris often accumulates in cycle lanes or wide shoulders as it is pushed off the carriageway by passing motor vehicles; this can decrease the riding comfort to cyclists and increase the likelihood of punctures. Regular sweeping of on-road trials is required and it is imperative that contractors do not sweep debris into the space dedicated for cyclists.

Road re-seals should include consideration of on-road cycling trails, in particular that a smooth riding surface is maintained. Where active warning signs are used, inductive loop sensors may need to be replaced during a reseal and the equipment recalibrated afterwards to ensure it still works correctly.

9.4 Common Maintenance Requirements for All Trail Types

Trails need to be well maintained if they are to keep bringing people back and to encourage users to recommend the trails to others.

All trails will require upkeep of adjacent verges or vegetation. At least twice a year (during spring and autumn) vegetation growing into the riding corridor may need removing. Invasive weeds such as tradescantia, gorse, barberry and African clubmoss will need to be sprayed twice a year, to stop them from growing into the riding line, and spreading down the track.

After storms, trails should be inspected for fallen trees and branches and culverts and table drains may need clearing. The sooner this is done the better as a blocked culvert or table drain can send water onto the track, and in some cases a blocked culvert can result in major soil saturation and a land slip.

Signage will also need replacing, either due to vandalism, exposure to the elements or to include new information.

Wherever an off-road trail crosses a road and a bollard or similar threshold treatment is used it should be expected that motor vehicle damage to this treatment will occur periodically. At-grade road crossing facilities are particularly exposed to motor vehicle damage and are likely to require higher frequencies of maintenance than grade separated facilities.
10 Monitoring and Evaluation

10.1 Importance of Data Collection

The NZCT is targeted at cycle tourists (both domestic and international). It is expected that these cyclists will stay in local towns and cities and spend money on various goods, services and additional tourist attractions. This will stimulate the local economy and warrant the initial investment in developing the route and can be especially beneficial in small towns. Thus the viability of a cycle route depends on the number of cyclists using it.

Monitoring a cycle route by collecting data accurate about the cyclists using it is essentially an exercise in understanding the route better. Understanding how a route functions allows operators to manage and improve it.

Obviously a route cannot be monitored before it is built and thus the business case for establishing an NZCT route should be based on predictions of cycle volumes. By monitoring the actual numbers of cyclists who then go on to use the route, the prediction methods can be refined. Thus monitoring is important to inform those developing other trails and to the government for future funding decisions.

The data collected on a particular route will also be of great use to the route owner itself. Data can show seasonal trends and thus be used in preparing local accommodation, services and goods providers so that the level of demand is appropriately supplied each season. Maintenance requirements can be better understood by comparing the amount of wear on a trail with the amount of use it has been subjected to. This in turn can help in choosing the appropriate surfacing treatments and major maintenance opportunities.

10.2 Monitoring and Data Collection Methods

As displayed in Table 18, there are three methods that may be used to collect NZCT data:

1. Automatic counters
2. Manual counters
3. Surveys

**Automatic counters** are machines that, once installed and correctly set up, can count cyclists without requiring human assistance. This is advantageous as automatic counters can provide continuous data over long periods. However, they are effectively a “blind” technology that can count numbers of cyclists and possibly give information on speed and direction but cannot give additional information on cyclist gender, age or cycle type, for example.

There are a number of different technologies available for automatic counting. Pneumatic or rubber tube counters are currently the most common automatic device used in NZ for counting cycle traffic. To record cyclist direction and speed, two tubes located a short distance apart are used. The tubes are laid on the path or road surface and detect changes in air pressure when compacted. Pneumatic tubes are exposed and therefore vulnerable to general wear and tear or vandalism. Accordingly, they are generally not used for more than a couple of weeks for on-road situations but maybe suitable for longer off-road counts, although vandalism is still a potential issue. The counters are easily portable to different locations.
Inductive loop detectors involve wires laid under the path or road surface that experience electro-magnetic induction when metal objects (including most bicycles) pass over them. This technology is becoming more common in NZ and has the advantage of being protected from vandalism. Inductive loop counters can provide long-term, continuous data. They do not detect pedestrians. Many road controlling authorities (especially NZTA) currently operate inductive loops for counting motor vehicles and the housing units employed may be able to also accommodate cycle counting equipment.

Pressure counters are also used in some parts of NZ, generally for detecting pedestrians although some applications for detecting cyclists on off-road trails also exist. Pressure counters rely on peizo-electric pads or strips buried beneath the path or road surface that detect changes in pressure when a cyclist rides over them. There is currently no pressure detection system that can be used to distinguish between cyclists and pedestrians.

Infra-red or pyro-electric detectors will detect both cyclists and pedestrians but cannot distinguish between the two groups. Some radio-beam products, however, claim to be able to do this accurately. The technology for counting pedestrians and cyclists is evolving rapidly, however.

**Manual counters** are people who record volumes of cyclists passing a site. Manual counts offer more flexibility in terms of data coverage as people can record supplementary information such as cyclist gender, age, cycle type, trip type, helmet usage and make notes on unusual behaviour.
Figure 87: Manual cycle counting

The disadvantage of manual counting is that it is difficult to sustain for long periods. A single person counting will require regular breaks (say every two hours) for food and toilet stops and should only be expected to work a standard shift per day. To conduct a week-long, continuous manual count, several staff working in shifts would be required – a prohibitively expensive process.

Surveys can be conducted on the spot, by using manual counters stationed on the route interviewing users as they pass by or local business people interviewing those who come into their shop or accommodation. Surveys can also be conducted after cyclists have completed their route by asking them to fill out a form and mail it back or to complete an online form.

Surveys can be used to interview cyclists and extract information on their home town and country, length of stay, trip origins and destinations, demographic data (such as age, employment status and income), expenditure and their impressions of the trail(s) travelled. Surveys can also be targeted at local business owners to determine the effect of the route on their business operations.

10.3 Types of Data

Cycle route monitoring can be informed by a number of different data types which have different uses and are collected or monitored in a variety of ways. Table 18 outlines the main data types that are collected on the NZCT.
### Table 18: Data types and monitoring or collection methods related to cycle trails

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Purpose / Use</th>
<th>Monitoring / Collection Method</th>
</tr>
</thead>
</table>
| Volumes (including aggregation by time of day, day of week, season, year etc) | Inform operators, investors and designers of the effects of installing a cycle trail  
Aid in planning and maintenance  
Further understanding of daily, weekly and seasonal trends | Manual counter (for short periods, say 2 hours at a time)  
Automatic counter (for longer or even continuous periods) |
| Cyclist characteristics                        | Understand the demographic of users  
Aid marketing campaigns                                                           | Manual counter  
User survey                                                                 |
| • Age                                          |                                                                                |                                                                                                |
| • Gender                                       |                                                                                |                                                                                                |
| • Ability level                                |                                                                                |                                                                                                |
| • Journey type / length                        |                                                                                |                                                                                                |
| Satisfaction ratings                           | Identify positive and negative aspects to further improve the trail and design better trails in future | User survey                                                                                   |
| Expenditure (on accommodation, supporting goods and services etc)                    | Understand the economic impacts of cycle trails  
Assist forward planning for goods and service provision | User survey  
Local business survey                                                            |
References


Appendix 1 – Gradient Summary Tables

Gradient summary for off-road trails (from Table 3, Section 3.3)

<table>
<thead>
<tr>
<th>Trail Grade</th>
<th>Main uphill gradient range</th>
<th>Steeper slopes up to 100 m long</th>
<th>Steeper slopes up to 10 m long</th>
<th>Maximum Downhill Gradient (up to 100 m long)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 – 2 degrees for 98% of length</td>
<td>2 – 3 degrees</td>
<td>3 – 4 degrees</td>
<td>4 degrees</td>
</tr>
<tr>
<td>2</td>
<td>0 – 3.5 degrees for 95% of length</td>
<td>3.5 – 5 degrees</td>
<td>5 – 6 degrees</td>
<td>6 degrees</td>
</tr>
<tr>
<td>3</td>
<td>0 – 5 degrees for 90% of length</td>
<td>5 – 7 degrees</td>
<td>7 – 8 degrees</td>
<td>8 degrees</td>
</tr>
<tr>
<td>4</td>
<td>0 – 6.5 degrees for 90% of length</td>
<td>6.5 – 8 degrees</td>
<td>8 – 10 degrees</td>
<td>10 degrees</td>
</tr>
<tr>
<td>5</td>
<td>0 – 8 degrees for 90% of length</td>
<td>8 – 10 degrees</td>
<td>10 – 14 degrees</td>
<td>14 degrees</td>
</tr>
<tr>
<td>6</td>
<td>0 – 10 degrees for 90% of length</td>
<td>10 – 15 degrees</td>
<td>15 – 30 degrees</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. This table applies to off-road unsealed trails and gravel roads.
2. Maximum downhill gradient applicable only if trail is to be ridden in one direction.
3. IMBA recommends a maximum gradient of 10% (5.7 degrees). Steeper trails will require more maintenance due to increased erosion from skidding tyres and water scour.

Gradient summary for on-road trails (from Table 11, Section 4)

<table>
<thead>
<tr>
<th>Trail Grade</th>
<th>Main uphill gradient range</th>
<th>Steeper slopes up to 100 m long</th>
<th>Steeper slopes up to 10 m long</th>
<th>Maximum Downhill Gradient (up to 100 m long)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 – 2.5 degrees for 98% of length</td>
<td>2.5 – 3.5 degrees</td>
<td>3.5 – 4.5 degrees</td>
<td>4.5 degrees</td>
</tr>
<tr>
<td>2</td>
<td>0 – 4 degrees for 95% of length</td>
<td>4 – 5 degrees</td>
<td>5 – 7 degrees</td>
<td>7 degrees</td>
</tr>
<tr>
<td>3</td>
<td>0 – 6 degrees for 90% of length</td>
<td>6 – 8 degrees</td>
<td>8 – 10 degrees</td>
<td>10 degrees</td>
</tr>
<tr>
<td>4</td>
<td>0 – 8 degrees for 90% of length</td>
<td>8 – 10 degrees</td>
<td>10 – 13 degrees</td>
<td>13 degrees</td>
</tr>
<tr>
<td>5</td>
<td>0 – 10 degrees for 90% of length</td>
<td>10 – 15 degrees</td>
<td>15 – 18 degrees</td>
<td>18 degrees</td>
</tr>
</tbody>
</table>

Notes:
1. This table applies to on-road sealed trails and off-road sealed (concrete or asphalt) trails.
2. Maximum downhill gradient applicable only if trail is to be ridden in one direction.
Specification for Design, Construction and Maintenance of Cycling and Shared Path Facilities

This specification details the requirements for the design, construction and maintenance of cycling and shared path facilities on the state highway network or local road corridors that are maintained and managed by the NZ Transport Agency (Transport Agency).

This specification does not currently apply to footpaths (Sept, 2018) but work is underway to better understand the design, construction and maintenance requirements for footpaths given the recent shift in funding policy.

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1 Glossary

See Notes for the Specification for the Design, Construction and Maintenance of State Highway Cycling and Shared Path Facilities for definitions used within the specification.

2 The State Highway Cycling Network

The New Zealand State Highway Cycling Network has been defined, agreed and mapped based on frequently used and promoted routes. It includes sections of state highway that are part of the New Zealand Cycle Trail (both Great Rides and Heartland Rides), popular sports routes as identified by usage heat maps and local knowledge, and strategic urban cycling networks as defined by local authorities. In 2018, the State Highway Cycling Network comprises around 2000km of the entire state highway network and is made up of sealed shoulders, cycle lanes, separated cycleways and shared paths. The network may change over time and maps will be adapted as required and stored on the Transport Agency’s Maphub.

3 Planning and Design

The Transport Agency shall collaborate with the appropriate Local Authority to develop a regional cycling plan to ensure a connected and consistent cycling network. The cycling network needs to be considered as part of a wider integrated transport system approach.

This specification signals an intention to deliver a suitable level of service for people cycling on the parts of the state highway network that form the State Highway Cycling Network and contribute to the broader New Zealand cycleway network. It is designed to specify the requirements for developing new and maintaining existing cycling facilities to ensure the needs and safety of people cycling are considered and provided for in a similar way to those of other road users.

3.1 Pavement Markings

All pavement markings must be designed in accordance with the Traffic Control Devices (TCD) Manual and comply with the Traffic Control Devices Rule.

3.2 Traffic Signs and signals

All traffic signs and signals must be designed in accordance with the TCD Manual.

4 Forward Works Programme Development

The development of any cycling and shared path renewal programme must follow the principles detailed below:

- Discuss objectives and expectations including funding levels and changes to asset integrity trends and service levels.
- Analyse deterioration, historical performance, other known sources of information such as but not limited to CRMS and RAMM maintenance costs data.
- Undertake a visual condition inspection, using the appended Cycling and Shared Path Visual Condition Inspection Guide.
- Optimise treatment length segmentation.
- Integrate with the rest of the Forward Works Programme for approval.
Consider the needs of different users especially vulnerable users that might require a nonstandard design to be safe and effective, eg. for cycling facilities near schools
Prioritise opportunities that have the greatest customer impact and best value for money.

The contractor must identify opportunities for improvements to the existing sealed shoulder sections of the State Highway Cycling Networks as part of planning of road resurfacing or pavement rehabilitation renewals. See Specification notes for details on funding processes for these associated improvements.

The cross-section standard in the table below shall be applied to pavement rehabilitation works.

Table 1 TARGET SHOULDER SEAL WIDTH FOR STATE HIGHWAY CYCLING NETWORK

<table>
<thead>
<tr>
<th>Minimum adjacent traffic lane width</th>
<th>50 km/h</th>
<th>70 km/h</th>
<th>100 km/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–1000 AADT</td>
<td>3.0 m</td>
<td>3.3 m</td>
<td>3.5 m</td>
</tr>
<tr>
<td>1000–2000 AADT</td>
<td>0.75 m</td>
<td>0.75 m</td>
<td>0.75 m</td>
</tr>
<tr>
<td>2000–5000 AADT</td>
<td>1.0 m</td>
<td>1.0 m</td>
<td>1.0 m</td>
</tr>
<tr>
<td>5000–8000 AADT</td>
<td>1.2 m</td>
<td>1.5 m</td>
<td>1.5 m</td>
</tr>
<tr>
<td>8000–18,000 AADT</td>
<td>1.5 m</td>
<td>1.7 m</td>
<td>2.0 m</td>
</tr>
<tr>
<td>18,000+ AADT</td>
<td>2.0 m</td>
<td>2.0 m</td>
<td>2.2 m</td>
</tr>
</tbody>
</table>

For high volume roads (AADT 8000+), refer to national and local cycle network plans, as alternatives such as off-road cycle paths or parallel local roads may have been identified. In such cases, for some sections, the cycling network target width for highway shoulders may not be required. For lower volume roads (less than 2000 AADT) that have high proportion of heavy vehicles, the Contractor must consider providing additional seal width especially where the roads are used by vulnerable road users (e.g. Elderly, children etc.)

Adequate shoulder width is particularly important where ATP limits useable cycling space around the edge line.

Where sufficient shoulder widths are not possible, reduced speed limits should be considered.

5 RAMM Data

All as built and maintenance data relating to cycle lanes, separated cycleways and shared paths must be created and entered as per the State Highway Database Operations Manual (SHDOM)

The minimum information that is required is:

- The asset owner
- The agreed maintenance owner and agreed maintenance tasks
- The forward works programme requirements/responsibilities including condition assessment
- The surfacing Information
- The pavement layer information if different from the remainder of the carriageway
- Associated cycle furniture, safety components, signage, markings etc; and
- GPS/ location data
- Maintenance activities and costs
Coloured surfacing is not captured as a surfacing asset, but is recorded as a delineation asset in the 'marking' table in RAMM. The marking type that applies to coloured surfacing is 'M83 – Coloured surfacing'. The attributes (such as location, colour, material etc.) of the coloured surfacing is to be captured in the same manner as for other road marking.

6 Pavement Design and Construction Requirements

Asphalt, concrete and granular pavements are all acceptable pavement material construction solutions.

All pavement materials and construction shall comply with the current NZ Transport Agency Specifications.

6.1. Sealed Shoulder (cycling) and Cycle Lanes

The design traffic loading and design life shall be that used for the adjacent vehicle carriageway.

6.2. Separated Cycle Paths and Shared Paths

The pavement design shall consider all potential heavy vehicle loading and be designed for a minimum of 1000 Equivalent Standard Axles and a nominal design life of 25 years when subject to environmental deterioration.

7 Surfacing Design and Construction Requirements

Asphalt, concrete and chip seal surface types are all acceptable finished surfaces for cycling and shared path facilities.

All asphalt surfacing used in cycling facilities shall meet the requirement of the NZ Transport Agency specification M10 particularly the minimum thickness requirements and compaction requirements.

All chip seal surfacing used in cycling facilities shall follow the procedures set out in the Chipscaling in New Zealand Handbook. Grade 4, grade 5 or grade 6 chips are acceptable chip sizes when chipsealing cycling facilities in accordance with NZTA Specification M6.

For shared paths, the design and construction of the surface shall provide a minimum of 8 years maintenance free service.

8 Resurfacing

The sealing or resurfacing of the sealed shoulder or cycle lanes should occur at the same time as sealing the adjacent traffic lanes in order to minimise traffic disruption, except when there are significant factors warranting another approach.

All surfacing treatment shall be for the full width of the cycling facility (including sealed shoulders) so that there is no surface lip present.

When the best treatment option is to resurface the vehicle lanes only, the seal edge should be within the edge line so there is no surface lip on the shoulder.

When the best treatment option for vehicle lanes uses stone larger than grade 4, consideration should be given to not resurfacing the shoulder and only sealing within the edge lines when the shoulder is in good condition, or using a smaller chip on the shoulders in order to not adversely affect the ride quality for cyclists using the shoulder.
9 Pavement Markings

All cycling-related pavement markings (eg. bicycle symbols) shall meet the requirements of the NZ Transport Agency’s specification P22 Specification for Reflectored Pavement Marking and/or P30 Specification for High Performance Road Marking.

All coloured surfacing used in cycling and shared path facilities shall meet the requirement for the NZ Transport Agency’s P33 Specification for the supply and installation of coloured pavement surfacing.

10 Utility Operators

New underground utility services shall not be placed within a cycling facility unless there is no practicable alternative. If utilities must be placed or repaired within a cycling or shared path facility then all surfacing reinstatement shall be for the full width of the facility.

11 Temporary Traffic Management

All traffic management plans for works within the State Highway Cycling Network shall explicitly provide for cyclists, even when there is no marked cycle lane present.

Alternative road space for cyclists must be provided if the existing cycling space is unavailable due to the works.

The contractor must ensure that signs are placed in a manner that the safety of road users, including pedestrians and cyclists, is not unduly affected.

All temporary traffic management signs, signals and road markings shall conform to the Traffic Control Devices Rule, the Traffic Control Devices Manual and the principles described in the Code of Practice for Temporary Traffic Management.

12 Maintenance and Operational Requirements

Operational and maintenance plans and activities shall be:

- adjusted to respond to the different needs and capabilities of cyclists in different circumstances, eg the abilities of younger cyclists near schools
- developed for the many types of cycle facilities present on the State Highway Cycling Network, and
- scheduled and executed to deliver the standards detailed below

Guidance on how to determine appropriate sweeping routines is included in the notes to this specification.

12.1 Auditing of Operational Performance Measures

Operational performance measures relating to sealed shoulders, cycle lanes, shared paths and separated cycleways shall be included in the compliance inspections whenever the adjacent road carriageway has been selected as part of the compliance audit programme and is identified as part of the State Highway Cycling Network. The appended Cycling and Shared Path Visual Condition Assessment guide provides details for undertaking a visual inspection.
12.2.  Pavement Repairs

Reinstatement by the contractor shall not increase the roughness of the cycling or shared path facility.

12.3.  Surface Debris/Detritus

All glass or detritus that could lead to a cyclist falling off their bike and incurring injury or needing to take evasive action (e.g., stones over the size of 50mm, large tree branches), shall be removed within 24 hours of being detected or reported.

No cycling facility should have more than 0.5 kg of detritus that sits proud of the surface within any 5m² area.

This is defined as any collection of fragments or material on or within a cycling facility that includes small slips, fretting’s from cuttings, deposits of windblown sand, or grit, deposits of loose aggregates, fallen leaves, and the build-up of minor droppings or spillages created from passing traffic or weather/climatic conditions.

12.4.  Utility Service Covers

The difference between an existing utility service lid cover and the surrounding surface shall not exceed 15mm.

12.5.  Surface Bumps

There shall be no surface bump within a cycling facility with a +/- 20mm lip which causes a noise, vibration or ride nuisance.

12.6.  Potholes

A pothole is defined as having a diameter of 100 mm.

There shall be no pothole >100mm, and any that occur shall be repaired within 48 hours of being detected or reported.

12.7.  Edge Break

There shall be no edge break that encroaches in a separated cycleway, shared path or cycle lane that reduces the effective width. Where the cycling facility is a sealed shoulder, no edge break should reduce the width to less than the minimum shoulder widths, as required by Table 1.

12.8.  Vegetation

Vegetation shall be maintained to provide the clearway as per the envelope shown in Figure 1 at all times.

Note that for separated cycle lanes and shared paths, the height of the vegetation free envelope is reduced to 2.5 metres.
13 Review

The Agency intends to review this document before 2023 having considered its usefulness and value for money considering feedback from customers and users.
The Geological Origin of the Manawatū Gorge

Vince Neall

"A romantic gorge, with a brook flowing in its bottom, approaching Pallawston Ward."
Mark Twain describing the Manawatū Gorge in 1866.

One of the major and distinctive geomorphological features of the Manawatū landscape is the Manawatū Gorge, known to local Maori as Te Apli (Figure 1), where the Manawatū River carves a route through the main axial mountains of the North Island. This situation is unique in New Zealand, where a river flows westwards across the main axial divide. How did a river achieve such a counter-intuitive route? The explanation is complicated by the relative closeness of the east coast, 70 km east of it. Why did the waters of the central East Coast North Island not gather and carve a path eastwards to the sea? To understand this we need to appreciate how the palaeogeography of the southern North Island has changed so dramatically in the last 5 million years. To do this we must delve a little more deeply into the geological history of plate tectonics in the North Island.

The Manawatū catchment occupies an area of almost 6,000 km². The catchment upstream of the Gorge is east of the Ruahine–Taranaki Ranges divide. It comprises four main sub-catchments that join just upstream of the gorge and east of the Wellington (Mohaka) Fault. Downstream from this point, the river enters a 5 km long, 300 m deep entrenched before setting near Ashhurst, at the confluence with the Pahangina River (Figure 2). From here, it flows south-westwards to the Tasman Sea at Foxton Beach. There have been at least 10 principal scientific accounts published over the last century to explain the origin of the Manawatū Gorge (Ogilvy 1935). However, these were all proposed before the theory of plate tectonics was widely accepted in the 1960s. Once the location of the Manawatū Gorge is understood in the light of a tectonic plate boundary setting, then the neotectonics (recent earth movements) of the North Island can be seen as responsible for this conundrum.

The North Island of New Zealand is located above a subduction zone where the cold dense (oceanic) Pacific Plate advances westwards from the east, and ploughs beneath the more buoyant continental portion of the Australian Plate, i.e., beneath the North Island. Hence the North Island is a collision zone upon the leading edge of the Australian Plate that rides above the descending Pacific Plate. The collision and consequent rapid uplift is responsible for the numerous earthquakes experienced in the region, as well as the numerous major faults that cross the land parallel to the Taranaki and
Raukitchi Ranges. So too is the recent rapid uplift of these ranges part of the explanation for the Manawatu Gorge.

To explain the current river flow pattern, we must travel back about 20 million years to the geological period of the Miocene. At the beginning of the Miocene, present-day New Zealand was largely beneath the ocean, although there may have been land in what is the Wanganui-Wairarapa-Kaimanawa region. When the Australian plate began to split apart from the Antarctic plate, a plate boundary was created through the New Zealand region, in which a northward motion occurred to the west and a southward relative motion to the east, much of which occurred along the current Alpine Fault.

These forces were expressed as twisting and warping of the eastern edge of the Australian Plate as the current North Island began to be compressed and thus elevated above the ocean, initially as a series of islands. These can be identified from the Hauraki Range in the south-eastern corner of the Waikato to the Waitakere Range east of the Manawatu Gorge. The evidence for this uplift is the occurrence of greywacke boulders in Miocene conglomerates. The formation of conglomerates requires a source of large boulders and/or pebbles, and these are most likely to be derived from nearby mountains. Miocene greywacke (a hard sandstone showing poor sorting under a microscope) forms the undermass of much of central New Zealand, so this greywacke must have been uplifted, exposed, and eroded to supply the boulders. In fact, an alignment of this Miocene uplift and its accompanying conglomerates can be seen parallel to the east of the main axial ranges of today (see Figure 3).

It is significant that there is no indication that the main axial ranges had been uplifted at this time (Figure 4A). There are no currently known Miocene greywacke conglomerates associated with the uplift of the Tararua or Southern Ruahine Ranges. Even in later Pliocene times (5 to 2.5 million years ago (see Figure 4B)) deep water mudstones were deposited over much of the axial greywacke ranges, as shown by the strata preserved on the Saddle Road to the north of the Manawatu Gorge (known geologically as the palaeogeographic Manawatu Strait), and at outliers such as at Makara, west of Wellington. Further evidence that the axial ranges were not uplifted until about 1 million years ago comes from...
widespread pumiceous pyroclastic-flow volcanic deposits in Hawke's Bay etc. The Kidnappers Tutt, derived from the Taupo Volcanic Zone, could not have reached there if the Ruahine Ranges were in their path.

Only in early Pleistocene times (about 2.5 million years ago) did the oceans across the south-western North Island become more shallow, as shown by the Tataraunui Limestone at the eastern entrance to the gorge (Figure 5), and the greywacke pebble-dominated Gorge Conglomerate exposed in a quarry on the top of the Saddle Road. The latter indicates that the current sediment ranges were beginning to be uplifted about 2.5 million years ago (Figure 4C), and the greywacke being exposed to erosion. In the vicinity of the Saddle Road, uplift was lower than at the Manawatu Gorge, so the top surface of the greywacke there is only 15-20 m above sea level (but buried under younger mainly Pliocene mudstones), whereas at the Gorge the greywacke is 250-300 m above sea level, and forms the northern Taranaki Range ridge-crest.

So, compared with the Saddle Road, uplift was greater 1 km to the south, at the site of the present Manawatu-Gorge, and considerably greater further to the north and south where the highest points of the Taranaki and Ruahine Ranges exist today. After the earlier Miocene uplift east of the Manawatu-Gorge (the Wairarapa Range in Figure 3), there remained shallow, Plioene mudstones between Hawke's Bay, the Wairarapa, and the Manawatu. Land was yet to emerge at the Gorge and in the upper Manawatu catchment area. The constraining subsequent uplift to the north of Norsewood and south of Eketahuna (Figure 4J) cut off the sea ways to Hawke Bay and to the Wairarapa. Further uplift of the Wairarapa and Puketoti Ranges to the east prevented any westward flow from this proto-Manawatu catchment eastwards to the Pacific Ocean. At this time there may have been strong tidal flows through the Manawatu Strait, such as is seen currently at the mouths of the Heiiaanga, Keipara and Kawhia Harbours.

By 125,000 years ago the Manawatu Strait ceased to exist (Figure 4E). By this time the Gorge area had become land, and the large proportion of the area to the east must also have been uplifted above the waves. This meant that all rainflow south of Norsewood, north of Mt. Bruce, and west of the Puketoti Range, could only flow in the direction of least resistance, amalgamating towards the present Woodville basin, and then eastwards through the former-Manawatu Strait, prior to the Manawatu Gorge formation. Here the land remained low, whereas uplift had proceeded more rapidly to the north and to the south beginning at the ancestral Taranaki Island and Ruahine ranges (Figure 4C).

During continuing uplift the Manawatu River maintained its course, cutting down into the Mesozoic greywacke basement rocks, which prevented it from altering course. At that point, the River did not "know" that uplift at the Manawatu Gorge would make existing 250 m into resistant greywacke a much harder task then it would be 1 km to the north, where uplift rates were less and where a similar thickness would have been in 250+ m of soft Pliocene mudstones above only 15-20 m of greywacke.
So how do we know that this postulated geological origin is consistent with present-day uplift of the Ranges and downcutting by the Manawatū River? Two vital locations provide confirming evidence.

The first is on the Bulleritara [AgResearch] Research Station, near Woodville, where the Wellington Fault passes the property, offsetting some late Quaternary (<120,000 years old) river terraces and alluvial fans. The eastern end of the Saddle Road also crosses the Wellington Fault scarp on the northern boundary of the Bulleritara property, where the offset can be easily seen at the point where the Saddle Road takes a sharp right-angle turn into Oxford Road. Close to the research buildings on the Bulleritara property, and formerly exposed in the excess road, an important section was exposed in the 1970s (since destroyed), with preserved wood above a thick accumulation of 

...
Manawatu Gorge saddle, and so the drainage from the east began incising its current route, discharging into the nearby ocean near the Gorge’s current exit point. This fits well with the observation that the Last Interglacial marine bench (the old sea shoreline and nearshore platform), locally referred to as the Tokomaru Terrace (the surface on which the International Pacific Colloge and the Bunnings Shopping Centre is Palmerston North until built), extended as far inland as the mouth of the Manawatu Gorge. The Last Interglacial marine bench formed about 125,000 years ago.

Subsequent uplift under Ridge Road to the west of the western entrance to the Gorge (Te Apiti, 1967), formed the Pohangina Anticline (an anticline is an arch-shaped fold), which then forced the Manawatu River south-westwards on its current route, discharging into the sea at Foxton Beach.

The second location is within the Manawatu Gorge, at Te Apiti corner, also known as Barnet’s Point (Figure 7). Here, measured in a road cutting, is a thin veneer of gravels, sands and silt, overlying an older bench that is the Tertiary greywacke. This bench is an old river bed now uplifted to the level of the present road. Occasional fragments of wood within these deposits have been radiocarbon dated (R28371A) at 13,150 ± 200 yr BP. This gives a good estimate of when the river was incising this bench at this level (about 1 m above current road level) in the Manawatu Gorge. The bench is 21 metres above present river level, providing an average downcutting rate over this time period of 1.5 mm yr⁻¹. Hence the average rate of downcutting over the last approximately 13,000 years is of a similar order of magnitude to the rate of uplift. This means that the Manawatu River is incising in the Gorge at about the current uplift rate of the range in this vicinity. In fact, the current height of the river cut bench at Barnet’s Point in the Gorge is approximately the same as the maximum height of the Wellington Fault scarp at Ballantynes. One can visualise the Gorge at the end of the Last Glaciation, about 13,000 years ago, as a deep river valley, with the river bed in the Holocene (the last 10,000 years) not only heightened to its present meandering course but also oversteepened them. Further steepening to construct the current road and railway line has led to the continuing instability of the hillside through the Manawatu Gorge, causing long periods of road and railway closure.

The formation of the Manawatu Gorge can therefore be seen as a relatively recent feature representing the culmination of much older geological processes at work over the last 20 million years. The long-term geological hypothesis for the origin of the Manawatu Gorge, involving uplift of a horst across the path of a former river [as originally suggested by Hill over 100 years ago [7], Onley 1953], is supported by the current rates of tectonic uplift of the Main Divide in this vicinity and the rates of downcutting by the Manawatu River in Holocene times.

Acknowledgements

I thank Matt Innes for helping me prepare Figures 3 & 4; and Celi Wallace and Bob Stewart for their thoughtful reviews of this text.

References


Manawatu Gorge
Mountain Bike Trails
BUSINESS CASE

29 July 2016
Acknowledgements

The Manawatu Gorge Mountain Bike Trails | Business Case | has been prepared by TRC for the Department of Conservation (DOC).

Disclaimer

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Introduction

The Department of Conservation (DoC) and the Horizons Regional Council, Palmerston North City Council and some iwi believe there is significant potential for Manawatu Gorge to contribute further to community and cultural wellbeing and a strong local economy. There is a view from some that mountain biking could make a significant contribution to this goal.

TRC has been contracted to develop a business case for mountain biking in Manawatu Gorge. In preparing this plan TRC has reviewed previous investigations and reports on the potential development of trails at the Gorge as well as undertaking a detailed field assessment to explore potential trail alignment and infrastructure and support services. This analysis has been combined with our detailed understanding of mountain bike demand in New Zealand and a comparison of the potential Manawatu facility with other opportunities in New Zealand to develop demand projections as a basis for predicting the benefits of investing in a mountain bike network at Manawatu Gorge.

BACKGROUND

Manawatu Gorge

Manawatu Gorge Scenic Reserve is a 962 hectare Tawa Podocarp broadleaf forest located 16 km north-east of Palmerston North on State Highway 3.

The Gorge is unusual because it is one of the few places in New Zealand where the river crosses a mountain range. The Manawatu River was created long before the mountain ranges were born. As the land rose, the river continued to cut its way through the mountains creating the Gorge. To the north is the Ruahine Range and to the south lie the Tararuas.

The Manawatu Gorge Scenic Reserve and surrounds are part of an inter-agency biodiversity project between the Department of Conservation, Horizons Regional Council, Palmerston North City Council, Rangitaane, Tararua District Council, On Track, Transit, Ashhurst Action Group and others, who are working together to protect the native flora and fauna.

The Manawatu Gorge Biodiversity Project area is culturally important to many iwi. In particular, there are areas of Maori owned land within the Project area; the Rangitane o Manawatu Treaty Settlement provides for a Statutory Acknowledgment and Deed of Recognition over Manawatu Gorge Scenic Reserve; and some of the Project area is within the Area of Interest included in the Wairarapa and Rangitane o Tamaki nui-a-Rua Deed of Settlement and Ngāti Kahungunu ki Wairarapa Tāmaki Nui-ā-Rua Deed of Settlement. Any decision to progress with any proposal will need to ensure appropriate involvement of iwi including cultural impact assessments.

The Manawatu Gorge offers a range of land and river based activities and attractions in a nationally significant biodiversity management site and scenic location. Destination Manawatu has identified the Gorge as the number one free tourist attraction in the Manawatu, Rangitikei and Tararua districts.
Destination Manawatu

Destination Manawatu is the Regional Tourism Organisation responsible for marketing the Region to visitors and developing the Manawatu economy through improving the image of Palmerston North City and the Manawatu as a region. The organisation is funded by Palmerston North City Council, Manawatu District Council and local businesses.

Palmerston North and Manawatu have a goal of becoming ‘the best place in New Zealand to ride a bike’ and there is strong collaboration between local stakeholders to achieve this¹.

The gorge is promoted as one of NZ summer 101 must do activities. The annual survey of New Zealanders demonstrates that for those living in the Manawatu-Wanganui Region the Manawatu Gorge Scenic Reserve is an important site for recreation, the DOC destination visited by most people². Those who visited the Gorge on their most recent visit showed a high level of satisfaction of 86%³.

Image: 2 Southern Route entry to Hall Block Road

¹ Destination Manawatu Cycling Overview 2014
² DoC, Survey of New Zealanders, June 2015
³ DoC, Visitor Demand Potential proposal – establish a network of grade 3 mountain bike trails in the Manawatu Scenic Reserve, undated
Map 1 - Location of Manawatu Gorge
EXISTING SUPPLY

Existing trail network at Manawatu

Te Apiti Manawatu Gorge is one of the fastest growing recreation areas in the Manawatu/Tararua region and currently contains some very popular walking tracks, a short downhill mountain bike track, a modern cultural sculpture of Rangitaane ancestor Whatonga, within an outstanding area of native bush and wildlife that represents the bush that once covered the region.

Several walking trails are provided on the southern side of the Manawatu Gorge from the Ashhurst Car Park and the Woodville end of the Gorge. There is a 10 km long one way walking track that traverses the length of the gorge. In December 2012 a 4 km long loop track – the Tawa Loop Walk - was opened at the western end of the gorge with a toilet and carpark. There is also a 30 minute family friendly Manawatu Gorge Loop Track.

The Te Ara O Mahurangi Mountain Bike Trail constructed by DoC and maintained by the Manawatu Mountain Bike Club is located at the eastern end of the Gorge near the Bridge Café and provides a 1.8 km downhill experience from the Hallblock Road.

Access to the northern part of the reserve relies on access across land owned by Meridian Energy, the Te Apiti Wind Farm.

There is a shuttle bus operating during summer to support cycling and walking in the area. There are two bike retail/hire outlets in Palmerston North.

Existing mountain bike trails in the region

Existing mountain bike trails in the region include the Arapuke Forest, located approximately 20 minutes drive south of Palmerston. This area of exotic pine plantation has recently been harvested and new riding trails subsequently developed. This area is managed by the Manawatu Mountain Bike Club (MMBC) and has 15 kms of single track mostly at Grade 3 (intermediate) standard with plans to double this network by 2020 with a range of Grade 2 to Grade 6 trails.

Another mountain biking network is also available at Raumai, located 30 minutes north-west of Palmerston North. This area is also managed by the MMBC, and has 12 kms of Grade 2+ single track and a 1.2 km kids loop trail.

DoC provides two off-road cycling opportunities within Ruahine Forest Park, neither of which were specifically designed for biking. These are a 16 km Grade 4 (advanced) climb to the top of the range on a 4wd track and a 17 km Grade 3 loop.

The Manawatu River Pathway runs for 10 kms along the western side of the Manawatu River through Palmerston North city and connects a number of cycling experiences including a small mountain bike park and BMX and dirt jumping experiences within the town limits. The track is being extended along the river through to Ashhurst Domain 14 kms away.

The wider geographic region provides a number of additional opportunities to those interested in Grade 3 mountain biking experiences.

The Makara Peak Mountain Bike Park is located in Wellington approximately two hours drive from Palmerston North. This area has over 40 km of tracks over a range of skill levels from beginner to expert and receives 100,000 annual visits. The area is owned by the Wellington City Council and managed with a volunteer support group.

To the north The Mountains to Sea is a long distance (217 km) trail forming part of the New Zealand Cycle Trail. It runs from Mt Ruapehu to Whanganui and is primarily a Grade 3 standard. It receives around 7,600 visits each year.
The Rimutaka Incline is also part of the New Zealand Cycle Trail. It is an 18 km rail trail through a spectacular setting near Upper Hutt approximately 140km from Palmerston North. It receives 28,800 annual visits each year.

Use of Manawatu Gorge

In 2015 over 2.6 million vehicles travelled through the gorge\textsuperscript{4} however NZTA have estimated only 1\% of these stop and use the reserve.

The Manawatu Gorge walking track network has had a consistent increase in users over the last five years from a total of around 20,000 in 2011/12 to 75,167 in 2015/16\textsuperscript{5}. Of these more than 20,000 used the Tawa Loop walk and just over 10,000 walked the full Manawatu Gorge Walk. Based on anecdotal advice some counts would have been triggered by mountain bikers.

\footnotesize
\textsuperscript{4} NZ Transport Agency, State Highway AADT Data Booklet, 2011-2015
\textsuperscript{5} DoC, Manawata Gorge Track Count Data
Market context

Market demand

Sport New Zealand data\(^6\) shows around 6.2% of New Zealanders undertake off road cycling.

In May 2016 Bike Taupo surveyed 2,560 of their members, and less than 10% selected easy to ride cycle trails (fairly flat, wide family oriented trails – Grade 1) as being of the most interest. Easy to intermediate trails (Grade 2-3) were of interest to most riders at 74%, and advanced trails (Grade 4+) to 16%. Seventy percent rated themselves as intermediate riders, 27% as advanced. Those surveyed were domestic cycling visitors to the region.

Local analysis has indicated a strong demand for mountain biking in the region\(^7\). A survey of trail users in Manawatu Gorge undertaken over the period 2012 to 2014 indicates a strong interest in further development of the trail network, participation in events and a willingness to pay or volunteer to assist in those developments. Most respondents were cyclists. This survey estimated 13,400 additional visits per annum if the proposed DOC mountain bike trail was implemented.

Over the last 5 year period, 318,000 international tourists participated in cycling sports in NZ. Annually around 4% of international holiday visitors do some sort of cycling sports while visiting New Zealand and around half of these are mountain bikers\(^8\).

These figures provide a base for estimating the potential participation of local residents, domestic and international visitors.

The most popular areas for cycling by international visitors are the Auckland, Canterbury, Queenstown, West Coast, Wellington, Rotorua, Nelson, Lake Taupo and Lake Wanaka areas. Domestic visitors are primarily attracted to cycle in the Rotorua, Auckland and Canterbury, Hurunui, Queenstown, Lake Taupo areas.

Tourism New Zealand is targeting international cycle visitors from its main cycling source markets:

- recreational cyclists aged 45 and over from Australia, UK, USA and Germany who view nature/scenic attractions as key reasons for travel. These visitors are generally well-travelled, financially secure and are keen to experience other activities alongside their cycling experience
- mountain biking enthusiasts aged 25 to 40 years from Australia who are looking for new challenges and thrills. These visitors generally travel in small groups and may seek extra adrenaline filled, competitive activities to complement their mountain biking experience.

The New Zealand Government has made a major investment in cycle trail tourism through the New Zealand Cycle Trail (Nga Haerenga) concept which was initiated in 2009. The New Zealand Cycle Trail is intended to be a world-class network of 23 multi-day cycle trails (or ‘Great Rides’) throughout the country with linked accommodation, services, shuttle transport and attractions. The trails can also be used for day cycling trips and many are also used for walking, running and events. In January 2014 almost 97,000 people used the New Zealand Cycle Trails\(^9\) and usage increased to 125,000 people in January 2015\(^10\).

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\(^6\) Sport New Zealand, 2015. *Sport and Active Recreation in the Lives of New Zealand Adults. 2013/14 Active New Zealand Survey Results*

\(^7\) Manawatu Mountain Bik Club, Manawatu Gorge Trail User Survey, 2012

\(^8\) New Zealand Tourism, Tourist Special Interest Profile - Cycling, April 2013

\(^9\) [http://nzcycletrail.com/about/history/](http://nzcycletrail.com/about/history/)

In 2013 an evaluation and trail user survey of four newly opened trails in different locations in the New Zealand Cycle Trail network\textsuperscript{11} found differences in markets and user characteristics that were linked to the type of trail and its location. The evaluation suggests that:

- soft adventure cycle trail experiences in relatively remote areas are likely to attract mostly groups of NZ residents in the middle to older demographics (with a small number of international visitors) who come from neighbouring areas and nearby areas and who travel to a location specifically for the trail experience. Such trails as the Motu Trails and the Mountains to Sea Trail in the Central North Island can be major drivers of local tourism

- easy cycle trails with associated attractions near population centres are likely to attract mostly NZ residents for day and short overnight experiences and are appealing to older people in addition to other age groups. The Hauriki Rail Trail, a 98 km 3-day ride in the Thames-Coromandel District near Hamilton and Auckland, has become a major reason for visiting the district. In January 2014 the trail attracted 14,000 cyclists who spent an average of $103 each in the local economy

- iconic, well-promoted trails with a variety of experience offerings are likely to attract a wider range of local and users and more international visitors.

**BROADER TRENDS IN MOUNTAIN BIKING**

Mountain bike tourism is a relatively small but growing niche tourism market. The market includes active mountain bikers that are motivated to travel to destinations primarily or solely because of the trails and the riding experience. However, the market also includes a much larger segment of mountain bikers and casual off-road riders who will ride while on holiday in a destination although bike riding is not their primary reason for the holiday.

Over the last decade there have been a huge number of mountain bike-specific trails built in Europe, North America, Australia and New Zealand. During this process of trail development, communities and local governments have begun to realise the economic and social values of the trails to the community.

Valuable lessons for developing trails in Manawatu Gorge can be provided by developments elsewhere in New Zealand such as the Timber Trail in the Waikato, Otago Rail Trail, Whakarewarewa Forest at Rotorua, and the Hutt River Trail in Wellington.

The benefits that these biking destinations have received include local community engagement and enjoyment; increased participation in recreational activity; the ability to attract a dedicated mountain bike market, business opportunities and economic benefits for the local areas and the broader regional economy.

Successful trails are characterised by active and well coordinated governance arrangements, often with close relationships between land managers and local mountain bike clubs as a source of volunteers for the routine track monitoring and detailed maintenance that is required to maintain track consistency and manage risk.

We have estimated the number of mountain bikers who live in and visit the region and would be potential trail users. Our analysis of direct and indirect spending is developed from high, medium and low scenarios based on these estimates of potential users. Most benefit would arise from trail users who come from outside of the local area, because they must stay overnight in order to experience the trail and therefore contribute more to the local economy.

It should be noted however that the actual participation on the Manawatu trail would be dependent on the ability of this trail to attract new users in what is a competitive and well supplied market.

\textsuperscript{11} Angus & Associates with TRC Tourism for MBIE, New Zealand Cycle Trail Evaluation – Four Cycle Trail Case Studies, Nov 2013
The proposal

PLANNING THE MANAWATU GORGE CYCLING EXPERIENCE

Field assessment undertaken during June 2016 indicated there are six options for mountain bike trails or combinations of trails within the Manawatu Gorge area.

The landscape of the Gorge is generally steep on the sides of the gorge above the Manawatu River with areas resembling a plateau on top of the gorge. The plateau area descends steeply in places towards Woodville on the eastern end and Ashhurst at the western end.

The topography, landscape and geology of the Gorge have a significant influence on the trail grade, the trail experience and investment required to provide the most suitable and sustainable trail based on the market and user demands. Land tenure, and public infrastructure investment constraints are likely to influence the development of mountain biking opportunities within the Gorge.

It is clear that there will be local interest in using Grade 3 trails as indicated in the Manawatu Mountain Bike Club Survey (2015) within the Gorge however the challenge is to provide a trail or network of trails at Grade 2-3 Easy and Intermediate that attracts the domestic tourism market and to a significantly lesser extent, the international market.

The Gorge is a distinctive attraction and to create a competitive riding experience, any Gorge trail will need to present the features of the Gorge to riders. The vegetation of the Gorge is an attraction and riding through Nikau Palm and rainforest areas is a good experience but one that is unlikely to attract significant numbers of mountain biking tourists.

Views of the Gorge need to be incorporated into any cycling experience and there needs to be a perception that the experience is a distinctive Manawatu Gorge trail riding experience. The steep sides of the Gorge provide particular challenges for the construction of mountain bike trails and the history of landslips in the Gorge reflect its unstable nature evidenced through the 2011 landslide that closed the Gorge for almost a year.

Any trail construction will need to provide an experience that is grounded in the landscape and features of the Gorge. The steep terrain and forested nature of the environment will necessitate the track being located on the plateau above the Gorge with access to sites where riders can overlook the Gorge and experience its spectacular features.

What are the further planning considerations?

The field assessments undertaken included discussions with a range of stakeholders and landowners together with assessment of previous work, potential trail alignments on the ground and through desktop evaluation.

Community and stakeholder discussion has been a common theme in the exploration of mountain biking opportunities in Manawatu Gorge reflected in strong support to determining the best cycling option for the Gorge. Preferred and endorsed cycling options will require further planning including and not limited to:

- Consultation with local Iwi and Iwi partners in the Manawatu Gorge Biodiversity Project
- Consultation with stakeholders and affected partners including Kiwi Rail, Meridian Energy, private landowners and Councils
- Application for any required planning, land use, building and resource consents
- Design, specifications including further technical assessments
Additional planning and assessment to avoid adverse impacts on natural resources and historic and cultural heritage.

Trail construction estimates provided in this report are based on previous trail assessments and construction work undertaken in New Zealand and Australia and are provided for budget and business planning purposes.

**FUTURE OPPORTUNITIES**

The popularity of the Gorge is evident through the increase in walking visitors following the construction of the Tawa Loop at the western end of Te Apiti – Manawatu Gorge. There is opportunity for tourism investment and development linked to a trail hub and shuttle vehicles at the Ashhurst end of the Gorge, and on private land in this area. The entrance to the Gorge provides opportunity for Iwi involvement in tourism enterprise including traditional gardens on Mahingia Island should the owners of the land wish to see such development.

Links to the Manawatu River Pathway and the Ashhurst Domain for walkers and cyclists are required for any future development in this area currently constrained by access and safety issues with the Ashhurst Bridge and the busy State Highway 3.

**Access and Safety Considerations**

A major consideration in the identification of suitable trail experiences, trail hubs, trail alignment and positioning is ensuring safe and accessible walking and cycling access from Palmerston North 13.5 km to the south via the Manawatu River Bridge (Ashhurst). The bridge is a key link from Ashhurst to Manawatu Gorge but it is unsuited to walking and cycling. The bridge is 340 metres long and carries the State Highway 3 over the Manawatu River via two lanes of traffic at a posted speed limit of 100kph.

The existing bridge does not meet current standards for a bridge with pedestrian and cycle use. The bridge is recognised as the missing link between activities on both sides of the river. Future mountain biking opportunities would be constrained by this arrangement due to the narrow width of the shared path and numerous steps currently required as part of the crossing.

Based on the existing infrastructure arrangements cyclists would start or finish a Southern Manawatu Gorge Cycling Trail at the Ashhurst Car Park at the western end of the Gorge or on private property adjacent to the Ashhurst Car Park having arrived at the car park by vehicle or risking the hazardous ride across the Ashhurst Bridge.

A northern Gorge option could utilise the Saddle Road Bridge over the Pohangina River and link to the Ashhurst Domain. Links back to the Gorge, a trail hub or to a future circuit of the Gorge would be constrained by lack of safe access across the Manawatu River Bridge (Ashhurst).

The existing bridge arrangement also separates the Gorge from the Manawatu River Pathway. This path runs almost continuously along the western side of the Manawatu River and connects a number of cycling experiences including those within the town limits.

A range of options to resolve the access and health and safety issues associated with pedestrian and cycling on the Ashhurst Bridge have been proposed and discussed in the Manawatu River Bridge (Ashhurst) Walk/Cycleway Indicative Business Case (Opus 2015).\(^\text{12}\)

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\(^{12}\) Opus, Manawatu River Bridge (Ashhurst) Walk/Cycleway Indicative Business Case, 2015
The Business Case recommended two options to be taken forward to a further detailed business case:

- Supporting a separate walk/cycleway off the existing bridge piers
- An independent footbridge located within 50 metres of the existing bridge.

Both options would provide safe and effective access across the river for cyclists and walkers and would significantly enhance the viability of trail based experiences within Manawatu Gorge. The Business Case indicated costs for the bridge options to be:

- Off existing bridge piers $5,470,000 to $6,330,000 depending on length to a total cost over a 40 year period of $6,560,000 to $7,430,000
- Independent footbridge $4,310,000 to $6,330,000 depending on length to a total cost over a 40 year period of $5,170,000 to $7,430,000

Alternative designs for a separate walk/cycleway off the existing bridge piers have been proposed and these have varying costs. Groups considering construction of a cycle trail may wish to investigate these costs further.

Improving cycling and walking access to the western end of the Gorge opens up new commercial tourism based opportunities on private, public and Iwi land adjacent to the existing car park and the Manawatu River.

The walking and cycling opportunities are further constrained by the need to get recreational users across the State Highway 3 to access the Te Apiti – Manawatu Gorge Walk or any future mountain bike opportunities on the southern side of the Gorge.

In 2014 DoC sought advice on costs to improve the current situation where walkers walk alongside the 100kph State Highway 3 via a narrow path inside a highway guardrail until they pass under the road at Dam Bridge and enter the reserve some 200 metres from the car park.

Options considered included:

- Upgrading the existing fence and path behind the highway guardrail estimated cost $380,000 plus geotechnical and design and assessment costs $30,000
- Install a new pedestrian underpass beneath the highway and providing a new connection to walking trails in the reserve estimated cost $400,000 plus geotechnical and design and assessment costs $50,000
- Constructing a pedestrian overbridge across the highway providing at least six metre clearance to the highway and span of about 25 metres at an estimated cost of $750,000 plus geotechnical and design and assessment costs $80,000.

There are advantages and disadvantages with all these options. The fencing option does not remove the fundamental issue of walking along the busy road edge whilst the underpass option would require some good design elements to remove the dark and subterranean and negative safety perceptions associated with underpasses. The overpass may create some discomfort for users due to the height above the road.

The overpass option does however (with suitable design) have the potential to become less of a bridge and more of an entrance statement to the Gorge. The overpass option also provides opportunity for improved access to the reserve and potential cycling trails into the reserve by reducing the initial gradient into the reserve or by agreement, private land.

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13 Manawatu Gorge Walkway Improvements, internal report to DOC, MWH 2014
Manawatu Gorge Mountain Bike Cycling Opportunities

Characteristics of a successful mountain bike destination should include experiences that stimulate the physical and spiritual senses and are linked to other visitor experience opportunities.

Assessment of the proposed trails within the Manawatu Gorge indicates that some Grade 2 Easy trail will be available but the majority of trails will be Grade 3 Intermediate.

The ultimate Manawatu Gorge Trail would be a trail that exposes the rider to the natural features of the Gorge on an easy Grade 2 trail that connects the riders with the things that make a great mountain bike destination.

Important features of a successful mountain bike destination include:

- Grade suitable to the users predominantly Easy Grade 2 Trails
- Attractive landscape
- Provision of transport
- Accessibility
- Range of bike friendly accommodation options
- Cafes, food, beverages and shops “good trails start with coffee and end with beer”
- Supporting bike services
- Quality commercial tours
- Community engagement and support
- Strong position as a mountain bike destination.

OPTIONS ANALYSIS

Assumptions

The following assumptions have been used in developing options for a mountain bike trail in Manawatu Gorge:

- The majority of domestic cyclists seek Grade 1-2 Easy to Intermediate trails
- Domestic cycle tourists and recreational riders are not primarily focused on cycling, but on the broader experience
- Both markets are looking for ways to access safe and traffic-free trails
- Improved walking or cycling access from Ashhurst to the Southern Gorge is dependent on modification of the Ashhurst Bridge or construction of a pedestrian and cycling bridge across the Manawatu River
- Southern Gorge cycling opportunities require the development of safe passage across the State Highway 3
- Trail gradient is a critical factor in successfully designing the trail to achieve an average Grade of 2-3 Easy to Intermediate
- Trails require appropriate support services, such as accommodation, bike hire, transport (bike shuttle) and security
- Building of the trail experience is likely to be staged
- Trail will have appeal for those already riding in the region
- New cycle events will be developed around the trail
Trail access will be required by negotiation and agreement across private property
Cycling participation will continue to grow
Trails will need to be a Gorge experience with views and lookouts
Ashhurst Car Park area will become a trail hub with future tourism enterprises and attractions
Future trail links will be developed with the town of Woodville 3.5 km to the East of the Gorge
Maintenance of trails is dependent on many variables:
  - initial alignment and design
  - rate of vegetation growth/encroachment
  - level of use
  - commitment to regular inspection/audits and repair before problems escalate
  - natural hazards such as storms and bushfires.
Annual maintenance costs are estimated to be around 3% of construction costs. This figure has been adopted for the purpose of this analysis. Typically maintenance tasks could include pruning, minor water shedding, small rock picking and clearing, clearing trail of debris and fallen limbs
Other tasks such as reconstruction of damaged structures, drainage works, and minor realignment are considered to be repair rather than maintenance and will need a separate capital budget.

Manawatu Gorge Mountain Bike Trail Opportunities
Six mountain bike trail alignments were analysed. These options are set out in the Table and summarised below.

Mountain biking could be a key feature of future visitor investment and trail activity in Manawatu Gorge.

We have concluded that Option 4, the downhill mountain bike traverse from the Te Apiti Wind Farm to Ashhurst Domain, is the most preferred Grade 2-3 Easy to Intermediate Manawatu Gorge cycling experience.

This could be the first of a future staged mountain bike experience in the Gorge. Further stages would be dependent on the establishment of safe cycling and walking access across the Manawatu River Bridge (Ashhurst) and State Highway 3.

Features of this preferred Te Apiti Wind Farm to Toitoi Lookout to Ashhurst Mountain Bike Trail include:
  - Exceptional Grade 2-3 Gorge experiences, wind turbines, spectacular Gorge views, lookouts, forests and Iwi culture
  - A downhill Gorge traverse from one of the highest points in the Gorge to Ashhurst Domain
  - Loop options for those that seek greater challenge
  - Vehicle or shuttle drop off opportunities at the top of the trail
  - Easy transition into the trail through the wind farm, more challenging experiences through the Gorge and comfortable river bank cycling along the Pohangina River to the Ashhurst Domain
  - Strong support and commitment from key landowners and stakeholders
  - The trail becoming the first stage of new Manawatu Gorge mountain bike and trail opportunities linked to improvements in access and safety relating to the Manawatu River Bridge and the State Highway 3 and future trail connections to Woodville.
Summary of Six Mountain Bike Trail Options

1 SOUTHERN GORGE TRAIL: Ashhurst Car Park to Bridge Café

Predominantly a Grade 3, approximately 15 km long Mountain Bike Trail from Ashhurst Car Park to Bridge Café. The trail begins or ends on private property south of the Ashhurst Car Park and through switchbacks climbs to the plateau above the Gorge running to the south of the existing walking trail. The mountain bike trail will need to access the existing lookouts to ensure this is a Gorge experience and will share some sections with walkers. The trail runs close to the Tararua Wind Farm which is established on private land before heading downhill via switchbacks to traverse across steep side slopes towards Hallblock Road. The trail follows Hallblock Road to a decision point where riders can continue down the public road or on the 1.8 km Te Ara O Mahurangi Mountain Bike Trail to the entrance to the Bridge Café.

Estimated construction cost $2,079,000
Estimated Maintenance cost $62,400 per year

Comment - Not suitable at this stage due to steep inclines and the Grade 3 trail does not fit with the international or domestic tourism target market. This trail has future potential to provide around the Gorge mountain bike trail to link with northern Gorge mountain bike trail experience and future trail hub tourism experience and enterprises.

2 WOODVILLE CEMETERY TO ASHURST DOMAIN (FRAME GROUP REPORT 2011)

Planned by the Frame Group and DOC in 2011 this northern Gorge trail is predominantly Grade 3 with some Grade 2 segments on the plateau area. This 15 kilometre trail starts at Woodville Cemetery and ends at the Ashhurst Domain. The trail starts on private property mostly Kiwi Rail land and traverses steep cleared and forest country with steep valleys until it reaches the Toitoi Point area midway along the Gorge south of the Te Apiti Wind Farm. The trail plan includes 75m and 45m swing bridges to span the steep valleys and at least two switch back sections to deal with the steep country. The trail levels out at Toitoi Point and falls to a switch back section near where it re-joins Kiwi Rail land. The trail plan recommends crossing the Pohangina River via modifications to the Railway Bridge. The trail finishes at the Ashhurst Domain.

Estimated Construction Costs $3,294,000 excluding GST plus professional fees
Estimated Maintenance Costs $78,000 Excluding GST

Comment - Not suitable in the full Gorge alignment due to the steep eastern sections not fitting with the predominantly Grade 2 requirement. The steep sections also create issues with stability and sustainability and it is unlikely that Kiwi Rail will endorse trail construction in proximity to the railway line due to health and safety issues associated with the sides of the Gorge and do not support clip-ons or public access modifications to the railway bridge across the Pohangina River. The Western alignment has potential and this will be discussed in option 4.

3 Te Apiti Wind Farm to Toitoi Lookout

Predominantly a Grade 2, 3.5 kilometres shared use trail on the plateau within the Te Apiti Wind Farm and Manawatu Gorge Scenic Reserve. The proposed trail will be constructed 1.5m wide alongside the alignment of the internal wind farm management track until it reaches the boundary of the Te Apiti Wind Farm. The trail leaves the wind farm at this point and joins DOC land and travels by a loop to Toitoi Point. The very start of the trail near the car park has a small steep valley which conflicts with the Grade 2 assessment as the valley slopes are approximately 40% in and out, the trail is however on firm ground with an established creek crossing. Pedestrian/cycle gates at stock gates are to be established together with trail head and direction signs on the wind farm land. Iwi cultural assessment and approval will be required prior to any development near Toitoi Point and access agreements with Te Apiti Wind Farm, Kiwi Rail and private land owners will be required for this option.

Estimated Construction Costs $213,400
Estimated Annual Maintenance Costs $6,400

Comment - This is a suitable addition to mountain bike experiences within the Gorge or as a standalone option for shared use walking and cycling tourism within Tararua District Council area. The mountain bike experience on its own does not fit with what the cycle tourism market is looking for however linked to other trail connections it provides a useful starting point for a wider mountain bike experience see option 4. The access to Toitoi Point will provide access for a range of different users and will provide options for Iwi people including Elders to this important site.

4 Te Apiti Wind Farm to Toitoi Lookout to Ashhurst

Predominantly Grade 2-3, 11 kilometre mountain bike trail from the Te Apiti Wind Farm Car Park to the Ashhurst Domain. The trail follows the wind farm management tracks on separate constructed trails and leaves the wind farm on the boundary of private property to join the Manawatu Scenic Reserve. The constructed trail picks up on Gorge views to the East until it joins the forest and on level trails opens up at the proposed Toitoi Lookout. The trail provides the option for another lookout overlooking the landslip area on the south side of the Gorge. The lookout option is over the railway tunnel area that should reduce risk to railway infrastructure. There is also the option of provide a loop trail off the main trail to provide more challenge for those that seek it. The trail then leaves the lookout and travels on undulating country that is generally downhill until it meets private land at the bottom of the hill. This trail does not attempt to cross the railway bridge but travels along the Pohangina River flats to the Saddle Road Bridge. The bridge provides relatively safe access as it allows for walkers and cyclists and not being a major highway the traffic load is much less than the Ashhurst Bridge. After crossing the Saddle Road Bridge the trail follows the levee bank and river edge south to pass under the railway bridge and enter the Ashhurst Domain where the trail finishes.

Estimated Construction Cost $1,111,700
Estimated Annual Maintenance Costs $33,400

Comment - This option is preferred as it provides a Gorge Mountain Bike trail at close to Grade 2 and provides some unique attractions such as the views from within the wind farm, pleasant riding on wide well-made trails and the experience of entering the forest and leaving it at the lookout to view the Gorge. It also has the option for loop trails and another lookout over the Gorge. Track widths will be reduced on DoC managed lands to minimise impacts however this may mean track grades are affected. There are fewer approvals required with this option as the Te Apiti Wind Farm access is supported (subject to negotiated agreements). The Saddle Road Bridge option to Ashhurst Domain is a simple option with riverbank riding. This option can be stand alone or can be linked with an alternative route to Woodville (see option 5), as a staged option and linked to a bike/walker shuttle bus option from Ashhurst Domain or future options from Ashhurst Car Park or Woodville. Future trail alignment planning will need to consider the important cultural sites found within the area and additional consultation and cultural impact assessment will be required.
5 Woodville Cemetery to Te Apiti Wind Farm (inland option) and then to Ashhurst Domain

Predominantly Grade 3 -2, 16.5 kilometre mountain bike trail from Woodville Cemetery to Ashhurst Domain by an alternative (inland) route to Te Apiti Wind Farm and Toitoi Lookout. This trail could work as a Gorge Trail as the eastern end follows a less steep route without requiring the infrastructure and without the risk associated with the rail corridor. The trail traverses private farmland across five titles until it reaches the Te Apiti Wind Farm where the trail can join the trail established on the wind farm and then to Toitoi Lookout. The trail then links to the trail from Toitoi Lookout to Ashhurst Domain as above. The trail provides views to the east as it climbs to the wind farm.

Estimated Cost $2,434,000
Estimated Annual Maintenance $73,000

Comment - This provides a staged option which can be added to option 4 to provide a through the Gorge trail. The eastern section of this option does not work for a Grade 2 trail and would be less attractive to the market due to the climb up to the wind farm. Options on this trail include an alternative downhill trail from the drop off point at the wind farm to link up with opportunities at Woodville. Some consideration will be required for two way trails due to the speed of downhill riders and those coming up. There are a number of approvals required for this option due to private land that could slow any progress or negate this option. This is a worthy future link to Te Apiti Wind Farm to Ashhurst Domain option (option 4).

6 Around the Gorge Option

Grade 3-2, 45 kilometres round trip from Ashhurst Car Park to Ashhurst Car Park via option 1 and 5 enabling riders to complete a round the Gorge trip utilising the two options above. The trail will be reliant on resolution of all the issues associated with access across the State Highway 3 to enable riders to safely cross the bridge and highway.

Estimated Cost $4,513,000
Estimated Annual Maintenance $135,400

Comments - On its own it doesn’t fit the market as described above as there are links that are predominantly hard Grade 3 however when considered in the future with development of a trail hub at the Ashhurst Bridge Car Park Area this future option may have benefit. The Tararua Wind Farm sits on private property and currently there are no plans for public access however over time this may change and there may be opportunity for a downhill option from a car park or shuttle bus drop off at the southern wind farm for riders to traverse the easier alignment to the Ashhurst Car Park.
Map 2 – Manawatu Gorge Trail Options
## Analysis of Options

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost Estimates</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Southern Gorge Trail</strong></td>
<td><strong>Construction Cost</strong></td>
<td><strong>Opportunity for links to hospitality and accommodation with Café and link to Woodville 3.5 km from the eastern end of the trail and developing cabin style (or similar) accommodation at Ashhurst area</strong></td>
<td><strong>Walkers and cyclist safety issues with Ashhurst Bridge limiting access from Ashhurst Domain and Palmerston North and Palmerston River Pathway</strong></td>
<td><strong>Access across the Ashhurst Bridge and Gorge Highway would make this option more attractive</strong></td>
</tr>
<tr>
<td>Ashhurst Car Park to Bridge Café</td>
<td><strong>Annual Maintenance</strong></td>
<td><strong>Potential to pick up existing features such as Whatonga and the existing walking trail lookouts</strong></td>
<td><strong>Crossing of the Gorge Highway and side road is required to access private property for trail start</strong></td>
<td><strong>With the proposed alignment there are limited Gorge viewing experiences</strong></td>
</tr>
<tr>
<td>Beginning on private property adjacent to Ashhurst Car Park and travelling East through switch backs. Links to Gorge walking trail lookouts by spur trail. Traverses through steep country to Hallblock Road which connects to Te Ara O Mahurangi Mountain Bike Trail and then finish at the Bridge Café area</td>
<td><strong>$2,079,000</strong></td>
<td><strong>Future opportunity for strong links to Ashhurst and Palmerston North if bridge and highway safety issues are resolved.</strong></td>
<td><strong>Mixing walking and cycling will be required to take advantage of Gorge views</strong></td>
<td><strong>Mixing walking and cycling to incorporate the lookouts may detract from the overall Gorge experience</strong></td>
</tr>
<tr>
<td></td>
<td><strong>$62,400</strong></td>
<td><strong>Opportunity for car park and vehicle access for cyclists on the high country would flow from approved access to the property containing the wind farm on southern side.</strong></td>
<td><strong>The steep nature of this trail particularly on the eastern end takes does not fit the grade 2 trail being sought for the greatest potential target market.</strong></td>
<td><strong>Lower investment than the northern Gorge experience and provides an end to end experience</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Strong support from the landowner at the western side of the Gorge providing good access opportunities.</strong></td>
<td><strong>Access across the Ashhurst Bridge and Gorge Highway would make this option more attractive</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Walkers and cyclist safety issues with Ashhurst Bridge limiting access from Ashhurst Domain and Palmerston North and Palmerston River Pathway</strong></td>
<td><strong>Access across the Ashhurst Bridge and Gorge Highway would make this option more attractive</strong></td>
</tr>
</tbody>
</table>

*Note: The table is organized in a way that aligns with the structure of the analysis provided in the document.*
<table>
<thead>
<tr>
<th>Description</th>
<th>Cost Estimates</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Woodville Cemetery to Ashhurst Domain (Frame Group Report 2011)**         | **Construction Cost $3,294,000**  
Annual Maintenance $78,000 | • Views of the Gorge and a through the Gorge experience  
• Links to Woodville to Ashhurst  
• Swing Bridges a feature would be an experience for the trail | • Steep terrain which makes trail construction challenging and adds challenge to the riding experience  
• Eastern section east of Toitoi Point has untested Geotechnical issues. Kiwi Rail unlikely to support trail construction on their property due to potential risk to rail operations  
• Original plan looks at access across railway bridge and Kiwi Rail does not allow clip on to rail bridges  
• Costly option due to infrastructure, swing bridges and rail crossing option. | • High cost option and sections are unlikely to be supported by landowner Kiwi Rail particularly on the steep eastern end of the Gorge and railway bridge crossing option. |
<p>| This option follows the Frame Group alignment of 2011 and traverses the steep Gorge country on cleared land, forestry and native bushland east of Toitoi Lookout. The Grade 3 trail features a 75m and 45m suspension bridge and views. The trail west of the Toitoi Lookout is mostly on DOC land before it traverses down to meet the Kiwi Rail land and recommends sharing the Pohangina River railway bridge to Ashhurst Domain. |</p>
<table>
<thead>
<tr>
<th>Description</th>
<th>Cost Estimates</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Te Apiti Wind Farm to Toitoi Lookout</strong></td>
<td>Construction Cost $213,400 Annual Maintenance $6,400</td>
<td>• Provides car park access for shared use link to top of the Gorge</td>
<td>• Requires final approval from Meridian and tenant farmer</td>
<td>• Access through the Te Apiti Wind Farm is pivotal to delivering a grade 2 experience on the Gorge. The Te Apiti Wind Farm trail provides the vehicle access to the 340m top of the Gorge and access to the 300m lookout from where trails can progress east and west.</td>
</tr>
<tr>
<td>Traverse the Te Apiti Wind Farm land for 1.5 km on a 1.5m wide shared use trail before it leaves the wind farm where Merinda land ends. The trail then traverse DOC land for 2km to the Toitoi Lookout on 1.2m wide shared use trail.</td>
<td>• Feature with the wind turbine, views to the Gorge at Toitoi Lookout</td>
<td>• Feature with the wind turbine, views to the Gorge at Toitoi Lookout</td>
<td>• Meridian seek to be indemnified against anything that may happen to users of the trail e.g. through NZ Walkways</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Grade two trail through wind farm and on contour to Toitoi Lookout</td>
<td>• Grade two trail through wind farm and on contour to Toitoi Lookout</td>
<td>• Meridian and the Tenant may close the walkway for periods of time for maintenance of stock related issues reality, practical methods will be used to avoid the need for closures and public information will be required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Can be combined with Gorge trail east or west of lookout using downhill gradient</td>
<td>• Can be combined with Gorge trail east or west of lookout using downhill gradient</td>
<td>• Meridian and the Tenant may close the walkway for periods of time for maintenance of stock related issues reality, practical methods will be used to avoid the need for closures and public information will be required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strong Meridian corporate support and Tararua District Council support for this trail opportunity</td>
<td>• Strong Meridian corporate support and Tararua District Council support for this trail opportunity</td>
<td>• Meridian and the Tenant may close the walkway for periods of time for maintenance of stock related issues reality, practical methods will be used to avoid the need for closures and public information will be required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Purpose built shared use trail within the management track corridor will enable better use of the views to the eastern Gorge.</td>
<td>• Purpose built shared use trail within the management track corridor will enable better use of the views to the eastern Gorge.</td>
<td>• Purpose built shared use trail within the management track corridor will enable better use of the views to the eastern Gorge.</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Cost Estimates</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
<td>------------</td>
<td>---------------</td>
<td>----------</td>
</tr>
</tbody>
</table>
| 4 Te Apiti Wind Farm to Toitoi Lookout to Ashhurst | Construction Cost $1,111,722 Annual Maintenance $33,400 | • Wind farm to lookout and west downhill progression provides opportunity for purpose built grade 2 and 3 experience being less steep than other trail options  
• Provides option for more challenging loop trail off the main trail  
• Feature views at Toitoi Lookout and potential for one other lookout site  
• Opportunity for loop trail for more challenging opportunities  
• Avoids the need for railway bridge over Pohangina River. | • Does not provide east to west full Gorge experience  
• By passing the railway bridge adds 3.6 kilometres to trail to Ashhurst Domain via the Saddle Road Bridge. | • This option provides the greatest opportunity to getting close to a grade 2 trail with gentler downhill gradients suitable for less experienced riders. Provision of the loop trail for more advanced riders provides variety and additional lookout spur trail will benefit visitors. Some negotiation required with private land holders but safe access across Saddle Road Bridge is assured. |
| 5 Woodville Cemetery to Te Apiti Wind Farm (inland option) and then to Ashhurst Domain. | Construction Cost $2,434,000 Annual Maintenance $73,000 | • Most suitable through Gorge option as the inland option east of Toitoi Lookout has less side slope and is potentially less steep  
• The inland alignment links neatly with the Te Apiti Wind Farm Track heading to the Toitoi Lookout  
• Fewer trails on Kiwi Rail land reducing approvals required  
• Enthusiasm of Tararua Council and community in developing a trail from or to Woodville. | • Majority of this trail is on 5 titles requiring agreement of the landholders  
• The trail alignment has not been proofed on the ground and will require further planning  
• Access through Te Apiti Wind Farm and choice of direction of use can cause issues and potential conflict between up and downhill cycling. | • This is the best long term option which provides a through the Gorge experience. Te Apiti Wind Farm access ensures mid trail access for less experienced riders or others who wish to not climb. |
<table>
<thead>
<tr>
<th>Description</th>
<th>Cost Estimates</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Around the Gorge Option</strong></td>
<td><strong>Construction Cost $4,513,000</strong></td>
<td>• Would provide a strong around the Gorge option for mountain biking with links to lookouts and a future trail hub. It provides a big picture future staged option once infrastructure and safety issues are resolved and can build on results of smaller initial mountain bike options in the Gorge</td>
<td>• Does not fit the market as described above as there are links that are predominantly hard Grade 3</td>
<td>• When considered in the future with development of a trail hub at the Ashhurst Bridge Car Park Area this future option may have benefit. Repliant on resolution of State Highway access issues</td>
</tr>
<tr>
<td>Round trip from Ashhurst Car Park to Ashhurst Car Park via option 1 and 5 enabling riders to complete a round the Gorge trip utilising the two options above. The trail will be reliant on resolution of all the issues associated with access across the State Highway 3</td>
<td>Annual Maintenance $135,400</td>
<td></td>
<td>• Reliant on safe access across the Manawatu Bridge and across the busy State Highway</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• There is no access to Tararua Wind Farm limiting access points at the top of the range</td>
<td></td>
</tr>
</tbody>
</table>
Potential trail users

DoC has estimated that by increasing the number and variety of recreational opportunities in the gorge and promoting them, visitor numbers could increase to 50,000-75,000 per annum over 3-5 years and up to 100,000 per annum within 10 years of a new development\(^\text{15}\).

These assumptions by DoC are based on the increasing demand for mountain biking opportunities nationally, the strong local mountain biking community, the potential regional market, and a survey conducted by the Manawatu Mountain Bike Club which estimates a potential 20,000 mountain bikers would use an expanded track network.

Our analysis below breaks down potential track users into local, regional and international users and discusses their potential attraction to the new trail network, potential additional numbers and the associated economic benefits of their involvement.

Estimates of participation are based on 2013/14 figures that show 24.8% of New Zealanders participated in cycling\(^\text{16}\). Of these 25% participated in these activities ‘on an off road bike trail or walking track’ which we have assumed means they are mountain biking.

**LOCAL RESIDENTS**

The local area includes Palmerston North and the adjacent districts of Manawatu and Tararua where cyclists can potentially access the gorge by riding or a short drive from home.

This area has a population of 132,200 and has an active mountain bike club based in Palmerston North with around 700 members.

Based on the local population we therefore estimate there are potentially 8,196 cyclists who would cycle on an off road bike trail such as this.

Whilst delivering a trail will be attractive to the local population and may contribute to better social and health outcomes, it will have limited economic impact.

**DOMESTIC VISITORS TO THE REGION**

The Manawatu Regional Tourism area attracts 693,434 domestic overnight visits of an average of two nights per visit\(^\text{17}\). Of those visits approximately 29% are for a holiday purpose (as opposed to visiting friends and relatives, business or education purposes) and these have potential to include leisure activities such as mountain biking. Using the national participation rates there are therefore potentially 12,468 mountain bikers who would cycle an off road bike trail such as this.

**INTERNATIONAL VISITORS**

Over the last 5 year period, just over one million international tourists participated in walking or hiking activities and 318,000 participated in cycling sports. Annually around 4% of international holiday visitors do some sort of cycling sports while visiting New Zealand\(^\text{18}\).

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\(^{15}\) DoC, Manawatu Gorge Gateway Additional Facilities Business Case 2013-14

\(^{16}\) Sport New Zealand, 2015. *Sport and Active Recreation in the Lives of New Zealand Adults. 2013/14 Active New Zealand Survey Results.*

\(^{17}\) Ministry of Business Innovation and Employment regional tourism estimates for 2011

\(^{18}\) New Zealand Tourism, Tourist Special Interest Profiles – Walking and Hiking, Cycling, June 2015
For international cycling tourists, on road cycling (56%) is slightly more popular than off-road mountain biking (48%). A small percent of cycling tourists do both on-road cycling and mountain biking (4%).

There are 110,463 international overnight visits to the Manawatu region with an average of eight nights per visit\(^{19}\). Of those visits approximately 16% are for a holiday purpose (as opposed to visiting friends and relatives, business or education purposes) and these have potential to include leisure activities such as mountain biking. Using the international participation rates there are potentially 339 mountain bikers who would cycle a trail such as this.

**COMPETITIVENESS OF MANAWATU GORGE AS A MOUNTAIN BIKING DESTINATION**

The number of potential mountain bikers that will actually be attracted to any new development at Manawatu is dependent on a range of factors.

The key factor is the competitive nature of the trail compared with other rides and the strength of pulling power to travel to undertake it. Given the existing awareness of many of the 23 cycleways already developed, and the relative distance, this one would need to be exceptional to compete.

There appears to be evidence of an interest from local mountain bikers to take up new opportunities in their region, and while there are a number of intermediate opportunities that are similar to the one proposed at Manawatu Gorge already available locally, these are a popular category of trail amongst mountain bikers.

Those interested in Grade 3 mountain biking can already visit a number of well-developed experiences either closer to home or in a recognised tourism destination such as Taupo or Rotorua.

We believe it will be difficult for the Gorge to attract significant numbers of mountain bikers. This is because of the difficult terrain, especially in locations where the Gorge scenery is viewable and because of the attractive and well serviced options available in other regions.

**USE SCENARIOS**

Our estimates of the potential numbers of local, domestic and international mountain bikers residing in or visiting the region determine the maximum numbers who could potentially use the trail.

Over time the total population and both domestic and international visitor numbers are likely to grow, and participation in mountain biking may also grow for both residents and international visitors, thus increasing the potential pool of trail users in the future.

Our analysis does not factor growth in regional visitation and a subsequent increase in potential trail users. Whether this growth translates into increased use of the trail will depend on its attractiveness.

We have estimated visitor participation in a conservative manner – we have not considered use of the trail by visitors other that holidaymakers; some of the other categories of visitors may participate in mountain biking on the trail.

In analysing the potential financial benefits arising from the trail development we have developed three use scenarios. The ‘high’ scenario is similar to the estimates by the Manawatu Mountain Bike Club but is below the estimates previously developed by DOC\(^{20}\).

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\(^{19}\) Ministry of Business Innovation and Employment regional tourism estimates for 2011

\(^{20}\) DoC, Manawatu Gorge Gateway Additional Facilities Business Case 2013-14
As previously noted there is some existing trail use by mountain bikers. This means that some of the existing 75,000 trail users are mountain bikers already visiting the area. The economic benefits of the new proposal needs to consider the fact these existing users are already contributing to the local economy either as locals or as visitors to the area.

Because we do not have accurate information about the numbers of existing cyclists or whether they are locals, national or international visitors we do not think the ‘high’ scenario will reflect the actual additional benefit from the new trail developments.

### High scenario

<table>
<thead>
<tr>
<th>Category</th>
<th>Assumption</th>
<th>Annual Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locals</td>
<td>100% participation (of potential cyclists)</td>
<td>8,196</td>
</tr>
<tr>
<td>Regional Visitors</td>
<td>100% participation (of potential cyclists)</td>
<td>12,468</td>
</tr>
<tr>
<td>International Visitors</td>
<td>100% participation (of potential cyclists)</td>
<td>339</td>
</tr>
<tr>
<td>Total annual trail riders</td>
<td></td>
<td>21,003</td>
</tr>
</tbody>
</table>

### Medium scenario

<table>
<thead>
<tr>
<th>Category</th>
<th>Assumption</th>
<th>Annual Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locals</td>
<td>60% participation (of potential cyclists)</td>
<td>4,918</td>
</tr>
<tr>
<td>Regional Visitors</td>
<td>60% participation (of potential cyclists)</td>
<td>7,480</td>
</tr>
<tr>
<td>International visitors</td>
<td>60% participation (of potential cyclists)</td>
<td>204</td>
</tr>
<tr>
<td>Total annual trail riders</td>
<td></td>
<td>12,602</td>
</tr>
</tbody>
</table>

### Low scenario

<table>
<thead>
<tr>
<th>Category</th>
<th>Assumption</th>
<th>Annual Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locals</td>
<td>30% participation (of potential cyclists)</td>
<td>2,459</td>
</tr>
<tr>
<td>Regional Visitors</td>
<td>30% participation (of potential cyclists)</td>
<td>3,740</td>
</tr>
<tr>
<td>International Visitors</td>
<td>30% participation (of potential cyclists)</td>
<td>102</td>
</tr>
<tr>
<td>Total annual trail riders</td>
<td></td>
<td>6,301</td>
</tr>
</tbody>
</table>

### Development and Operating Costs

The following economic analysis is based on the preferred option 4 - Te Apiti Wind Farm to Toitoi Lookout to Ashhurst with the estimated construction cost of $1,111,700 and estimated annual maintenance costs of $33,400.

Any economic benefit from completing part of this project, such as option 3 - Te Apiti Wind Farm to Toitoi Lookout only, will be smaller reflecting the lower construction phase economic impacts. Predicting the relative user numbers of this partial development is also difficult however it is likely to be attractive to fewer users and therefore probably more reflective of the low rather than medium scenario.
Economic Analysis-Manawatu Trails

CONSTRUCTION PHASE ECONOMIC IMPACTS

The total construction cost of the Manawatu Trail was estimated at $1.112 million. The project would have an impact on regional income and jobs during the construction period.

- Regional income in Manawatu would increase by a total of $0.600 million during the construction phase.
- The project would generate a total of 3.5 direct FTE jobs and 0.7 indirect FTE jobs (total 4.2 FTE jobs) during the construction phase.

<table>
<thead>
<tr>
<th>Construction Phase Jobs</th>
<th>Direct Jobs</th>
<th>Indirect Jobs</th>
<th>Total Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Jobs (Region)</td>
<td>2.8</td>
<td>0.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Materials Jobs (NZ-wide)</td>
<td>0.7</td>
<td>0.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Total Jobs - Construction Phase</td>
<td>3.5</td>
<td>0.7</td>
<td>4.2</td>
</tr>
</tbody>
</table>

TRAIL OPERATIONS- ECONOMIC IMPACTS

The following section outlines the economic impact of the operations of the trails. The modelling covers three cases – Low, Medium and High.
**TRAIL USERS**

The following table shows the estimated annual trail users under each case. Trail users were segmented into several categories: Locals, Regional Visitors and International Visitors.

Manawatu Trails Users (Annual no.)

<table>
<thead>
<tr>
<th>User Category</th>
<th>C1 Low</th>
<th>C2 Medium</th>
<th>C3 High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locals</td>
<td>2459</td>
<td>4918</td>
<td>8196</td>
</tr>
<tr>
<td>Visitors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Visitors</td>
<td>3740</td>
<td>7480</td>
<td>12,468</td>
</tr>
<tr>
<td>International Visitors</td>
<td>102</td>
<td>204</td>
<td>339</td>
</tr>
<tr>
<td>Total Visitors</td>
<td>3842</td>
<td>7684</td>
<td>12,807</td>
</tr>
<tr>
<td>Total Trail Users</td>
<td>6301</td>
<td>12,602</td>
<td>21,003</td>
</tr>
</tbody>
</table>

**TRAIL USER SPENDING**

Spending by trail users in the region were based on a number of assumptions:

- All local users were assumed to be day visitors
- Regional visitors were assumed to have an average length of stay of 1 overnight
- International Visitors were assumed to have an average length of 2 overnight
- Average spending per day was assumed to be: Locals $20 per day (coffee, meal etc.); Regional Visitors - $275 per day (covering accommodation, food service, recreational services, transport and other retail); International Visitors - $275 per day (covering accommodation, food service, recreational services, transport and other retail).\(^{21}\)

\(^{21}\) The $275 per day is based on the findings of a 2015 survey of 2560 existing Bike Taupo members residing outside the Taupo District.
Spending Assumptions - Trails Users

<table>
<thead>
<tr>
<th>Trail Users by Category</th>
<th>Ave Length of Stay in Region &lt;Days&gt;</th>
<th>Average Spend per Day $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locals</td>
<td>Day Visitor</td>
<td>$20</td>
</tr>
<tr>
<td>Regional Visitors</td>
<td>1</td>
<td>$275</td>
</tr>
<tr>
<td>International Visitors</td>
<td>2</td>
<td>$275</td>
</tr>
</tbody>
</table>

The modelling of expenditure shows that total annual spending in the region by trail users would range from $1.1 million (C1 Low Scenario) to $3.8 million (C3 High Scenario) and $2.3 million for C2 Medium Scenario.

Trails User Spending (Annual $ million)

<table>
<thead>
<tr>
<th>Spending ($ million)</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail Users by Category</td>
<td>C1 Low</td>
</tr>
<tr>
<td>Locals</td>
<td>0.049</td>
</tr>
<tr>
<td>Visitors</td>
<td></td>
</tr>
<tr>
<td>Regional Visitors</td>
<td>1.029</td>
</tr>
<tr>
<td>International Visitors</td>
<td>0.056</td>
</tr>
<tr>
<td>Total Visitors</td>
<td>1.085</td>
</tr>
<tr>
<td>Total Users</td>
<td></td>
</tr>
<tr>
<td>Total Trail User Spending</td>
<td>1.134</td>
</tr>
</tbody>
</table>

Manawatu Trail Users - Annual Spending ($ million)

- 0.049 to 0.098 for C1 Low, 0.098 to 0.112 for C2 Medium, 0.112 to 0.186 for C3 High scenarios.
Economic Impacts

**TRAIL USER IMPACTS**

The spending by trail users would generate an increase in regional income and jobs in the Manawatu Region.

- The total jobs generated range from 5.1 FTE (C1 Low Scenario) to 17.1 FTE (C3 High Scenario), with 10.2 FTE jobs for the C2 Medium Scenario.
- These jobs would mainly be concentrated in visitor services in the accommodation, food service and recreational services sectors.
- Annual regional income would be $0.32 million higher under the C1 Low Scenario and $1.05 million higher under the C3 High Scenario.

**Employment Impacts**

![Manawatu Trails Users - Regional Job Impacts - Comparison of Cases (no)](image-url)
Total Jobs Generated by Manawatu Trail - Industry Sector (no.)

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>C1 Low</th>
<th>C2 Medium</th>
<th>C3 High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total All Jobs (Direct &amp; Indirect)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accommodation</td>
<td>1.4</td>
<td>2.9</td>
<td>4.8</td>
</tr>
<tr>
<td>Food Service</td>
<td>1.9</td>
<td>3.8</td>
<td>6.4</td>
</tr>
<tr>
<td>Clothing &amp; Footwear</td>
<td>0.2</td>
<td>0.4</td>
<td>0.7</td>
</tr>
<tr>
<td>Housing</td>
<td>0.0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Household Furnishings</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Health</td>
<td>0.1</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Transportation</td>
<td>0.1</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Communication</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Recreation Services</td>
<td>1.1</td>
<td>2.3</td>
<td>3.8</td>
</tr>
<tr>
<td>Education</td>
<td>0.0</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>5.1</td>
<td>10.2</td>
<td>17.1</td>
</tr>
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</table>

Regional Income Impacts

<table>
<thead>
<tr>
<th>C1 Low</th>
<th>C2 Medium</th>
<th>C3 High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Income</td>
<td>0.28</td>
<td>0.55</td>
</tr>
<tr>
<td>Total Indirect Income</td>
<td>0.04</td>
<td>0.08</td>
</tr>
<tr>
<td>Total Income</td>
<td>1.05</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 1 Trail Descriptions and Cost Estimates

### 1. Southern Gorge Trail Ashhurst Car Park to Bridge Café

<table>
<thead>
<tr>
<th>Trail Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begins and ends</td>
<td>Ashhurst car park at western end of Manawatu Gorge and ends at the bridge Café, mostly single direction.</td>
</tr>
<tr>
<td>Landscape Features</td>
<td>To be successful the trail will need to pick up the features of the Te Apiti including views of the Gorge, significant vegetation and Iwi cultural features including Whatonga sculpture.</td>
</tr>
<tr>
<td>Routes and linkages</td>
<td>The majority of the trail is to be purpose built for mountain bike and allowing for walkers, it would need to link into sections of the existing walking trail as shared use to experience the views and features important to the Manawatu Gorge experience. Trail would commence at Ashhurst Car Park with future options for a trail hub with links to Palmerston River Path subject to resolution of public risk issues associated with walking and cycling access on Manawatu Bridge (Ashhurst). Trail needs to commence on private property adjacent to Ashhurst Car Park to ensure an appropriate trail gradient is maintained. The west to east route is recommended due to a more appropriate starting gradient at the western end.</td>
</tr>
<tr>
<td>Difficulty rating</td>
<td>High quality Grade 2 is sought for the Manawatu Gorge cycling experience with the trail to encourage beginner riders and families however due to the steep nature particularly at the beginning and end long segments of the trail will be greater than 10% and riders will be exposed to trail edges and trees particularly on several switchback sections. Trail will be predominately Grade 3.</td>
</tr>
<tr>
<td>Diversity of trail types</td>
<td>The Southern Gorge Trail Ashhurst Car Park to Bridge Café would be one of a range of cycling opportunities within the Palmerston North Woodville area including the Arapuke Mountain Bike Park and off-road cycling experiences situated adjacent to the Manawatu River Pathway. Off main road cycling routes are also available to access this option particularly via Hallblock Road and the Te Ara O Mahurangi Mountain Bike Trail and the New Zealand Cycle Trail, Palmerston North — Alfredton Route 52 (1 day, 67km).</td>
</tr>
<tr>
<td>Reference on map</td>
<td>The proposed Southern Manawatu Mountain Bike Trail was developed by the Manawatu Mountain Bike Club and the proposed alignment has been provided on Map 1.</td>
</tr>
<tr>
<td>Approximate length</td>
<td>The proposed trail is approximately 15 kilometres long and comprises 1.8 km from the Ashhurst Car Park to the start of the trail on sealed roads, 12 kilometres of new trail, 1.2 kilometres of public gravel road on Hallblock Road and the 1.8 km Te Ara O Mahurangi Mountain Bike Trail (includes an option of continuing on Hallblock Road and not the Te Ara O Mahurangi Mountain Bike Trail).</td>
</tr>
<tr>
<td>Proposed surface</td>
<td>The soil types within the Manawatu Gorge are liable to erosion and can be slippery when wet. With all trails a strong focus on water management is required and the trail will be constructed following DOC Track Construction and Maintenance Guidelines(^\text{22}) and International Mountain Bike Association principles(^\text{23}) The nature of the soils require the application of surface materials once the trail is formed utilising locally sourced compacted and stabilised weed and pest free lime gravel. Rock will be used for armouring boggy sections and fording minor water courses.</td>
</tr>
</tbody>
</table>

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\(^{22}\) Track Construction and Maintenance Guidelines DOC 2008

\(^{23}\) Trail Solutions International Mountain Bike Association 2004
### 1. Southern Gorge Trail Ashhurst Car Park to Bridge Café

<table>
<thead>
<tr>
<th>Trail Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude</td>
<td>The proposed trail rises from 60 metres to its highest point at 380 metres</td>
</tr>
<tr>
<td>Width</td>
<td>The trail should be constructed at an average 1.2 metre width</td>
</tr>
<tr>
<td>Trail head links to towns</td>
<td>The proposed trail is close to Ashhurst and the popular Ashhurst Domain Recreation Area on its western end and on its eastern end is 3.5 kilometres from the town of Woodville.</td>
</tr>
</tbody>
</table>

The Woodville side of the Gorge has facilities for cyclists and walkers including the Bridge Café at the trail start or finish and the Ferry Reserve provides an open camping area adjacent to the river. Woodville District Vision is working on building a pedestrian bridge for a walkway/cycleway from Woodville out to the Gorge.

With the current situation the start of the trail (the western end would be the preferred start due to the gradients being less steep) would necessitate the riding on the road edge or by arrangement on private property and crossing one or two roads depending on the trail alignment.

The private property access is required to ensure the trail gradients are appropriate for the grade of trail proposed, there is support from the landholder for the start of the trail on the private property and access would be subject to formalised access arrangements.

A major consideration in the identification of a suitable southern trail alignment and positioning is ensuring safe and accessible walking and cycling access from Palmerston North 13.5 km to the south. The Manawatu River Bridge (Ashhurst) that links Ashhurst to Manawatu Gorge is unsuited to walking and cycling. The bridge is 340 metres long and carries the State Highway 3 (GORGE) over the Manawatu River via through two lanes of traffic at a posted speed limit of 100 kph. The existing bridge does not meet current standards for a bridge with pedestrian and cycle use. The bridge is recognised as the missing link between activities on both sides of the river.

Based on the existing infrastructure arrangements cyclists would start or finish a Southern Manawatu Gorge Cycling Trail at the Ashhurst Car Park at the western end of the Gorge or on private property adjacent to the Ashhurst Car Park having arrived at the car park by vehicle or risking the hazardous ride across the Ashhurst Bridge.

The existing bridge arrangement separates the Gorge from the Manawatu River Pathway which runs continuously along the western side of the Manawatu River and connects a number of cycling experiences including those within the town limits.

A range of options to resolve the access and health and safety issues associated with pedestrian and cycling on the Ashhurst Bridge have been proposed and discussed in the Manawatu River Bridge (Ashhurst) Walk/Cycleway Indicative Business Case (Opus 2015). The Business Case recommended two options to be taken forward to a further detailed business case being:

- Supporting a separate walk/cycleway off the existing bridge piers
- An independent footbridge located within 50 metres of the existing bridge

Both options provide safe and effective access across the river for cyclists and walkers and would significantly enhance the viability of trail based experiences within Manawatu Gorge. The Business Case indicated costs for the bridge options to be:

- Off existing bridge piers $5,470,000 to $6,330,000 depending on length to a total cost over a 40 year period of $6,560,000 to $7,430,000

---

24 Opus Manawatu River Bridge (Ashhurst) Walk/Cycleway Indicative Business Case 2015
1. **Southern Gorge Trail Ashhurst Car Park to Bridge Café**

<table>
<thead>
<tr>
<th>Trail Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Independent footbridge $4310,000 to $6,330,000 depending on length to a total cost over a 40 year period of $5,170,000 to $7,430,000</td>
</tr>
</tbody>
</table>

Improving cycling and walking access to the western end of the Gorge opens up new commercial opportunities on private, public and Iwi land adjacent to the existing car park and the Manawatu River.

The walking and cycling opportunities are further constrained by the need to get recreational users across the SH3 to access the Te Apiti – Manawatu Gorge Walk or any future mountain bike opportunities on the southern side of the Gorge.

In 2014 DOC sought advice on costs to improve the current situation where walkers walk alongside the 100kph SH3 via a narrow path inside a highway guard rail until they pass under the road at Dam Bridge and enter the reserve some 200 metres from the car park.

Options considered included:

- Upgrading the existing fence and path behind the highway guardrail estimated cost $380,000 plus geotechnical and design and assessment costs $30,000
- Install a new pedestrian underpass beneath the highway and providing a new connection to walking trails in the reserve estimated cost $400,000 plus geotechnical and design and assessment costs $50,000
- Constructing a pedestrian overbridge across the highway providing at least six metre clearance to the highway and span of about 25 metres at an estimated cost of $750,000 plus geotechnical and design and assessment costs $80,000

There are advantages and disadvantages with all these options, the fencing option does not remove the fundamental issue of walking along the busy and dangerous road edge whilst the underpass option would require some good design elements to remove the dark and subterranean and often unsafe perceptions associated with underpasses. The overpass provides an opposite to the underpass option where there may be some issues of discomfort for users due to the height above the road.

The overpass option, with suitable design has the potential to be developed as less of a bridge and more of an entrance statement to the Gorge picking up on the importance the Gorge has to Iwi Culture. The overpass option also provides opportunity for improved access to the reserve and potential cycling trails into the reserve by reducing the initial gradient into the reserve or by agreement, private land.

### Trail Support

The Manawatu Mountain Bike Club has expressed support for this trail which includes commitment to monitoring and maintenance.

### Provision of transport

During summer months a shuttle bus operates through the Gorge enabling cyclists and walkers to travel one way and be collected. The success of this option and other trail experiences within the Gorge are reliant on transport services such as this.

### Accessibility

There are issues with accessibility due to risks for cyclists and walkers on the Ashhurst Road Bridge and the need to cross the Gorge to access the start of the trail as discussed above. The start of the trail is accessible due to the current support of the landowner. From time to time the Gorge is closed due to land slips and rock falls and the Gorge was closed between October 2011 and September 2012.

### Events

There is strong interest in events being undertaken within the Gorge evidenced by popular recent events.

### Sustainable management of trails and infrastructure

The Manawatu Mountain Bike Club has expressed support for future maintenance of this trail.
1. **Southern Gorge Trail Ashhurst Car Park to Bridge Café**

<table>
<thead>
<tr>
<th>Trail Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visitor experiences</strong></td>
<td>The trail experience will be part of a range of visitor experiences including Gorge walks and links to existing cycling pathways and adjacent towns. A future trail hub at Ashhurst Car Park provides opportunity for tourism development within the area and is reliant on resolution of the safe access issues associated with SH3 and the Ashhurst Bridge.</td>
</tr>
<tr>
<td><strong>Attractive landscape</strong></td>
<td>The Manawatu Gorge is an area of natural beauty and native bushland situated within a surrounding landscape dominated by agricultural production.</td>
</tr>
<tr>
<td><strong>Range of bike friendly accommodation options</strong></td>
<td>Accommodation is available at nearby Palmerston North (13.5km) and Woodville (3.5). Camping is available at the Ashhurst Domain (western end) and at the Ferry Reserve at the eastern end. Small cabins are available for hire on private property adjacent to the proposed southern option, it is anticipated as current demand is strong further similar cabins will be built.</td>
</tr>
<tr>
<td><strong>Cafes food beverages shops “coffee to beer”</strong></td>
<td>The bridge café situated at the end of the Te Ara O Mahurangi Mountain Bike Trail provides a range of food and drink. A café is located in the Ashhurst Domain at the western end but access is constrained for cyclist and walkers due to safety issues on the Ashhurst Bridge. There is strong interest in the development of business opportunities in the area adjacent to the Ashhurst car park linked to hospitality and tourism and proposed development of an Iwi Mahinga garden on the island cultural site in the Manawatu River for community use or sale.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction Cost Estimates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail Head Private Property 2.52km CDR2</td>
<td>$123,000</td>
</tr>
<tr>
<td>Private property to dozer line 5.2km CDR 4</td>
<td>$399,000</td>
</tr>
<tr>
<td>Dozer line to Toilet site 1.2km CDR 2</td>
<td>$132,000</td>
</tr>
<tr>
<td>Dozer line to Hallblock Road 6.5km CDR 5</td>
<td>$858,000</td>
</tr>
<tr>
<td>Hall Block Road to Bridge Café 1.7 km minor adjustments Minimal infrastructure costs required upgrading of existing trail required</td>
<td>$45,000</td>
</tr>
<tr>
<td>Additional cost trails head signs, way markers, and trails head infrastructure costs</td>
<td>$250,000</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td>$1,807,000</td>
</tr>
<tr>
<td><strong>Contingency 15%</strong></td>
<td>$271,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$2,079,000</td>
</tr>
<tr>
<td><strong>Annual maintenance</strong></td>
<td>$62,400</td>
</tr>
</tbody>
</table>
2. **WOODVILLE CEMETERY TO ASHURST DOMAIN**

<table>
<thead>
<tr>
<th>Trail Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Begins and ends</strong></td>
<td>Trail begins at Woodville Cemetery and ends at the Ashhurst Domain</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>Proposed trail has been planned in two segments A &amp; B. Segment A has two options, Option 1 (Gorge Route) being close to the Gorge in steep terrain and requiring two suspension bridges or other structural features to provide access across the steep valleys. This section is mostly on Kiwi Rail land requiring geotechnical survey and the approval of the land owners who have concerns due to the risk from land slip and other factors that may affect the safety an operation of the rail service. A second option (Inland Route) traverses a mix of cleared agricultural land, pine forest, native bush across steep country up to one kilometre from the Manawatu River. The inland option travels adjacent to Te Apiti Wind Farm for approximately 2 kilometres and would link to the proposed Toitoi Lookout and has views to the south including the Gorge and open land to the east. Segment B starts at potentially the best lookout on the Gorge being the Toitoi Point which has 360° views up and down the Gorge. The traverse of segment B is less steep than segment A and with modification can include a one more Gorge lookout.</td>
</tr>
<tr>
<td><strong>Routes and linkages</strong></td>
<td>The proposed trail links Woodville (3.5km by road) to Ashhurst Domain and links to the Manawatu River Pathway at Ashhurst Domain. The trail links to the proposed option for shared use access through Te Apiti Wind Farm which provides easier access to the trail for beginner riders and families as well as more experienced riders who take advantage of car access to the high country.</td>
</tr>
<tr>
<td><strong>Difficulty rating</strong></td>
<td>Easy Grade 2 to intermediate grade 3 is sought for the Manawatu Gorge cycling experience with the trail to encourage beginner riders and families however due to the steep nature particularly at the beginning and end segments there will be a number of trail sections greater than 10% and riders will be exposed to trail edges and trees particularly on steep declines encountered through switchbacks. The potential for access through the Te Apiti Wind Farm provides significant opportunity to develop a trail route that is closer to the Easy Grade 2 particularly if riders take the western trail option where the gradient is less steep.</td>
</tr>
<tr>
<td><strong>Diversity of trail types</strong></td>
<td>The Woodville to Ashhurst Manawatu Mountain Bike would be one of a range of cycling opportunities within the Palmerston North area including the Arapuke Mountain Bike Park and off-road cycling experiences situated adjacent to the Manawatu River Pathway. Off main road cycling routes are also available particularly via Hallblock Road and the Te Ara O Mahurangi Mountain Bike Trail. The New Zealand Cycle Trail, Palmerston North — Alfredton Route 52 (1 day, 67km).</td>
</tr>
<tr>
<td><strong>Reference on map</strong></td>
<td>The proposed Woodville to Ashhurst Manawatu Mountain Bike Trail was developed by DOC, the Manawatu Mountain Bike Club and the Frame Group in 2011 and is provided on Map2.</td>
</tr>
<tr>
<td><strong>Approximate length</strong></td>
<td>Segment A, Inland Option (preferred option) from Woodville Cemetery to Toitoi Lookout is 7.3 kilometres 2.7 kilometres longer than Gorge Option.</td>
</tr>
</tbody>
</table>

---

### 2. WOODVILLE CEMETERY TO ASHURST DOMAIN

<table>
<thead>
<tr>
<th>Trail Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proposed surface</strong></td>
<td>The soil types within the Manawatu Gorge are liable to erosion and can be slippery when wet. With all trail a strong focus on water management is required and the trail will be constructed following DOC Track Construction and Maintenance Guidelines and International Mountain Bike Association principles. The nature of the soils require the application of surface materials once the trail is formed utilising locally sourced compacted and stabilised weed and pest free lime gravel. Rock will be used for armouring boggy sections and fording minor water courses.</td>
</tr>
<tr>
<td><strong>Altitude</strong></td>
<td>The proposed trail rises from 60 metres to its highest point at 300 metres</td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>The trail should be constructed at an average 1.2 metre width</td>
</tr>
<tr>
<td><strong>Trail head links to towns</strong></td>
<td>The proposed trail links to Ashhurst and the popular Ashhurst Domain Recreation Area on the western end and the eastern end is approximately 3.5 kilometres for the town of Woodville. The western end has the opportunity to link with Palmerston North 13.5 kilometres to the south. The 2011 proposal explores opportunity to develop a crossing of the Pohangina River via the Kiwi Rail bridge approximately 1 kilometre from the Ashhurst Domain. This option relies on approval by Kiwi Rail who do not allow clip on structures to trail bridges. With no access across the railway bridge the trail will need to utilise the Saddle Road Bridge 1.8 kilometres north of the railway bridge. The Saddle Road Bridge is a more recent bridge and includes some separation between cyclists, walkers and traffic and as it is not a major transport route the traffic is significantly less than on the Ashhurst Bridge.</td>
</tr>
<tr>
<td><strong>Elevation profile</strong></td>
<td>TBA</td>
</tr>
<tr>
<td><strong>Trail Support</strong></td>
<td>The Manawatu Mountain Bike Club has expressed support for this trail which includes commitment to monitoring and maintenance.</td>
</tr>
<tr>
<td><strong>Provision of transport</strong></td>
<td>During summer months a shuttle bus operates through the Gorge enabling cyclists to ride one way this may be encouraged to provide drop off services to the wind farm car park.</td>
</tr>
<tr>
<td><strong>Accessibility</strong></td>
<td>Currently the wind farm is open from 08:30 am to 5:30 pm and an automatic gate closes access after hours for security. As an operating wind farm the managers will reserves the right to close the trail from time to time during maintenance for safety reasons.</td>
</tr>
<tr>
<td><strong>Events</strong></td>
<td>There is strong interest in events being undertaken within the Gorge evidenced by popular recent events.</td>
</tr>
<tr>
<td><strong>Sustainable management of trails and infrastructure</strong></td>
<td>The Manawatu Mountain Bike Club has expressed support for future maintenance of this trail.</td>
</tr>
</tbody>
</table>

26 Track Construction and Maintenance Guidelines DOC 2008
27 Trail Solutions International Mountain Bike Association 2004
2. **WOODVILLE CEMETERY TO ASHHURST DOMAIN**

<table>
<thead>
<tr>
<th>Trail Section</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Attractive landscape</td>
<td>The landscape provides exposed views of the Gorge to the east and the wind farm experience adds to the diversity of experiences. The purpose built trail to the Toitoi Lookout has the opportunity to provide additional views to the east and for the length of the Gorge at the lookout.</td>
</tr>
<tr>
<td>Visitor experiences</td>
<td>The trail experience will be part of a range of visitor experiences including Gorge walks and links to existing cycling pathways and adjacent towns. A future trail hub at Ashhurst Car Park provides opportunity for tourism development within the area and is reliant on resolution of the safe access issues associated with SH3 and the Ashhurst Bridge.</td>
</tr>
<tr>
<td>Range of bike friendly accommodation options</td>
<td>Accommodation is available at nearby Palmerston North (13.5km) and Woodville (3.5). Camping is available at the Ashhurst Domain (western end) and at the Ferry Reserve at the eastern end. Small cabins are available for hire on private property adjacent to the proposed southern option, it is anticipated as current demand is strong further similar cabins will be built.</td>
</tr>
</tbody>
</table>

### Estimated Construction Cost

| Woodville Cemetery to 1.6 km mark | $132,700 |
| Woodville Cemetery to Toitoi Lookout (Gorge Route) 7270 m | $1,197,000 |
| Toitoi Lookout to Ashhurst Domain via Kiwi Rail Bridge | $1,667,000 |
| **Total** | **$2,864,000** |
| Contingency 15% | **$429,600** |
| **Total exclusive of GST** | **$3,293,600** |

| Annual Maintenance includes trail and infrastructure | $78,000 |

### Alternate Route Inland Option

| Woodville Cemetery to 1.6 km mark | $132,700 |
| Inland option to Te Apiti Wind Farm | $880,200 |
| Woodville Cemetery to Te Apiti Wind Farm Inland option Total 8885m | $1,012,900 |
| Toitoi Lookout to Ashhurst Domain via Saddle Road Bridge (excludes Kiwi Rail Bridge infrastructure and adds 3.8 km and two bridges over creeks and boardwalk beneath Kiwi Rail Bridge) | $786,000 |
| **Total Woodville Cemetery to Ashhurst Domain (inland route)** | **$1931600** |
| 15% contingency | **$289740** |
| **Total exclusive of GST** | **$2,221,340** |
| Annual Maintenance | **$67,000** |

3. **TE APITI WIND FARM TO TOITOI LOOKOUT**

<table>
<thead>
<tr>
<th>Trail Section</th>
<th>Description</th>
</tr>
</thead>
</table>

Manawatu Gorge Mountain Bike Trails | **BUSINESS CASE** | 29 July 2016
<table>
<thead>
<tr>
<th><strong>Begins and ends</strong></th>
<th>Trail begins at Te Apiti Wind Farm visitor car park and ends at Toi Toi Lookout with potential to end at Ashhurst or Woodville</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td>Trail travels alongside existing tracks on the south eastern boundary of the wind farm and provides spectacular views of the wind turbines and of the eastern side of Manawatu Gorge and provides easy access to the highest point on the north side of the Gorge.</td>
</tr>
<tr>
<td><strong>Routes and linkages</strong></td>
<td>The Te Apiti Wind Farm Trail starts on the Saddle Road between Woodville and Ashhurst at the approximate centre of the Gorge. The trail provides access to the top of the Gorge enabling generally downhill cycling opportunity to Ashhurst or Woodville. At the boundary between Te Apiti Wind Farm and the private farm land the trail leaves the property and traverse DOC land to the east of the cleared land on a purpose built trail to Toitoi Lookout. The trail follows the 300m contour and the fence line for 2 km until the trail enters the thick vegetation of the reserve for a further 1.5 km to the Toitoi lookout on easy gradients of less than 10%.</td>
</tr>
<tr>
<td><strong>Difficulty rating</strong></td>
<td>Easy Grade 2 is provided on the Te Apiti Wind Farm Trail which will encourage beginner riders and families with trail segments generally below 10% apart from the start of the trail adjacent to the car park where there is a 400 metre section which is steep with average gradient of 18% with short steep sections up to 40%. This steep section is on a well-maintained farm track and with care should not be an issue for most riders but will require walking by many.</td>
</tr>
<tr>
<td><strong>Diversity of trail types</strong></td>
<td>The Te Apiti Wind Farm Trail is to be constructed at 1.5m alongside the management tracks until it leaves the wind farm and travels through bushland to the Toitoi Lookout on a minimum 1.2 m purpose built mountain bike trail.</td>
</tr>
<tr>
<td><strong>Reference on map</strong></td>
<td>The Te Apiti Wind Farm Trail is presented on Map?</td>
</tr>
<tr>
<td><strong>Approximate length</strong></td>
<td>The proposed trail comprises 2 km adjacent to management tracks and 1.5 km of purpose built shared use trail to Toitoi Lookout. A loop trail can be constructed from the lookout back to the wind farm making a total trail distance of 4km.</td>
</tr>
<tr>
<td><strong>Proposed surface</strong></td>
<td>The 2 km of Te Apiti Wind Farm Trail will be built adjacent to the wind farm management track on a separate track for the walkers and cyclists adjacent to the road. This would involve removal of topsoil at about 1.5 m wide and placing and compacting lime on the trail. This would provide better views for the users while making it safer in terms of potential for motor vehicles and cyclists/walkers being on the wind farm roads at the same time. The 1.5 km section through bush land will be consistent with the other mountain bike trails in the Gorge area and will be natural surface capped with compacted locally sourced lime material.</td>
</tr>
<tr>
<td><strong>Altitude</strong></td>
<td>The proposed trail falls from 340m at the Te Apiti Wind Farm car park to 300m at the Toi Toi Lookout.</td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>The trail should be constructed at an average 1.5 metre width adjacent to the Te Apiti Wind Farm management tracks and will be a maximum of 1.5m in the bushland reduced to 1.2 in sections.</td>
</tr>
<tr>
<td><strong>Trail head links to towns</strong></td>
<td>The proposed trail will have its own trail head at the car park but will be developed with trail head links to Ashhurst Domain and future opportunities at Woodville Cemetery and future options at the town of Woodville.</td>
</tr>
<tr>
<td><strong>Infrastructure required allowance</strong></td>
<td>The Te Apiti Wind Farm Trail will require trail construction; trails head signage, way marking and stock stops or pedestrian gates where farm gates cross the trail. The purpose built mountain bike trail to Toitoi Lookout will require minimal infrastructure due to the nature of the landscape however lookout infrastructure will be required at the lookout area including timber fencing, limestone gravel and options for a raised platform to optimise the view without the need for vegetation removal. The lookout will be consistent with the lookouts on the southern side of the Gorge. Consultation with Iwi will take place regarding the access and approach to the project and also as to what would be appropriate to present the importance of Iwi Culture of this site to visitors.</td>
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<tr>
<td><strong>Trail Support</strong></td>
<td>The Manawatu Mountain Bike Club has expressed support for this trail which includes commitment s to monitoring and maintenance.</td>
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<tr>
<td><strong>Provision of transport</strong></td>
<td>During summer months a shuttle bus operates through the Gorge enabling cyclists to ride one way this may be encouraged to provide drop off services to the wind farm car park.</td>
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<tr>
<td><strong>Accessibility</strong></td>
<td>Currently the wind farm is open from 08:30 am to 5:30pm and an automatic gate closes access afterhours for security. As an operating wind farm the managers will reserves the right to close the trail from time to time during maintenance for safety reasons.</td>
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<tr>
<td><strong>Events</strong></td>
<td>There is strong interest in events being undertaken within the Gorge evidenced by popular recent events.</td>
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<tr>
<td><strong>Visitor experiences</strong></td>
<td>The trail experience will be part of a range of visitor experiences including Gorge walks and links to existing cycling pathways and adjacent towns. A future trail hub at Ashhurst Car Park provides opportunity for tourism development within the area and is reliant on resolution of the safe access issues associated with SH3 and the Ashhurst Bridge. The trail through the wind farm provides great views of the Gorge and the wind farm and the Toitoi Lookout will provide a unique Gorge experience.</td>
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<tr>
<td><strong>Attractive landscape</strong></td>
<td>The landscape provides exposed views of the Gorge to the east and the wind farm experience adds to the diversity of experiences. The purpose built trail to the Toitoi Lookout has the opportunity to provide additional views to the east and for the length of the Gorge.</td>
</tr>
<tr>
<td><strong>Range of bike friendly accommodation options</strong></td>
<td>Accommodation is available at nearby Palmerston North (13.5km) and Woodville (3.5). Camping is available at the Ashhurst Domain (western end) and at the Ferry Reserve at the eastern end. Small cabins are available for hire on private property adjacent to the proposed southern option, it is anticipated as demand is strong further similar cabins will be built.</td>
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<tr>
<td><strong>Cafes food beverages shops coffee to beer</strong></td>
<td>The bridge café situated at the end of the Te Ara O Mahurangi Mountain Bike Trail provides a range of food and drink. A café is located in the Ashhurst Domain at the western end but access is constrained for cyclist and walkers due to safety issues on the Ashhurst Bridge. There is strong interest in the development of business opportunities in the area adjacent to the Ashhurst car park and Woodville provides a range of shops and hospitality.</td>
</tr>
<tr>
<td><strong>Range of bike friendly accommodation options</strong></td>
<td>Accommodation is available at nearby Palmerston North (13.5km) and Woodville (3.5). Camping is available at the Ashhurst Domain (western end) and at the Ferry Reserve at the eastern end. Small cabins are available for hire on private property adjacent to the proposed southern option, it is anticipated as current demand is strong further similar cabins will be built.</td>
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<td>Cost estimates By sections</td>
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<td>The 2 km of Te Apiti Wind Farm Trail will be built adjacent to the wind farm management track on a separate track for the walkers and cyclists adjacent to the road. Track construction $40,000 compacted lime $46,000</td>
<td>$86,000</td>
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<td>5 stock stop or pedestrian gates at start, on internal gates and where trail leaves the management track 5@$1,500</td>
<td>$7,500</td>
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<tr>
<td>Trail head sign and way marking signs to ensure users do not stray from agreed track</td>
<td>$3,000</td>
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<tr>
<td><strong>Te Apiti Wind Farm Boundary to Toitoi Lookout</strong></td>
<td>$79,000</td>
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<tr>
<td>Shared use trail to Toitoi Lookout at minimum 1.2 m wider in sections to reflect Grade 2 to encourage beginners and families and to encourage shared use. Construction Difficulty Rating 3 ($30 LM) x 1.5 m and surfacing with limestone gravel at $23 LM</td>
<td>$10,000</td>
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<tr>
<td>Timber safety fencing, compacted limestone gravel, raised platform and cultural presentation</td>
<td></td>
</tr>
<tr>
<td><strong>Total Te Apiti Wind Farm Trail and Toitoi Lookout</strong></td>
<td>$185,500</td>
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<tr>
<td>15% contingency</td>
<td>$27,900</td>
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<tr>
<td><strong>Total</strong></td>
<td>$213,400</td>
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<tr>
<td><strong>Annual Maintenance</strong></td>
<td>$6,400</td>
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</tbody>
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