



**Horizons Regional Council /
Greater Wellington Regional
Council**

Palmerston North-Wellington Rail
Passenger

Business Case

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Horizons Regional Council / Greater Wellington Regional Council

Palmerston North-Wellington Rail Passenger

Business Case

Quality Assurance Statement

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Table of Contents

1.	Introduction	4
2.	Strategic Case.....	6
2.1	Strategic Assessment	6
2.2	Strategic Context	8
2.3	Conclusion	13
3.	Indicative Case	14
3.1	Option Description.....	14
3.2	Option Assessment	21
3.3	Conclusion	27
4.	Detailed Case	29
4.1	Description.....	29
4.2	Costs	30
4.3	Benefits	31
4.4	Economic Analysis	32
4.5	Assessment Profile.....	34
4.6	Risks	35
4.7	Financial.....	36
4.8	Commercial.....	38
4.9	Management	39
4.10	Conclusion	39

Appendix A

Cashflow Components

Executive Summary

This business case has been prepared for Horizons Regional Council and Greater Wellington Regional Council by TDG, and peer reviewed by John Bolland. It assesses the case for continued public investment in a Palmerston North-Wellington rail passenger service.

The corridor is currently served by the Capital Connection, a weekday return commuter service operated by KiwiRail. This was commercially operated prior to July 2015, but declining financial performance and increased maintenance expenditure have required joint funding support from the regional councils since that time. The current temporary funding arrangement is due to expire in June 2018, and an investment decision is required on whether to support continued operation in the short term, normalise the funding arrangement, and enable implementation of a sustainable solution for the longer term.

The existing service is a well-patronised, being used by an average of 250 peak period passengers each way per day, and integral part of the transport system on the corridor, having run since 1991. It has been found to respond well to clear and ongoing problems resulting from a large and growing population and limited roading links on the corridor, and provides accessibility, productivity, transport system capacity, and transport system resilience benefits that align with regional and national priorities. These provide strategic justification for current and future investment in a rail passenger option. Continued investment is supported by stakeholders, who have been involved in developing the options.

Six options have been identified as potential responses. These are the:

- do-minimum, which relates to the withdrawal of the train when the full level of existing funding support commitment ceases in June 2018;
- through train option, which relates to the continued operation of a conventional locomotive-hauled through train service between Palmerston North and Wellington, providing a single trip in each peak;
- through Diesel Electric Multiple Unit (DEMU) (single trip) option, which relates to the replacement of the existing train with a DEMU train set that would operate between Palmerston North and Wellington, providing a single trip in each peak;
- through DEMU (double trip) option, which relates to the replacement of the existing train with DEMU train sets that would operate two trips in each peak, one between Palmerston North and Wellington, and the other between Levin and Wellington where demand is greatest;
- connecting DEMU option, which relates to the replacement of the existing train with a feeder DEMU service that would provide one peak direction trip between Palmerston North and Waikanae and a return trip between Levin and Waikanae in each peak; and
- connecting coach option, which relates to the replacement of the existing train with a feeder coach service that would provide one peak direction trip between Palmerston North and Waikanae and a return trip between Levin and Waikanae in each peak.

The options have been assessed against their passenger response, cost and revenue, and an option effectiveness assessment framework consisting of:

- four investment objectives: maintain or improve accessibility for residents of the corridor, maintain or improve commuter productivity, maintain or improve transport system capacity, and maintain or improve transport system resilience; and
- six critical success factors: strategic fit, value for money, service provider capacity, affordability - operating costs, affordability - capital costs, and achievability.

The assessment finds that the through DEMU (double trip) option ranks as the best option, despite having highest present value capital cost. It:

- has high ratings for eight of the ten effectiveness criteria, including all four investment objectives;
- has the highest patronage potential, and therefore offers high benefits and a low funding gap (the lowest on a per passenger basis) over 40-year evaluation period;
- offers potential economies of scale and scope; and
- allows capacity to be matched to demand (in both spatial and temporal terms) and is best matched to the changing needs of a high-growth corridor.

The resulting investment proposal entails the continued operation of the existing train between Palmerston North and Wellington until the beginning of the 2021-22 financial year, when it will be replaced by two new four-car DEMU train sets. One will then run a Palmerston North-Wellington service and the other a Levin-Wellington service, to double service frequency from Levin southwards and drive patronage growth.

The overall proposal has a present value net cost of \$11.35m, and direct transport benefits of \$106.74m over the 40-year evaluation period, which give it a benefit cost ratio of 9.4. Assessment against the NZ Transport Agency's draft 2018-21 Investment Assessment Framework gives a results alignment rating of 'High', which gives it a rank of 3 when combined with the benefit cost ratio, making it eligible for longer-term funding through the National Land Transport Programme.

Risks around dependency, timeframe, revenue, costs and public funding will need to be managed. Of note are the dependency of the DEMU aspect of the proposal on the outcome of a separate business case (dealing with wider Wellington Region rolling stock requirements), a timeframe constraint imposed by the required withdrawal of the existing train by April 2022, and a \$6.2m three-year funding shortfall to enable its continued operation and maintain service levels until the DEMUs are introduced. The latter is a significant barrier to service continuity in the short term.

However, the business case concludes that the investment proposal clearly responds to the identified problems and provides clear benefits. These support economic growth and productivity on a high-growth corridor at a critical point on the transport network, and provide a strong case for investment. It recommends that key investors give strong consideration to the proposal.

Decision Sought from the Crown by Horizons Regional Council and Greater Wellington Regional Council

- **Agree** that continued operation of a rail passenger service between Palmerston North and Wellington provides significant regional and national benefits;
- **Agree** that the current service shall remain in operation for at least the next three years, funded by the Crown at a total cost of \$6.2m over that period;
- **Agree** to secure the funding decision prior to February 2018, so sufficient lead time is available to clearly communicate to the staff and the public the intention of ceasing the service from 1 July 2018 if funding cannot be established; and
- **Agree** that further work should be undertaken by Greater Wellington Regional Council, to prepare a business case for a larger rolling stock procurement order that should provide a longer-term solution for the corridor.

1. Introduction

This business case has been prepared for Horizons Regional Council (HRC) and Greater Wellington Regional Council (GWRC) by TDG, and peer reviewed by John Bolland. It assesses the case for continued public investment in a Palmerston North-Wellington rail passenger service.

The Palmerston North-Wellington corridor is currently served by the Capital Connection (CC), a weekday return commuter service operated by KiwiRail. This runs southwards in the morning peak and northwards in the evening peak, and links Palmerston North, Shannon, Levin, Otaki, Waikanae, Paraparaumu and surrounding areas of the Palmerston North city and Horowhenua and Kapiti Coast districts with each other and Wellington. It is the only peak rail passenger service on this corridor north of Waikanae¹, and the only long-distance commuter train that crosses a regional boundary in New Zealand.

The CC commenced running in 1991, and is an established and integral part of the transport system on the corridor. It runs on a 125-minute express schedule over the 136 kilometres between its end points, which is competitive with the car alternative, and typically carries around 250 passengers per trip. It provides amenities that are appropriate for a long-distance commuter service, such as table seating and at-seat power facilities that allow passengers to work while travelling, toilet facilities, and an on-board cafe.

The CC was commercially operated by KiwiRail and its predecessors prior to July 2015, but declining financial performance and increased maintenance expenditure have required joint funding support from HRC and GWRC since that time. The current funding arrangement is due to expire in June 2018 and the service will likely be withdrawn if public support ceases at that point. An investment decision is required on whether to support continued public transport service in the short term, normalise the funding arrangement, and enable implementation of a sustainable solution for the longer term.

The business case follows a 2012 GWRC business case, which was prepared on behalf of both regional councils and looked at integrating the CC into GWRC's Metlink suburban rail commuter operation, and earlier HRC investigations into the value of rail on the corridor. It has been developed with input from the regional councils, KiwiRail, the New Zealand Transport Agency (NZTA), the Te Hononga Capital Connection Community group (THCCC)², and other members of the Passenger Rail Working Party, which is composed of key stakeholders and responsible for providing direction and investigating long term options for the Palmerston North-Wellington corridor. Additional input has been sought from other parties as required.

The business case takes the form of a Detailed Business Case following the NZ Transport Agency Business Case Approach, with the subsequent following sections:

- Chapter 2 summarises the strategic case;
- Chapter 3 provides an outline of the indicative case options and option selection; and
- Chapter 4 describes the detailed case for investment in the preferred option.

¹ KiwiRail also runs the tourism-focused thrice-weekly Auckland-Wellington Northern Explorer on the corridor, which runs in the opposite direction to peak commuter requirements and stops at Palmerston North and Wellington only.

² The THCCC represents the train's users. It was established in response to uncertainty about the CC's future, and prepared its own business case to support the continuance of the train in 2015.

It should be noted that this business case is unusual, since most such cases involve new investment in new services or infrastructure. The subject of this business case is an existing service that is the subject of existing public investment, and the business case revolves around whether continued investment in it or another public transport option is the most effective way of addressing the problems and providing the benefits identified.

2. Strategic Case

2.1 Strategic Assessment

2.1.1 Problem Description

The CC was intended to capitalise on two key problems when it commenced operation in 1991:

- a large and growing population along the corridor, which is reliant on Wellington for many employment, educational and other opportunities and services; and
- limited roading links, which are susceptible to congestion and resilience issues and can be unreliable.

These problems remain pertinent in 2017. For example, the train serves a total catchment population of approximately 170,000, 75% of which lies north of Waikanae. Statistics New Zealand estimates that this population increased by 7% over the 2006-2016 period, and projects a similar 8% population increase over the 2013-2023 period of its most recent projections³. However, the Statistics New Zealand projections may underestimate future population growth. A recent report into the impact of roading improvements on the corridor for Horowhenua District Council by NZIER⁴ suggests that the Horowhenua population may increase at the much faster rate of 1.2% per annum. A similar effect may also be seen on the Kapiti Coast, which will also benefit from the roading improvements.

Employment, educational and other opportunities are available in the communities along the corridor, particularly in Palmerston North. However, many are only available in Wellington⁵, which serves as the key lower North Island metropolitan area and, with its government functions, is a destination of national significance. The travel purposes of CC passengers reflect the dominance of Wellington as a destination, with around 76% travelling to or for work (rising to 90% from the Kapiti Coast urban area), 8% to education and the remaining 16% for other purposes⁶.

The Palmerston North-Wellington rail corridor parallels State Highway 57 north of Levin and State Highway 1 south of that point. State Highway 1 carries large traffic volumes over the Levin-Wellington section, which lacks an alternative road route and is limited to a single lane in each direction for much of its length by geographical constraints. This makes it susceptible to congestion, particularly at peak times, and vulnerable to resilience issues. The CC and other rail passenger services on the corridor provide a useful alternative when the highway is congested or closed.

State Highway 1 south of Otaki is currently being upgraded to expressway standard, and congestion and resilience form a key part of the justification for the upgrade. Long term

³ Based on Statistics New Zealand subnational population statistics for the three territorial authorities that are directly served by the train, which showed estimated increases of 7% in Palmerston North city, 4% in the Horowhenua district, and 10% in Kapiti Coast district over the 2006-2016 period, and project similar population increases in each area over the 2013-2023 period. Some of the train's passengers are also likely to come from the neighbouring Manawatu district.

⁴ Investment in Transport Infrastructure: Effects on Economic and Demographic Outlook by NZIER (2015).

⁵ For example, Paraparaumu and Waikanae lie within the Capital Coast District Health Board area and residents of those places access key health services in Wellington. Residents north of Waikanae also access health services in Wellington, since Wellington Hospital is a tertiary hospital that provides the highest level of medical care for an area that encompasses the whole of the lower North Island.

⁶ Based on the findings of a THCC passenger survey, which was conducted in March 2015.

NZTA observations of the Ngauranga Gorge to MacKays Crossing section of the highway for the Transmission Gully motorway project exemplify the issue, showing that peak period and direction travel times are much higher (31-50%) and more variable (17-23%) than in other periods and directions⁷, suggesting that the highway suffers from both recurrent and non-recurrent congestion. The expressway is expected to alleviate this when it is completed in 2020, but congestion continues to be an issue during construction⁸ and is expected to remain a constraint at the Wellington end of the corridor after that point. Upgrades are also planned for State Highway 1 north of Otaki, but are not expected to be completed until 2024-25.

2.1.2 Benefits of Investment

The CC provides four key benefits that provide justification for current and continued investment in a rail passenger option on the corridor. These are:

- better accessibility for residents of the corridor, particularly those with limited access to private vehicle such as the young and the elderly, by connecting them with employment, educational and other opportunities and services;
- better productivity, by providing a work-in-travel option;
- better transport system capacity, by providing a transport alternative that reduces vehicle numbers and congestion (with associated road travel time reliability and safety benefits) and crowding on other peak public transport services from Waikanae southwards; and
- better transport system resilience, by providing a separate route and right of way from the road system and a different power source from the electrified Metlink suburban rail commuter service.

The 2012 GWRC business case identified accessibility, transport system capacity, and optimisation-related benefits. The latter were associated with synergies that were central to the preferred option in that case, which proposed changes to rolling stock ownership and operation. Productivity and transport system resilience were not included in the 2012 case, but are recognised as being valid long-distance rail commuter service investment benefits and are applicable in the current situation as described above.

The four benefits can be reinterpreted as investment objectives, which form part of the assessment framework that the options are assessed against in **Section 3.2.3**. Associated investment effectiveness can be monitored over the life of any investment in the following ways:

- accessibility through maintained or increased public transport mode share in the areas served by the train;
- productivity through maintained or increased availability of features that enable productivity, such as table seating, at-seat power facilities and Wi-Fi;
- transport system capacity through maintained or increased peak public transport boardings, for either the train or any services that replace it; and

⁷ Sourced from Transmission Gully Project: Assessment of Traffic & Transportation Effects by Sinclair Knight Merz (2011). Variability is measured as the standard deviation of observed travel times.

⁸ Reports suggest that it has been exacerbated (see <http://www.stuff.co.nz/motoring/90938322/motorists-say-kapiti-expressway-had-made-commute-into-wellington-twice-as-long>).

- transport system resilience through maintained or improved reliability, for either the train or any services that replace it.

2.2 Strategic Context

2.2.1 Background

The CC operated commercially for most of its life, with high patronage and farebox cost recovery. Patronage peaked at around 350 passengers each way per day in 2009 and 2010 when suburban rail commuter service reliability was problematic, but declined following the extension of the full electrified Metlink suburban service to Waikanae in February 2011. Fare increases in November 2011, May 2013 and November 2014 had an additional effect on demand. However, patronage has stabilised at around 250 passengers each way per day since late 2013 (approximately 70-80% of pre-2010 levels), as shown in **Figure 1**.

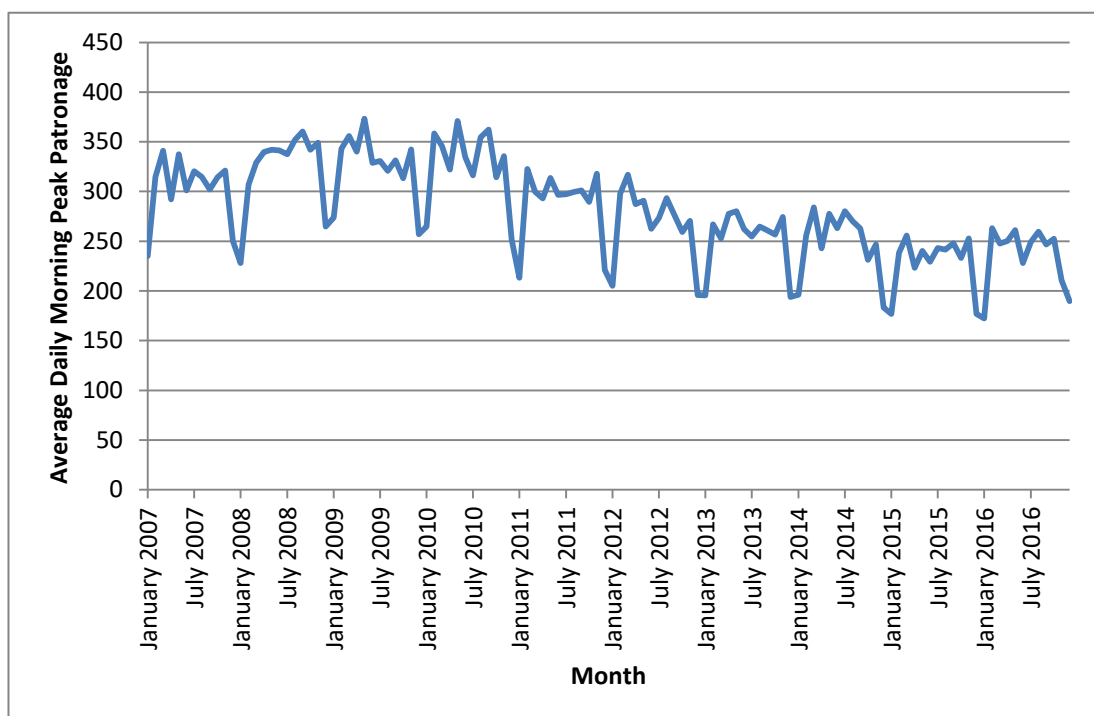


Figure 1: Average Daily Morning Peak Patronage

Figure 2 (following page) shows how morning peak boardings changed at each station between May 2010 and May 2016⁹. It shows that the patronage decline was largely confined to the Kapiti Coast district, and particularly to Waikanae, which directly benefited from the higher service levels that resulted from the extension. The extension also brought Otaki into closer proximity to the suburban rail services. The Metlink service has a lower amenity level than the CC, but uses a separate fare structure with lower fares¹⁰, which are likely to have contributed to the Kapiti Coast decline in CC patronage.

⁹ May is a typical business as usual month that is unaffected by school or public holidays.

¹⁰ Metlink fares are 14%-15% cheaper than the comparable Waikanae/Paraparaumu CC fare. CC and Metlink fare products are not transferable, so passengers who use a multi-trip product (ten trip ticket, monthly pass or quarterly pass) must commit to one service, or pay a separate fare if they use the other service for some trips.

The patronage change elsewhere on the corridor was not as dramatic. Palmerston North patronage declined, but not by as much as the Kapiti Coast stations. Shannon and Levin patronage levels remained at similar levels to 2010, which indicates that passengers at those stations are fairly reliant on the train.

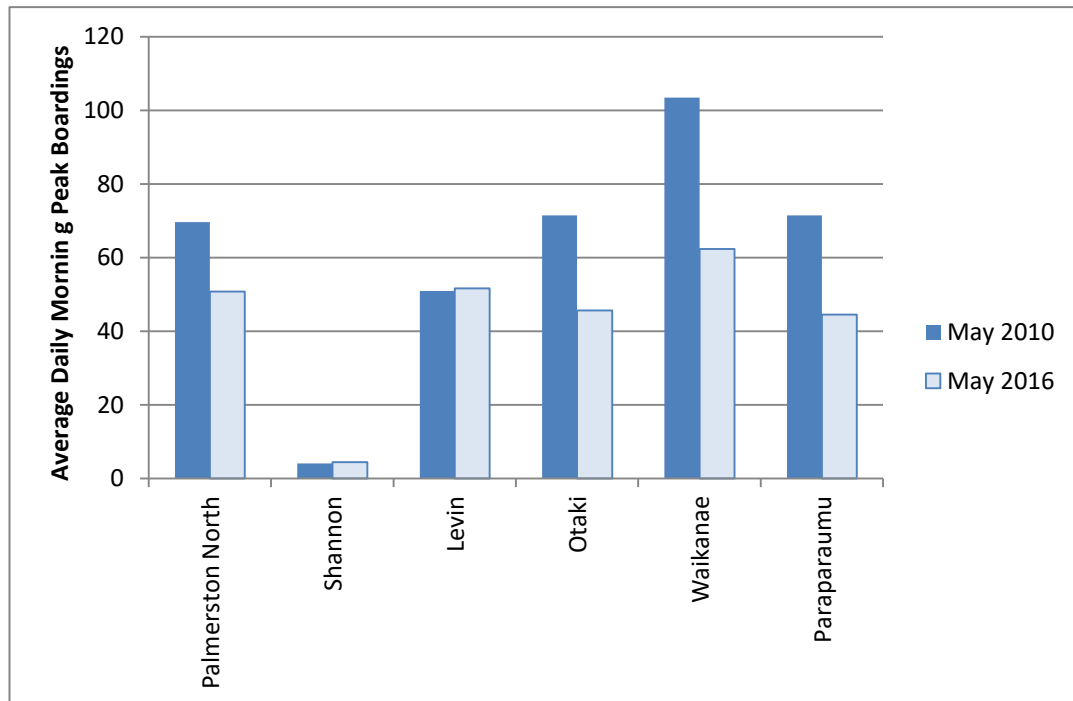


Figure 2: Average Daily Morning Peak Boardings by Station - May 2010 Compared to May 2016

The patronage decline affected the train’s commercial viability, although patronage has remained strong and farebox cost recovery continues to be high compared to most public transport services¹¹. KiwiRail responded by increasing fares as noted above and then by reducing capacity from seven to six passenger cars (plus the café car). Current patronage occupies approximately 70% of available capacity.

KiwiRail signalled that the service had become commercially unviable in 2011¹², and sought regional council funding to enable its continuance. This led to the development of the GWRC business case in 2012, which proposed integrating the CC into GWRC’s Metlink suburban rail commuter operation with GWRC, HRC and NZTA funding support. The business case determined that the proposed investment would have high strategic fit, medium effectiveness, and a low to medium benefit cost ratio (BCR). The proposal did not proceed, and KiwiRail committed to continue operating the train until June 2015.

During the lead-up to the June 2015 deadline, KiwiRail indicated that the CC would likely be discontinued without public funding support, given its commercial situation and the cost of essential deferred heavy maintenance. Following advocacy by several parties, an agreement was reached to continue operation until to June 2018, with joint funding support from HRC (\$0.5m over 3 years) and GWRC (\$0.55m over 5 years). KiwiRail agreed to carry out the deferred heavy maintenance. The Passenger Rail Working Party was also established at this point, to provide direction and investigate options for the corridor.

¹¹ Farebox revenue covered an average of 85% of operating costs over the three years between 2013/14 and 2015/16.

¹² KiwiRail had previously indicated on several occasions that extension of the Metlink suburban rail service would undermine the commercial viability of the service.

2.2.2 Wider Context

2.2.2.1 *KiwiRail*

KiwiRail is committed to the continued operation of the CC, if it makes financial sense for that organisation. However, hook and tow charges (for locomotive hire) have recently increased for all KiwiRail passenger services, reflecting the cost of passenger locomotive refurbishment to meet new regulatory requirements, and the inclusion of shunt and generator fuel costs and a return on the locomotive asset, both of which were not previously accounted for. The higher costs have been included in future year forecasts, which show an operating shortfall of c.\$1.2m per annum over the three years from June 2018. This shortfall is substantially higher than the current shortfall that regional council investment covers, and will consequently require a higher level of public investment and / or increased farebox revenue if the train continues to run beyond June 2018.

Previously deferred rolling stock heavy maintenance has now been completed, but further heavy maintenance will be required to maintain operation and meet additional regulatory requirements. This is expected to cost \$2.8m over the period to April 2022, when full refurbishment will be required¹³. Refurbishment will extend the cars' life by 15 years and cost an additional \$8.6m. They will need to be replaced at the end of that period.

KiwiRail will redeploy the cars to other services if the train is withdrawn.

2.2.2.2 *Regional Transport Plans*

The CC classified as an exempt service under the Land Transport Management Act 2003 (LTMA), due to its status as an inter-regional public transport service. This exempts it from the requirement to be provided under contract to a regional council, but previously complicated the provision of public funding, which is usually only provided to contracted services¹⁴. However, cross-regional public transport services are becoming more common nationally, and include a trial off-peak bus service between Levin and Waikanae. The NZTA has confirmed that such services may become eligible for national funding if defined as a public transport unit in the relevant regions' Regional Public Transport Plans (RPTPs).

The current RPTPs date from 2015 (HRC) and 2014 (GWRC), and are due for review in the next year. Little mention is made of a Palmerston North-Wellington rail passenger service in either plan, other than noting that the CC is exempt, but the current HRC plan does state that *consideration will be given to subsidising this service in the future if it is identified as the most efficient and effective means of providing a commuter service between Palmerston North and Horowhenua, and Wellington.*

Higher level regional strategic direction is shown in each region's Regional Land Transport Plan, which date from 2015 and are also due for review in the next year. These differ in content and approach, but both place an emphasis on the developing and maintaining a resilient, integrated multi-modal transport system, particularly on key corridors.

¹³ A 17 February 2017 letter from KiwiRail's Chief Executive to the Chief Executives of HRC and GWRC indicated that annual capital expenditure of \$0.2m to \$0.4m would be required over the evaluation period, but KiwiRail has subsequently confirmed that annual expenditure of \$0.7m to \$1.4m will be required to maintain operation up to the 2021/22 year.

¹⁴ Current public funding support for the CC falls outside of LTMA requirements, since it does not involve NLTP (see Section 2.2.2.4) or other national funding contribution.

The regional strategic priorities are supported by the NZTA's Long Term Strategic View, which identifies Palmerston North-Wellington as a key inter-regional journey.

2.2.2.3 Regional Rail Investment

Rail is a key component of the Wellington regional public transport network, carrying around one third of all passengers. The regional rail network comprises electrified suburban services on four lines from Waikanae and Upper Hutt southwards, and longer-distance locomotive-hauled Wairarapa services from Masterton. Consideration has previously been given to including the Palmerston North-Wellington service in this network, as noted in earlier sections of this business case.

Regional rail investment plans are detailed in GWRC's Wellington Regional Rail Plan (WRRP), which supplements the RPTP and RLTP. The last (2013) update of the plan focused on upgrades to the electrified network that were underway at that time, and specifically excluded consideration of the CC. However, the plan anticipated that any future Metlink service extension north of Waikanae would be demand-driven and based on shuttle or interlined services delivered by non-electrified rolling stock.

The WRRP will shortly be refreshed, and is expected to place more emphasis on:

- Wairarapa services, which are nearing capacity and the subject of ongoing reliability issues;
- emerging capacity constraints within the wider network; and
- network resilience (e.g. power outages).

Several rolling stock options have been investigated for the Wairarapa and will be the subject of a separate business case. Diesel electric multiple units (DEMUs)¹⁵ are favoured due to their speed and efficiency compared to locomotive-hauled trains, and operational flexibility compared to locomotive-hauled trains and electric multiple units (EMUs). Furthermore, they could be used to address the capacity constraints and resilience issues on the wider network if purchased in sufficient quantity¹⁶. They would also be suitable for the Palmerston North-Wellington corridor, where they offer similar benefits, and would logically be procured as part of a wider GWRC DEMU order.

2.2.2.4 Strategic Considerations

National transport investment is specified in the National Land Transport Programme (NLTP), and allocated from the National Land Transport Fund (NLTF) by the NZTA. NLTP funding priorities are based on the priorities of the Government Policy Statement on Land Transport (GPS). The draft GPS 2018/19-2027/28 has been published and will inform the 2018-2021 NLTP when finalised.

The draft GPS specifies three strategic priorities: economic growth and productivity, road safety and value for money. Each has supporting objectives and desired results. The economic growth and productivity strategic priority is most relevant to the Palmerston

¹⁵ DEMUs use a diesel generator to power on-board systems and electric traction motors, and could be configured to draw power from the electric overhead within the electrified network area.

¹⁶ Capacity constraints could be addressed by purchasing a small number of additional EMUs, but a small EMU order is expected to be expensive and be subject to long lead times. An expanded DEMU order would bring economies of scale and can therefore be expected to be more cost-effective overall. It would also provide a means of addressing resilience issues associated with power outages on the electrified network.

North-Wellington rail passenger service (although the other strategic priorities also have some relevance), and **Table 1** shows its objectives and relevant results.

National Land Transport Objectives	Long Term Results - Planning Direction 10+ years	Short to Medium Term Results - Investment Priorities (Selected) 3-6+ years
<ul style="list-style-type: none"> A land transport system that addresses current and future demand for access to economic and social opportunities. 	<ul style="list-style-type: none"> Support economic growth and productivity through provision of better access to markets, employment, business areas and housing development Support economic growth of regional New Zealand through provision of better access to markets and tourist destinations. 	<ul style="list-style-type: none"> Public transport is provided where there is sufficient demand, particularly for services that connect people to employment and education Regional networks are connected and resilient, and journey times on key regional freight routes are reliable and predictable.
<ul style="list-style-type: none"> A land transport system that is resilient. 	<ul style="list-style-type: none"> Improved network resilience at the most critical points. 	<ul style="list-style-type: none"> Regional and local system approaches, including investment in non-transport infrastructure where this has clear transport benefits, are used to improve resilience at the economically and socially most critical points of the network.
<ul style="list-style-type: none"> A land transport system that provides appropriate transport choice. 	<ul style="list-style-type: none"> Provide appropriate travel choices, particularly for people with limited access to a private vehicle. 	<ul style="list-style-type: none"> Appropriate public transport is available to system users with limited access to a private vehicle, including disabled people, where there is sufficient demand to support scheduled public transport.

Table 1: Economic Growth and Productivity Objectives and Results

There are clear links between the Government’s economic growth and productivity priority objectives and results shown in the table, regional strategic priorities for transport, and the two problems and four benefits specified in Section 2.1. Of particular note is the combined focus on:

- access, particularly for services that connect people to employment and education, and access that supports economic growth in regional areas¹⁷;
- transport system resilience, particularly regional and local system approaches that improve resilience at the economically and socially most critical points of the network; and
- transport choice, where there is sufficient demand to support scheduled public transport (as is demonstrated by the level of use of the current service).

¹⁷ The GPS focus on regional growth is supported other strategic documents that link it to transport on the northern end of the corridor. For example, the 2015 Manawatu-Whanganui Growth Study by the Ministry for Primary Industries and the Ministry of Business, Innovation and Employment, and its subsequent implementation programme Accelerate 25, note the importance of transport as a key enabler of economic growth for that region.

2.3 Conclusion

The Palmerston North-Wellington corridor is served by an established rail passenger service, which is well-patronised and an integral part of the transport system on the corridor. It responds to clear and ongoing problems in a fast-growing part of the country, and provides accessibility, productivity, transport system capacity, and transport system resilience benefits that align with regional and national priorities. These provide strategic justification for current and future investment in a rail passenger option on the corridor. Continued investment is supported by stakeholders, who have been involved in developing options for the corridor.

3. Indicative Case

3.1 Option Description

Six options have been identified by Passenger Rail Working Party stakeholders as potential responses: a do-minimum, and five investment options that respond to the problems identified in **Section 2.1** in different ways. These are a:

- locomotive-hauled through train service between Palmerston North and Wellington, providing a single trip in each peak;
- through DEMU service between Palmerston North and Wellington, providing a single trip in each peak;
- through DEMU service providing two trips in each peak, one between Palmerston North and Wellington and the other between Levin and Wellington;
- DEMU feeder service to Metlink services in Waikanae, providing one peak direction trip between Palmerston North and Waikanae and a return trip between Levin and Waikanae in each peak; and
- coach feeder service to Metlink services in Waikanae, providing one peak direction trip between Palmerston North and Waikanae and a return trip between Levin and Waikanae in each peak.

A high-level overview of each option is provided in the following sections.

3.1.1 Do-Minimum

The NZTA defines the do-minimum option as *the most likely transport situation over the course of the appraisal period if no intervention were to occur*. In this case, the do-minimum is the withdrawal of the CC at the end of June 2018, or soon after that point, when the full level of the existing funding support commitment ceases¹⁸.

Passengers would lose a travel alternative under this scenario, although GWRC would replace the CC with an EMU-run suburban rail service in the same train path and timetable between Waikanae and Wellington, to respond to increased demand and maintain network capacity at Waikanae and Paraparaumu¹⁹. In this environment, and in the absence of any new alternatives that might emerge²⁰, passengers would be expected to respond in one of the following ways:

- some would cease current travel, particularly those with limited access to private vehicle, the young, and the elderly²¹;
- some would switch to the commercial coach services that run via the state highways, but the number taking this option is expected to be small, since those services

¹⁸ HRC funding support ends in June 2018. GWRC funding is committed for a further two years, but is insufficient in isolation.

¹⁹ In the absence of the CC or a Metlink replacement in that train path, passengers would be most likely to switch to Metlink services that arrive at Wellington at 8:14 and 8:30 in the morning peak and depart Wellington at 17:17 in the evening peak, which currently have sufficient standing (but not seated) capacity at the Wellington end of the trip to cater to additional demand. The morning trains may be able to be expanded to provide additional capacity, but the evening train cannot be expanded beyond its current maximum size, and passengers would consequently need to adjust their travel times. Capacity would be a significant issue in the longer term.

²⁰ A commercial coach service was investigated in 2012, and it is possible that such a service might emerge in the absence of the train.

²¹ Some of this group would cease travel entirely, while others would make a different trip (e.g. to a new job or school).

primarily serve Palmerston North and Levin and are generally not conveniently timed for commuting-related journeys;

- some would use the Metlink Route 290 Otaki bus service to connect with Metlink suburban rail services at Waikanae, although the timetable would need to be adjusted to provide a conveniently-timed evening peak rail to bus connection;
- some with access to a private vehicle would use that to reach Metlink suburban rail services at Waikanae, which would increase pressure on road space to the north of that point, and on parking availability at Waikanae in the longer term²²;
- some with direct access to Metlink suburban rail services would switch to those services; and
- some with access to a private vehicle would switch to driving all the way to Wellington, which would increase pressure on road space along the corridor.

Table 2 provides an indication of the anticipated passenger response, based on the available travel options in each area²³.

Indicative Response – Do-Minimum	North of Waikanae (c.60% of passengers)	Waikanae & Paraparaumu (c.40% of passengers)
Cease travel	15-20%	5-10%
Commercial coach service	5-10%	0-5%
Bus to Waikanae rail connection	5-10%	-
Private vehicle to Waikanae rail connection	45-50%	-
Metlink suburban rail only	-	80-85%
Private vehicle to Wellington	20-25%	10-15%

Table 2: Indicative Passenger Response to the Do-Minimum

The data in the table show that a significant number of all passengers (around 10-15%) would be expected to cease travel under this scenario. Another 40-50% would use an all public transport option (commercial coach, bus and rail, or all rail), and 40-50% would change to using private vehicle for some of the journey (via park and ride) or the entire journey.

This option would partially respond to the problems resulting from a large and growing population and limited roading links, by maintaining rail capacity from Waikanae southwards, but would have accessibility, productivity, transport system capacity and transport system resilience disbenefits. Worsening accessibility would have negative economic and social impacts on individuals and negative economic growth impacts for the communities along the corridor. Reduced transport system capacity would have congestion impacts north of Waikanae, which would be more acute while the parallel road construction takes place. The removal of a route and motive power alternative would make the whole transport system less resilient and more vulnerable to adverse events.

²² A June 2017 extension to the Waikanae park & ride carpark adds 227 spaces, which should be sufficient to cater to short and medium-term demand, including any demand resulting from the withdrawal of the CC.

²³ Experience with travel change following long-distance public transport service withdrawal is limited, and this response is based on professional experience, but it is consistent with the findings of the March 2015 THCC passenger survey.

The replacement Waikanae-Wellington EMU-run suburban rail service would have an estimated funding gap²⁴ of c.\$1.1m in the first three years²⁵, and an overall 40-year present value funding gap of \$13.6m-\$16.6m. These estimates include all rolling stock-related capital costs, including \$16.0m for the procurement of three two-car EMU sets in 2021-22 to run the replacement EMU service and maintain longer-term network capacity²⁶. The option would also have wider and ongoing economic costs to the community, as noted above.

3.1.2 Through Train Option

This option is the status quo option, and is based on continued operation of a locomotive-hauled through train between Palmerston North and Wellington using conventional rolling stock, running a single service in each peak to the current timetable. This would require refurbishment of the existing rolling stock fleet prior to April 2022 and full replacement of it by 2037.

It is expected that the train would continue to be owned and operated by KiwiRail in the short term. However, substantial public investment would be required to fund fleet refurbishment / replacement and maintain operation, and it would be appropriate for ownership and operational responsibility to be transferred to one of the regional councils in the longer term, similarly to the 2012 GWRC business case proposal. GWRC would be best-placed to take on this role given its established rail capability.

The option has been clearly shown to respond to the two problems and provide the four investment benefits identified in **Section 2.1**. It would continue to address these through ongoing patronage growth, reflecting passenger familiarity with the existing service, certainty around its continued availability as a transport alternative, and population growth along the length of the corridor.

The option would require significantly increased direct public investment compared to the present, with an estimated three-year funding gap of c.\$6.2m, and an overall 40-year present value funding gap of \$28.1m-\$31.1m. These estimates include all capital costs, including \$8.6m for rolling stock refurbishment and \$16.0m for its later replacement.

3.1.3 Through DEMU (Single Trip) Option

This option is similar to the through train option, but would replace the existing train with an eight-car DEMU, which would operate between Palmerston North and Wellington on the existing train path and a similar timetable²⁷.

The option essentially implements Rail Scenario B from the most-recent update of the WRRP, and it is closely linked to GWRC's solution to the Wairarapa, capacity and resilience issues noted in **Section 2.2.2.3**. It is therefore expected that GWRC would procure the DEMUs as part of its response to those issues (which these DEMUs would also help to address), and incorporate their operation into its Metlink operation. This would deliver

²⁴ The funding gap is the difference between revenue and cost that is funded through public investment.

²⁵ This estimate assumes that this service would cater primarily to passengers transferring from the CC.

²⁶ This option assumes that this train would use EMUs from the existing fleet prior to 2021-22.

²⁷ DEMUs would be expected to have improved acceleration characteristics and consequently a faster running time than the current train, but would need to operate within the existing train path within the Wellington urban area.

economies of scale (e.g. from fleet size) and economies of scope (e.g. from flexibility and coordination).

The option would provide similar capacity to the through train option, and offer similar features, such as table seating, at-seat power facilities and toilet facilities, but being modern and purpose-built, would offer a higher standard of amenity, particularly with regards to passenger comfort (e.g. air conditioning, improved ride quality etc.). It would therefore be expected to provide a similar or better response to the two problems and four investment benefits identified in **Section 2.1**, and all existing passengers would consequently be expected switch to the new train.

Implementation of the option is predicated on the outcome of a separate GWRC business case, and it requires a minimum three to four-year lead time to enable DEMU funding, design and construction. It is therefore unlikely that DEMUs would be available prior to the beginning of the 2021-22 financial year, and the option assumes the continued operation of the existing train until then to provide continuity of service to passengers and other transport system users. The DEMUs would need to be available prior to April 2022 when the existing rolling stock would need to be withdrawn, placing a key timeframe constraint on the option and GWRC's response to the other rail investment priorities.

The option has an estimated three-year funding gap of c.\$6.2m, reflecting the cost of continued operation of the existing train over that period, and an overall 40-year present value funding gap of \$15.3m-\$18.3m. These estimates include all capital costs, including \$28.5m for the procurement of two four-car DEMU sets and basic stabling facilities in Palmerston North.

An alternative fall back sub-option is also available, but is not recommended due to its impact on passengers and other transport system users and has not been taken forward for assessment. It would replace the existing train with a temporary connecting coach and EMU between mid-2018 and delivery of the DEMUs in 2021-22, and have similar features over that period to the connecting coach option described in **Section 3.1.6**. This would reduce the three-year funding gap to c.\$1.1m²⁸, the overall 40-year present value funding gap to \$11.8m-\$14.8m, and eliminate the timeframe constraint.

However, passenger uncertainty around the sub-option temporary measure would likely lead to significant mode shift in the short term, which would reduce short-term patronage by 20-30% (more if the DEMU replacement was delayed), and consequently reduce the response to the two problems and four investment benefits. Much of the mode shift would be to road, where it would worsen the existing congestion and resilience issues described in **Section 2.1.1**. The new DEMUs would likely draw most passengers back over time, but some passengers would not return to public transport and such mode shift would take time to achieve. Overall 40-year patronage would therefore be lower than under the standard through DEMU (single trip) option, by approximately 5%.

3.1.4 Through DEMU (Double Trip) Option

This option is similar though to the DEMU (single trip) option, but would replace the existing single train with two separate four-car DEMU trains. One DEMU would run

²⁸ This three-year funding gap is higher than the connecting coach option, since the passenger response to the temporary coach is expected to be lower than for the permanent coach, at approximately 50%.

Palmerston North-Wellington in the morning peak and return in the evening peak, and the other would run Levin-Wellington in the morning peak and return in the evening peak. Additional morning and evening train paths would be required for this option, which would double service frequency from Levin southwards, providing service level benefits to most passengers.

The option is closely linked to GWRC's solution to the Wairarapa, capacity and resilience issues, and it is expected that GWRC would procure and operate the DEMUs similarly to the through DEMU (single trip) option (see **Section 3.1.3**). It would likewise provide economies of scale and scope.

Like the through DEMU (single trip) option, it would offer a higher standard of amenity than the through train, particularly with regards to passenger comfort. It would offer similar or better capacity, and the enhanced frequency would make the train more attractive as a travel option, and would be expected to boost patronage and in turn provide an enhanced response to the two problems and four investment benefits identified in **Section 2.1**. The additional patronage would require additional capacity from 2049-50.

As with the through DEMU (single trip) option, implementation of this option is predicated on the outcome of a separate GWRC business case, and the three to four-year lead time would require continued operation of the existing train until 2021-22 to provide continuity of service to passengers and other transport system users. The April 2022 withdrawal of existing rolling stock would again be a key timeframe constraint on the option and GWRC's response to the other rail investment priorities.

The option has an estimated three-year funding gap of c.\$6.2m, reflecting the cost of continued operation of the existing train over that period, and an overall 40-year present value funding gap of \$9.8m-\$12.8m. These estimates include all capital costs, including \$28.6m for the procurement of two four-car DEMU sets and basic stabling facilities in Palmerston North and Levin. It also includes the cost of the additional four-car DEMU set that is required to respond to patronage demand in 2049-50. The patronage boost offsets an increase in costs compared to the through DEMU (single trip) option.

An alternative fall back sub-option is also available, similarly to the through DEMU (single trip) option, but is not recommended due to its impact on passengers and other transport system users and has not been taken forward for assessment. As with that option, it would replace the existing train with a connecting coach and EMU between mid-2018 and delivery of the DEMUs in 2021-22. This would reduce the three-year funding gap to c.\$1.1m, the overall 40-year present value funding gap to \$6.5m-\$9.5m, and eliminate the timeframe constraint. However, passenger uncertainty around the temporary measure would lead to significant mode shift, which would reduce short-term patronage by 20-30% (more if the DEMU replacement was delayed), reduce the response to the problems and investment benefits, and worsen already-problematic congestion and resilience issues. Overall 40-year patronage would be approximately 5% lower than under the standard through DEMU (double trip) option.

3.1.5 Connecting DEMU Option

This option is similar to the through DEMU (double trip) option, but would replace the existing through train with a rail feeder service, which would connect with Metlink

suburban rail services at Waikanae²⁹. This would use a single four-car DEMU to run a Palmerston North-Waikanae-Levin-Waikanae pattern in the morning peak, and the reverse pattern in the evening peak, which would double peak-direction service frequency from Levin to Waikanae compared to the single trip options. It would also enable some counter-peak direction travel, and thus provide more travel choices for residents of the corridor and potentially facilitate other travel such as for tourism.

The option is closely linked to GWRC’s solution to the Wairarapa, capacity and resilience issues, and it is expected that GWRC would procure and operate the DEMUs, similarly to the through DEMU option. This would offer economies of scale, but economies of scope would be more limited as it would not help address wider Metlink network capacity and resilience issues. The option would also incur additional maintenance-related costs compared to the other DEMU options, due to the remote nature of the DEMU operation.

The option would provide reduced capacity compared to the through train, but sufficient to cater to projected demand north of Waikanae. It would offer a higher standard of amenity like the other DEMU options.

Patronage would be expected to be lower under this option than under the through options. The increased travel time and reduced convenience of the new rail to rail transfer requirement would likely deter some passengers north of Waikanae, although this would be partially offset by integrated fares³⁰ and improved service frequency from Levin and Otaki. Existing passengers from Waikanae southwards would lose a travel alternative and be expected to respond similarly to the do-minimum option.

Table 3 provides an indication of the anticipated passenger response. It shows that around 5-10% of passengers would be expected to cease travel under this scenario. Another 75-85% would use an all public transport option (commercial coach, bus and rail, or all rail), and 10-20% would change to using private vehicle for some of the journey (via park and ride) or the entire journey.

Indicative Response – Connecting DEMU Option	North of Waikanae (c.60% of passengers)	Waikanae & Paraparaumu (c.40% of passengers)
Cease travel	5-10%	5-10%
Commercial coach service	0-5%	0-5%
Bus to Waikanae rail connection	0-5%	-
Private vehicle to Waikanae rail connection	5-10%	-
Metlink suburban rail only	-	80-85%
Private vehicle to Wellington	10-15%	10-15%
Connecting train to Waikanae rail connection	70-75%	-

Table 3: Indicative Passenger Response to the Connecting DEMU Option

The option would provide a reduced response to the two problems and four investment benefits identified in **Section 2.1** north of Waikanae. It would have a similar effect to the do-minimum from Waikanae southwards.

²⁹ This option assumes a replacement EMU-run suburban rail service in the same path and timetable as the CC from 2021-22.

³⁰ Integrated fares would eliminate the transfer cost penalty and thus minimise the impact of the new transfer requirement.

As with the other DEMU options, implementation of this option is predicated on the outcome of a separate GWRC business case, and the three to four-year lead time would require continued operation of the existing train until 2021-22 to provide continuity of service to passengers and other transport system users. The April 2022 withdrawal of existing rolling stock would again be a key timeframe constraint on the option and GWRC's response to the other rail investment priorities.

The option has an estimated three-year funding gap of c.\$6.2m, reflecting the cost of continued operation of the existing train over that period, and an overall 40-year present value funding gap of \$28.4m-\$31.4m. These estimates include all capital costs, including \$14.3m for the procurement of a four-car DEMU set and basic stabling facilities in Palmerston North, and \$16.0m for the procurement of three two-car EMU sets in 2021-22 to run the replacement EMU service and maintain longer-term network capacity. They do not include additional maintenance costs that may result from the remote nature of the DEMU operation.

An alternative fall back sub-option is also available, similarly to the other DEMU options option, but is not recommended due to its impact on passengers and other transport system users and has not been taken forward for assessment. As with those options, it would replace the existing train with a connecting coach and EMU between mid-2018 and delivery of the DEMUs in 2021-22. This would reduce the three-year funding gap to c.\$1.1m, the overall 40-year present value funding gap to \$23.6m-\$26.6m, and eliminate the timeframe constraint. However, passenger uncertainty around the temporary measure would lead to significant mode shift, which would reduce short-term patronage by 20-30% (more if the DEMU replacement was delayed), reduce the response to the problems and investment benefits, and worsen already-problematic congestion and resilience issues. Overall 40-year patronage would be approximately 5% lower than under the standard connecting DEMU option.

3.1.6 Connecting Coach Option

This option is similar to the connecting DEMU option, but would replace the existing through train with a luxury coach (bus) feeder service, which would connect with Metlink suburban rail services at Waikanae³¹. The coach would run a similar Palmerston North-Waikanae-Levin-Waikanae (and reverse) pattern to the connecting DEMU option, and therefore offer similar frequency and travel choice benefits to that option. It is expected that it would be operated under contract to one of the regional councils.

The option would utilise a double-deck coach to provide sufficient capacity to cater to projected demand north of Waikanae³². This would provide similar amenities to the rail options, such as tray table seating, at-seat power facilities, Wi-Fi and air conditioning.

The deterrent effect of the transfer requirement, use of integrated fares, and impact of improved service frequency would be expected to have a similar effect to the connecting DEMU option north of Waikanae. However, patronage would be expected to be lower than that option, reflecting the lower passenger value that is typically placed on bus-based

³¹ This option assumes that GWRC would add a replacement EMU-run suburban rail service in the same path and timetable as the CC, similarly to the do-minimum.

³² The use of a standard-sized coach would likely restrict this service to passengers travelling from/to Levin and points north in the medium and longer term, requiring Otaki passengers to use the existing Metlink bus service, which might in turn require service enhancements.

options³³. Patronage growth would require an additional coach from 2048-49. Existing passengers from Waikanae southwards would lose a travel alternative and be expected to respond similarly to the do-minimum option.

Table 4 provides an indication of the anticipated passenger response. It shows that around 5-10% of passengers would be expected to cease travel under this scenario, 70-80% would use an all public transport option (coach, bus and rail, or all rail), and 15-25% would change to using private vehicle for some of the journey (via park and ride) or the entire journey.

Indicative Response – Connecting Coach Option	North of Waikanae (c.60% of passengers)	Waikanae & Paraparaumu (c.40% of passengers)
Cease travel	5-10%	5-10%
Commercial coach service	0-5%	0-5%
Bus to Waikanae rail connection	0-5%	-
Private vehicle to Waikanae rail connection	10-15%	-
Metlink suburban rail only	-	80-85%
Private vehicle to Wellington	10-15%	10-15%
Connecting coach to Waikanae rail connection	60-65%	-

Table 4: Indicative Passenger Response to the Connecting Coach Option

The option would provide a reduced response to the two problems and accessibility, productivity, and transport system capacity benefits identified in **Section 2.1** north of Waikanae. It would provide only limited transport system resilience benefits, due to the loss of the modal alternative on that section of the corridor. It would have a similar effect to the do-minimum from Waikanae southwards.

The option would be relatively easy to implement, as it would not require the procurement of new equipment. It could therefore potentially be in place to take effect in July 2018, subject to planning, funding and contracting processes. It has been assessed on this basis.

The option has an estimated three-year funding gap of c.\$0.6m, and an overall 40-year present value funding gap of \$9.2m-\$12.2m. These estimates include all capital costs, including the cost of the additional coach that is required to respond to patronage demand in 2048-49, and \$16.0m for the procurement of three two-car EMU sets in 2021-22 to run the replacement EMU service and maintain longer-term network capacity³⁴.

3.2 Option Assessment

The following sections compare the options in three areas – passenger response, revenue and cost, and option effectiveness. The option effectiveness assessment takes account of the passenger response and cost and revenue in its overall assessment.

³³ Bus-based options typically have a lower response rate than the equivalent rail-based option, reflecting the smoother ride and greater space and amenity of the rail alternative. A high-amenity coach is likely to counter this difference to some extent.

³⁴ This option assumes that this train would use EMUs from the existing fleet prior to 2021-22, similarly to the do-minimum.

3.2.1 Passenger Response

Under the through train and through DEMU (single trip) options, passengers would continue to use the train as they do now, with associated benefits, while the increased frequency of the through DEMU (double trip) option would boost patronage and provide increased benefits. Under each of the other options, passengers would cease travel or switch to the option or an alternative travel method, with reduced patronage and benefits compared to the present.

Table 5 summarises the anticipated passenger response north of Waikanae under each option.

Indicative Response – North of Waikanae	Through Train	Through DEMU (Single Trip)	Through DEMU (Double Trip)	Connecting DEMU	Connecting Coach	Do-Minimum
Through train to Wellington	100%	100%	125-130%	-	-	-
Cease travel	-	-	-	5-10%	5-10%	15-20%
Commercial coach service	-	-	-	0-5%	0-5%	5-10%
Bus to Waikanae rail connection	-	-	-	0-5%	0-5%	5-10%
Pte vehicle to Waikanae rail connection	-	-	-	5-10%	10-15%	45-50%
Train to Waikanae rail connection	-	-	-	70-75%	-	-
Coach to Waikanae rail connection	-	-	-	-	60-65%	-
Private vehicle to Wellington	-	-	-	10-15%	10-15%	20-25%

Table 5: Indicative Passenger Response Comparison - North of Waikanae

Table 6 summarises the anticipated passenger response from Waikanae southwards under each option.

Indicative Response – Waikanae Southwards	Through Train	Through DEMU (Single Trip)	Through DEMU (Double Trip)	All Other Options
Through train to Wellington	100%	100%	125-130%	-
Cease travel	-	-	-	5-10%
Commercial coach service	-	-	-	0-5%
Metlink suburban rail only	-	-	-	80-85%
Private vehicle to Wellington	-	-	-	10-15%

Table 6: Indicative Passenger Response Comparison – Waikanae Southwards

Table 7 compares the 40-year public transport patronage impact of each option compared to the through train.

Patronage Impact	Do-Minimum	Through Train	Through DEMU (Single Trip)	Through DEMU (Double Trip)	Connecting DEMU	Connecting Coach
Projected 40-year patronage	4.53m	6.92m	6.92m	8.76m	6.00m	5.71m
Compared to through train	-35%	0%	0%	+27%	-13%	-17%

Table 7: Patronage Impact – 40 Year Evaluation Period³⁵

The data in the tables show the extent to which the through train and DEMU options perform compared to the other options. The 27% patronage increase under the through DEMU (double trip) option would result in significant mode shift from private vehicle to public transport.

The connecting DEMU and connecting coach options perform similarly to each other, but well behind the through options. Both connecting options would increase peak Metlink rail passenger demand by c.225 passengers per direction per day in 2021-22, which the extra EMU service would comfortably accommodate, but result in mode shift from public transport to private vehicle.

Public transport patronage and mode share would significantly reduce under the do-minimum option, which would see greatly increased motor vehicle use and up to 40 passengers ceasing travel.

3.2.2 Revenue and Cost

Table 8 provides a summary of the present value revenue and costs associated with each option over a full 40-year evaluation period. They are expressed as ranges³⁶, reflecting the high-level indicative nature of this assessment. Coach-related capital costs are included in the operating cost.

³⁵ This assessment is based on the following: the KiwiRail 2018-19 patronage projection, May 2016 boardings by station patronage profile, a passenger response from within the ranges noted in Table 5 and Table 6, patronage growth of 2.0% (arithmetic growth), and a service level elasticity of 0.35.

³⁶ Revenue, operating cost and capital cost are expressed as +/- \$0.5m around the mid-point estimate, which in-turn provides a \$2m range for the operating funding gap and a \$3m range for the total funding gap.

Present Value Revenue & Costs	Do-Minimum	Through Train	Through DEMU (Single Trip)	Through DEMU (Double Trip)	Connecting DEMU	Connecting Coach
Revenue	(\$12.5)- (\$13.5)	(\$34.2)- (\$35.2)	(\$34.2)- (\$35.2)	(\$42.3)- \$43.3)	(\$27.2)- \$28.2)	(\$23.4)- \$24.4)
Operating cost	\$12.5- \$13.5	\$46.0- \$47.0	\$21.3- \$22.3	\$21.5- \$22.5	\$25.8- \$26.8	\$19.0- \$20.0
Operating funding gap	(\$1.0)- \$1.0	\$10.9- \$12.9	(\$11.9- \$13.9)	(\$19.8- \$21.8)	(\$0.4- \$2.4)	(\$3.4- \$5.4)
Capital cost	\$14.6- \$15.6	\$17.3- \$18.3	\$29.2- \$30.2	\$31.7- \$32.7	\$30.8- \$31.8	\$14.6- \$15.6
Total funding gap	\$13.6- \$16.6	\$28.1- \$31.1	\$15.3- \$18.3	\$9.8- \$12.8	\$28.4- \$31.4	\$9.2- \$12.2
Incremental funding gap (over do-minimum)	-	\$14.5	\$1.7	(\$3.8)	\$14.8	(\$4.4)

Table 8: Present Value Revenue and Cost – 40 Year Evaluation Period (\$m)³⁷

The data in the table show that the through DEMU (double trip) option performs best from an operating perspective, with a clear surplus that is linked to its high patronage. The through DEMU (single trip) option and connecting coach options also achieve operating surpluses. The do-minimum and connecting DEMU options are essentially cost neutral from an operating perspective. The through train option requires significant operating subsidy.

The connecting coach option performs best from a total funding perspective, with a 40-year present value funding gap of \$9.2-\$12.2m (c.\$4.4m less than the do-minimum). The through DEMU (double trip) option follows quite closely, with a 40-year present value funding gap of \$9.8-\$12.8m (c.\$3.8 less than the do-minimum). The through DEMU (single trip) option has a similar total funding gap to the do-minimum, while the through train and connecting DEMU options have a significantly greater funding requirement.

The through DEMU (double trip) option performs best on a per-passenger funding basis, at c.\$1.30. It is followed by the connecting coach at c.\$1.88, through DEMU (single trip) at c.\$2.43, do-minimum at c.\$3.34, through train at c.\$4.28, and connecting DEMU at \$4.99.

3.2.3 Option Effectiveness

The options have been screened using an assessment framework based on the approach recommended by Treasury for the Better Business Case five case model. This uses a multi-criteria analysis approach, with four investment objectives and six critical success factors, to assess the effectiveness of each option and identify a preferred option.

³⁷ This cost assessment is based on KiwiRail 2018-19 projections, DEMU costs assessed by GWRC for the Wairarapa (including track access), EMU contract variation costs, indicative coach costs provided by HRC, and the patronage assumptions that support Table 7.

3.2.3.1 Investment objectives

Investment objectives specify the desired outcomes of any proposed investment. The four investment objectives reflect the four benefits of investment that are described in **Section 2.1.2**. They are that an option must:

- maintain or improve accessibility for residents of the corridor;
- maintain or improve commuter productivity;
- maintain or improve transport system capacity; and
- maintain or improve transport system resilience.

Each option is assessed on how it achieves the outcomes over the 40-year period.

3.2.3.2 Critical Success Factors

Critical success factors are the attributes that are essential to successful delivery of the option. The six critical success factors are based on those recommended for the Better Business Case five case model, as defined to reflect the key considerations in this business case. They are:

- strategic fit: how well the option meets the investment objectives and associated service requirements, and fits with relevant strategies, programmes and projects;
- value for money: how well the option optimises value for money across the mix of benefits, costs and risks;
- service provider capacity: the ability of suppliers to deliver and how likely the option will result in a sustainable arrangement that optimises in value for money;
- affordability - operating costs: the scale of the net operational costs (i.e. operating funding gap) and the likelihood that they can be met from available funding;
- affordability - capital costs: the scale of capital expenditure and the likelihood that this can be met from available funding; and
- achievability: the likelihood of successful implementation within the available timeframe, given constraints such as lead times and implementation risks.

Each option is assessed on how it achieves the outcomes over the 40-year period.

3.2.3.3 Assessment

Table 9 shows the results of the assessment of the five options against the assessment criteria (as defined above) using a three-point scale (high/medium/low). The results have been used to rank each option.

	Do-Minimum	Through Train	Through DEMU (Single Trip)	Through DEMU (Double Trip)	Connecting DEMU	Connecting Coach
Investment Objectives						
Maintains or improves accessibility	Low	High	High	High	Med	Med
Maintains or improves productivity	-	High	High	High	Med	Med
Maintains or improves system capacity	Low	High	High	High	Med	Med
Maintains or improves system resilience	-	High	High	High	Med	Low
Critical Success Factors						
Strategic fit	Low	Med	High	High	Med	Med
Value for money	Low	Med	Med	High	Low	Med
Service provider capacity and capability	High	High	High	High	High	High
Affordability - operating costs (net)	Med	Low	High	High	Med	High
Affordability - capital costs	Med	Med	Low	Low	Low	Med
Achievability	High	High	Med	Med	Med	High
Overall Ranking	6	3	2	1	5	4

Table 9: Option Effectiveness

The through DEMU (double trip) option has the highest ranking, with high ratings against eight of the ten criteria, including all four investment objectives, and the strategic fit, value for money (high benefits, low costs, and medium risks), service provider capacity and capability, and affordability - operating costs criteria. Its medium rating relates to the achievability criterion, reflecting the reliance on the outcome of a separate business case and the long lead time, and the low rating to affordability - capital costs (although this is partly driven by the extra patronage demand associated with this option).

The through DEMU (single trip) option has the second highest ranking, with high ratings against seven of the ten criteria, including all four investment objectives, and the strategic fit, service provider capacity and capability, and affordability - operating costs criteria. Its medium ratings relate to the value for money (medium benefits, costs and risks) and achievability criteria, and low ratings to the affordability - capital costs criterion.

The through train option has the third highest ranking, with high ratings against six of the ten criteria, including all four investment objectives, and the service provider capacity and capability and achievability criteria. Its medium ratings relate to the strategic fit, value for money (medium benefits, high costs, and low risks) and affordability - capital costs criteria. Its low rating relates to and affordability - operating costs criterion.

The connecting coach option has the fourth highest ranking, with high ratings against three of the ten criteria. It does not achieve a high rating for any of the investment objectives (the primary reason that it ranks behind the above options), due to the impact of the transfer requirement, the lower amenity (compared to the present) from Waikanae

southwards, and the reduced transport system capacity and resilience that result from the removal of capacity and a modal alternative. Its high ratings relate to the service provider capacity and capability, achievability and affordability - operating costs. Its medium ratings relate to strategic fit, reflecting its lower rating against the investment objectives and lack of specific mention in planning documents, affordability - capital costs, and value for money (low benefits, low costs, and medium risks).

The connecting DEMU option has the fifth highest ranking. It achieves a high rating for supplier capacity and capability, and medium ratings for the investment objectives and the strategic fit, affordability – operating costs, and achievability criteria. Its low ratings relate to value for money (medium benefits, high costs, medium risks) and affordability – capital costs. The option is generally hurt by the transfer requirement and resulting low patronage, while not offering the cost and achievability advantages of the similar connecting coach option.

The do-minimum achieves low ratings for two of the investment objectives, which reflect the replacement of the CC with a Metlink service, but is unrated against two others, and is therefore ranked last.

3.3 Conclusion

Six options have been identified as potential responses in the current circumstances. These are the:

- do-minimum, which relates to the withdrawal of the CC when the full level of existing funding support commitment ceases;
- through train option, which relates to the continued operation of a through train service between Palmerston North and Wellington, providing a single trip in each peak;
- through DEMU (single trip) option, which relates to the replacement of the existing train with a DEMU that would operate between Palmerston North and Wellington, providing a single trip in each peak;
- through DEMU (double trip) option, which relates to the replacement of the existing train with DEMUs that would operate two trips in each peak, one between Palmerston North and Wellington and the other between Levin and Wellington;
- connecting DEMU option, which relates to the replacement of the existing train with a feeder DEMU service that would provide one peak direction trip between Palmerston North and Waikanae and a return trip between Levin and Waikanae in each peak; and
- connecting coach option, which relates to the replacement of the existing train with a feeder coach service that would provide one peak direction trip between Palmerston North and Waikanae and a return trip between Levin and Waikanae in each peak.

The options have been assessed against their passenger response, cost and revenue, and an option effectiveness assessment framework consisting of:

- four investment objectives: maintain or improve accessibility for residents of the corridor, maintain or improve commuter productivity, maintain or improve transport system capacity, and maintain or improve transport system resilience; and
- six critical success factors: strategic fit, value for money, service provider capacity, affordability - operating costs, affordability - capital costs, and achievability.

The assessment finds that the through DEMU (double trip) option ranks as the best option, despite having highest present value capital cost. It:

- has high ratings for eight of the ten effectiveness criteria, including all four investment objectives;
- has the highest patronage potential, and therefore offers high benefits and a low funding gap (the lowest on a per passenger basis) over 40-year evaluation period;
- offers potential economies of scale and scope; and
- allows capacity to be matched to demand (in both spatial and temporal terms) and is best matched to the changing needs of a high-growth corridor.

The option is subject to some risk and urgency, in that it is reliant on a separate business case choosing DEMUs as an immediate and preferred option, although the relevant costs have been included in this assessment to enable a longer-term perspective to be taken. It also has a long lead time that requires the existing train to continue running (at relatively high cost) until DEMUs are available. However, given the above advantages, it is appropriate to take this option forward for assessment as the investment proposal in the Detailed Case component of this business case.

4. Detailed Case

4.1 Description

The investment proposal entails the continued operation of the existing train until the beginning of the 2021-22 financial year (or as soon after that point as possible)³⁸, when it will be replaced by two new four-car DEMUs. One DEMU will then run a Palmerston North-Wellington service on the existing train path and timetable, while the other will run a new Levin-Wellington service on a new train path and timetable. Both trains will run southwards in the morning peak and northwards in the evening peak, between 15 to 60 minutes apart, to double service frequency from Levin southwards. This will improve passenger options and drive patronage growth on that section of the network, while maintaining existing passenger options elsewhere, and match capacity to demand.

Table 10 provides an indicative post-2021 timetable for the service. The actual timetable will be dependent on a suitable train path being available for the additional train, which will likely require some adjustment to other train times. The DEMUs can be expected to have improved acceleration characteristics, which could enable a faster running time and / or allow for additional stops within the existing timetable, such as at Porirua (see below).

Station	Distance (km)	Southbound (am)		Northbound (pm)	
		Additional Service	Existing Service	Existing Service	Additional Service
Palmerston north	136.23	-	6:15	7:20	-
Shannon	106.63	-	6:38	6:57	-
Levin	90.32	6:33	6:53	6:42	6:57
Otaki	70.49	6:53	7:13	6:22	6:37
Waikanae	55.43	7:05	7:25	6:10	6:25
Paraparaumu	48.26	7:12	7:32	6:03	6:18
Wellington	0	8:00	8:20	5:15	5:30

Table 10: Indicative Post-2021 Timetable

The DEMUs will provide similar or better capacity to the existing train, but patronage growth from the increased frequency will require an extra four-car DEMU to be added to one of the trains in 2049-50. The DEMUs will offer similar features to the existing train, such as table seating, at-seat power facilities and toilet facilities, but being modern and purpose-built, will provide a higher standard of amenity and passenger comfort (e.g. air conditioning, better acoustics, improved ride quality etc.).

It is expected that GWRC will procure the DEMUs and incorporate their operation into its Metlink operation. The investment proposal is therefore linked to the outcome of a

³⁸ An alternative fall back approach is also available for the period between mid-2018 and delivery of the DEMUs in 2021-22. This would replace the existing train with a connecting coach and EMU, but is not recommended due to its impact on passengers and other transport system users. **Section 3.1.4** provides further details of the impacts of this approach, with supporting information in **Section 3.1.3**.

separate GWRC business case, which will identify the case for investment in a preferred option to address the Wairarapa, capacity and resilience issues noted in **Section 2.2.2.3**. It is dependent on that business case being completed as soon as possible, selecting DEMUs as its preference (to achieve the necessary economies of scale), and targeting their introduction for the 2021-22 financial year (and prior to April 2022 when the existing rolling stock will need to be withdrawn). If this is the outcome, then the DEMUs will be used to address several different issues across and beyond the Metlink network, which is likely to offer economies of scope. Examples could include adding a Porirua stop and / or boosting the capacity of one or both Palmerston North / Levin trains (beyond that noted above) to address capacity issues in the electrified area, using this corridor's DEMUs (and the wider DEMU fleet) to address power outages in the electrified area, and potentially adding counter-peak direction services to provide more travel choices for residents and facilitate other travel such as for tourism.

4.2 Costs

The investment proposal has two cost elements, the:

- operating funding gap or net operating cost (operating cost less revenue); and
- capital cost.

These costs combine to form the total funding gap that must be funded by central and local government. They are considered separately, as they are subject to different cost and demand drivers and may possibly be funded through different funding channels.

The operating cost is made up of direct labour, fuel, track access, maintenance, hook and tow charges (for the existing train) and other costs. These total \$2.92m per annum for the first three years, reflecting the high cost of running the existing train. Half of that cost relates to the hook and tow (locomotive hire) charge, which is specific to the existing train and won't apply to DEMU operation. The operating cost is projected to drop to \$1.02m per annum in 2021-22, reflecting reduced DEMU operating costs, before increasing to \$1.35m per annum when the third four-car DEMU is added in 2049-50.

Revenue is composed of fare revenue and catering revenue. These are projected to total \$1.74m in the 2018-19 year, and then increase in line with patronage, which is projected to increase at a rate of 2% (arithmetic growth)³⁹, with a step change service level elasticity increase of 0.35 when service levels are increased with the introduction of the DEMUs in 2021-22⁴⁰.

The capital cost includes costs associated with heavy maintenance of the existing rolling stock for the first three years, the purchase of new DEMUs, construction of basic stabling facilities in Palmerston North and Levin⁴¹, and heavy maintenance of the DEMUs over the remainder of the period. Heavy maintenance of existing rolling stock totals \$2.8m over the first three years, reflecting the cost of required bogie overhauls, a safety system upgrade (regulatory requirement), an end egress upgrade (regulatory requirement), concertina

³⁹ This growth rate is consistent with the KiwiRail forecast and post-2014 growth rates, but lower than pre-2010 growth rates.

⁴⁰ This service level elasticity is higher than the 0.25 peak short term elasticity recommended in the EEM. However, the EEM rate is an average, and the EEM notes that elasticities will be higher when service frequency is low (as in this situation) and roughly double in the long term. The 0.35 rate can therefore be regarded as being conservative.

⁴¹ All maintenance will be carried out in Wellington, so these facilities will only provide secure overnight storage and comprise only a small portion of the capital cost.

replacement, and overhauls of one car and one van, which are required to maintain operation until 2021-22. Each of the four-car DEMUs has a \$14.17m procurement cost, which includes all costs associated with their introduction. DEMU heavy maintenance costs total \$9.9m over the 37 years of their use, and include both the regular heavy maintenance and mid-life refurbishment.

No other direct costs are associated with the proposal, other than contract management and administration costs for investors, which are assumed to be relatively minor.

4.3 Benefits

4.3.1 Direct Benefits

The investment proposal provides three types of direct transport benefit:

- road traffic reduction benefit;
- public transport user benefit; and
- public transport travel time saving benefit.

Road user benefits include travel time savings (including congestion reduction), vehicle operating cost savings, crash cost savings and environmental benefits (including CO₂ reduction), and apply to each passenger who would otherwise switch to driving for part of the journey or the full journey. These benefits are based on the Wellington rail values⁴² from Table SP10.1⁴³ of the NZTA Economic Evaluation Manual (EEM)⁴⁴, updated using the 2016 update factors and prorated for distance⁴⁵. Peak values are applied south of Waikanae where congestion is greatest, and off-peak values north of that point, reflecting the less congested conditions on the northern end of the corridor.

Public transport user benefits include a range of passenger benefits, and apply to each passenger who would otherwise cease travel or switch to driving for part of the journey or the full journey. These benefits are also based on the Wellington rail values from Table SP10.1 of the EEM, and updated, prorated and applied similarly to the road user benefits.

Public transport travel time saving benefits apply to each passenger who would otherwise switch to commercial coach, Metlink rail via connection, or solely to Metlink rail. These are based on the passenger value of time⁴⁶ and savings of 15, 8, and 3 minutes respectively⁴⁷.

Table 11 shows the resulting benefit values that have been applied. The public transport user benefit is combined for passengers from north of Waikanae, who would otherwise cease travel or drive to Wellington, reflecting the complete loss of public transport user

⁴² The Wellington rail values best reflect the valuation of train users, the substantial majority of who travel to Wellington.

⁴³ SP10 is the EEM simplified procedure for improvements to existing public transport services.

⁴⁴ The investment proposal has an undiscounted operational funding gap of \$3.42m over the first three years, which is less than the \$5 million simplified procedure threshold. Capital expenditure adds \$2.79m, which lifts the funding gap to \$6.21m, but this is skewed by a high cost in the second year, which reflects the costs of overhaul and upgrades to meet new regulatory requirements. The costs meet simplified procedure requirements if these additional costs are excluded.

⁴⁵ Distance is prorated on the weighted average journey distance, separately for north of Waikanae and Waikanae southwards.

⁴⁶ The passenger value of time is a weighted average, based on the EEM base values of time, and a travel purpose split based on the EEM standard split and the findings of the March 2015 THCCC passenger survey, and has been updated using 2016 update factors.

⁴⁷ These times are based on scheduled trip times, and a five-minute transfer time for the connection to rail. They do not include additional travel time savings that may result from the improved acceleration characteristics of the DEMUs.

benefits for these passengers.

	Waikanae Southwards	North of Waikanae	Commercial Coach
Road user benefit	\$47.68	\$4.19	-
Public transport user benefit	\$44.28	\$23.10	-
Public transport travel time saving benefit	\$0.67	\$1.12	\$3.36

Table 11: Per Passenger Benefit Values

Table 12 shows the effect of each type of passenger response in the do-minimum situation. The opposite responses apply as the direct transport benefits of the investment proposal.

Origin	Response	CC User Benefit Impact	Road User Benefit Impact
North of Waikanae	Cease travel	PT user loss	-
	Commercial coach	Travel time increase	-
	Bus to rail connect	Travel time increase	-
	Drive to rail connect	Travel time increase PT user loss	Road user loss
	Drive to Wellington	PT user loss	Road user loss
Waikanae Southwards	Cease travel	PT user loss	-
	Commercial coach	Travel time increase	-
	Metlink rail	Travel time increase	-
	Drive to Wellington	PT user loss	Road user loss

Table 12: Do Minimum Benefit Impact

4.3.2 Other Benefits

The investment proposal is likely to provide a wider range of social, economic and environmental benefits in addition to the direct transport benefits described above, which can be expected to improve the liveability of the corridor and quality of life of residents⁴⁸. These are difficult to directly quantify, but are likely to support the investment case and the broader objectives of the GPS.

4.4 Economic Analysis

The economic assessment is based on the change compared to the do-minimum case in accordance with EEM guidance. This uses the following as inputs:

- a 40-year evaluation period from the beginning of the 2018/19 financial year;
- the standard 6% discount rate from the EEM;

⁴⁸ These benefits include other accessibility, productivity and resilience-related benefits, option and non-use benefits, and wider economic benefits.

- the midpoint of the do-minimum response range noted in **Table 2**;
- the 2% patronage growth rate noted in **Section 4.2**;
- the 0.35 service level elasticity noted in **Section 4.2**;
- the benefits from **Table 11**, which apply in accordance with the responses noted in **Table 12**; and
- the operating costs, revenue and capital costs noted in **Section 4.2**.

Table 13 summarises the parameters of the central case, based on the above, and the lower bound and upper bound cases that form the BCR range.

Factor	Lower Bound	Central Case	Upper Bound
Costs	5% higher	As noted in Section 4.2 .	5% lower
Patronage growth	1%	2%	3%
Service level elasticity	0.25	0.35	0.45
Response	The responses of passengers who cease travel, drive to a rail connection or to Wellington are at the low end of the range, and the other responses are at the high end of the range	The midpoint of the do-minimum response range noted in Table 2	The responses of passengers who cease travel, drive to a rail connection or to Wellington are at the high end of the range, and the other responses are at the low end of the range

Table 13: BCR Range Parameters

Table 14 shows the results of the BCR assessment for the three scenarios. The BCRs shown are government BCRs, which show the value for money that the investment provides from a central and local government perspective.

Factor	Lower Bound	Central Case	Upper Bound
PV benefits	\$82.24m	\$106.74m	\$137.53m
PV costs (funding gap)	\$17.57m	\$11.35m	\$5.78m
Benefit Cost Ratio	4.7	9.4	24

Table 14: Cost Benefit Appraisal Results

The data in the table show that the investment proposal provides a positive BCR under all three scenarios and is expected to provide a very positive return on investment, with a central case BCR of 9.4. The lower bound case, which has lower patronage and benefits and higher costs, gives a healthy BCR of 4.7, and returns a positive BCR of 3.3 even if costs are 20% higher than the central case. The upper bound case, which has higher patronage and benefits, and lower costs, covers a significant portion of costs from revenue over the 40 years, resulting in a high BCR of 24.

The BCR is very sensitive to the patronage growth and service elasticity assumptions, but these are evidence-based. The high-growth nature of the corridor supports the central patronage growth parameter, which is based on the current growth trajectory, while the

service level elasticity can be regarded as conservative, particularly over the long run. Both are supported by recent experience in the Wellington region, where new rolling stock has driven significant patronage growth.

The mid-range BCR of 9.4 is taken forward to the assessment profile, since it is best supported by the available evidence.

4.5 Assessment Profile

The investment proposal has been assessed against the NZTA's draft Investment Assessment Framework for the 2018-21 NLTP, which rates a proposal on two factors: results alignment and cost benefit appraisal. The ratings are then brought together to form an overall assessment profile that determines a proposal's priority for NLTP investment.

4.5.1 Results Alignment

The results alignment factor is used to determine the significance of a problem, issue or opportunity relative to the desired results set out in the GPS. There are four rating bands – low, medium, high and very high – each of which has specific criteria.

The investment proposal meets criteria for both a medium and high rating. It achieves a medium rating on the basis that:

- There is an identified gap in meeting customer levels of service on the parallel state highways and increasingly will be on the Metlink suburban rail network, and the proposal delivers on the draft GPS 2018/19-2027/28 priority objectives of:
 - *a land transport system that addresses current and future demand for access to economic and social opportunities, with the specific short / med term investment priorities of public transport is provided where there is sufficient demand, particularly for services that connect people to employment and education (based on current patronage and trip purposes), and regional networks are connected and resilient, and journey times on key regional freight routes are reliable and predictable; and*
 - *a land transport system that is resilient, with the specific short/med term investment priority of regional and local system approaches, including investment in non-transport infrastructure where this has clear transport benefits, are used to improve resilience at the economically and socially most critical points of the network (since this diesel rail passenger option is a regional approach that improves resilience at an economically and socially critical point of the regional and national transport networks).*
- The proposal addresses the specific medium rating criterion of *the provision of access to economic and social opportunities, particularly for those with limited access to a private motor vehicle.*

It achieves a high rating on the basis that:

- the gap in meeting appropriate customer levels of service on the parallel state highways is significant, particularly while current and planned construction takes place, and would worsen if the rail passenger option was to be withdrawn;

- withdrawal of a rail passenger option on the corridor would significantly worsen capacity issues on the Metlink suburban rail network, while enhancing it in this way will help address those issues;
- the investment proposal addresses a situation where *specific types of customer journeys support economic growth and productivity* (as identified in Chapter 2); and
- the investment proposal provides capacity that can be matched to demand (in both spatial and temporal terms) in a situation where *capacity and demand are mismatched for journeys in a major urban and high growth urban area*.

The investment proposal is therefore assigned a results alignment rating of ‘High’.

4.5.2 Cost Benefit Appraisal

The NZTA classifies BCR ratings into four bands: between 1 and 2.9, between 3 and 4.9, between 5 and 9.9, and 10 or above. The investment proposal has a mid-range BCR of 9.4, as described in **Section 4.4**, and is therefore classified as being in the ‘between 5 and 9.9’ band.

The results alignment rating of ‘High’ and cost benefit appraisal rating of ‘between 5 and 9.9’ give the investment proposal a rank of 3 (in a scale of 1 to 6), which makes it eligible for NLTP funding under the draft Investment Assessment Framework⁴⁹.

4.6 Risks

The investment proposal carries some risks. The key risks and recommended responses are summarised in **Table 15**.

Risk Type	Risk Description	Risk Response
Dependency	Implementation of the longer-term DEMU aspect of the proposal is dependent on the outcome of a separate GWRC business case for the Wairarapa (and capacity and resilience).	Prompt completion of the GWRC business case will need to be a priority, to determine whether DEMUs are the preferred option for the Metlink network, as DEMUs are unlikely to be viable on the Palmerston North-Wellington corridor in isolation. If the GWRC business case does not select DEMUs, then this business case will need to be revisited to identify an appropriate long-term alternative for the corridor. This risk is closely linked to the timeframe risk below.
Timeframe	DEMU are not available to replace the existing train by April 2022, when it must be withdrawn.	The DEMUs require a minimum three to four-year lead time to enable funding, design and construction. This will require the above business case to be completed as soon as possible, and funding, design and procurement decisions to be made promptly, so that the DEMUs can be introduced at the beginning of the 2021-22 financial year, or as soon after that point as possible.
Revenue	Patronage increases at a slower rate than	The high-growth nature of the corridor and current growth trajectory support the patronage growth

⁴⁹ Programming of activities is also informed by the NZTA’s Programming Support urgency rating, which provides a view of when the issue or opportunity needs to be addressed. Programming is influenced by the availability of funding within the overall NLTP, the individual activity classes, and other funding sources including local funding.

	anticipated, resulting in lower revenue.	projection, and the service level elasticity can be regarded as conservative. Both are supported by recent experience in the Wellington region. However, scenario testing shows that the BCR remains positive if patronage growth is lower than projected. The economies of scope that are likely to result from incorporating the DEMU operation into the Metlink operation are likely to support patronage and revenue growth through better marketing and coordination of services.
Costs	The operating and capital expenditure forecasts may change.	Operating and capital cost forecasts for the existing train are based on those provided by KiwiRail. It may be appropriate to formally specify them and the agreed level of public funding support in a service contract. Longer-term DEMU costs are based on detailed GWRC analysis of the DEMU option. These are subject to further confirmation through the design and procurement process, but a conservative DEMU capital cost has been deliberately selected, to allow for a higher than anticipated cost and/or higher specification (e.g. to allow the DEMUs to draw power from the electric overhead within the electrified area).
Public funding	Public funding support is not confirmed.	The key investment partners (HRC, GWRC and NZTA) have participated previous assessments of the train, the current Passenger Rail Working Party, and this business case. All will consider the financial implications of this investment, which are significant for each organisation (see Section 4.7), before committing funding support. It would not be appropriate for investment proceed without contributions from all three organisations.
Public Funding	A short-term funding shortfall could affect the viability of the proposal.	The investment proposal is very viable over the long term, but continued operation of the existing train is subject to a \$6.2m three-year funding shortfall. This shortfall is likely to be a significant barrier to continued operation of the train and a special funding arrangement may be required to maintain levels of service until the DEMUs enter service.

Table 15: Risks and risk responses

4.7 Financial

Table 16 provides a breakdown of the cashflow components over the 10-year planning horizon in 2016 dollars⁵⁰. These include:

- revenue, from passenger fares and catering;
- operating expenditure, which include the components noted in Section 4.2, and change with the type and number of rolling stock in operation;
- the resulting operating funding gap that may be funded separately from capital expenditure;

⁵⁰ Revenue and expenditure exclude the effects of any future cost inflation. It is assumed that fare levels would increase to match inflation over the period.

- capital expenditure, which includes the purchase of new DEMUs in 2021-22 and 2049-50, construction of basic stabling facilities in Palmerston North and Levin in 2021-22, and heavy maintenance throughout the period, as noted in Section 4.2; and
- the total funding gap that will need to be covered through public investment by local and / or central government.

Appendix A provides a breakdown over the full 40-year evaluation period.

Financial Year Ending	Revenue (\$m)	Operating Expenditure (\$m)	Capital Expenditure (\$m)	Operating Funding Gap (\$m)	Funding Gap (\$m)
2019	(\$1.74)	\$2.92	\$0.66	\$1.17	\$1.83
2020	(\$1.78)	\$2.92	\$1.42	\$1.14	\$2.56
2021	(\$1.81)	\$2.92	\$0.72	\$1.10	\$1.82
2022	(\$2.33)	\$1.02	\$28.56	(\$1.31)	\$27.25
2023	(\$2.38)	\$1.02	-	(\$1.36)	(\$1.36)
2024	(\$2.42)	\$1.02	-	(\$1.40)	(\$1.40)
2025	(\$2.47)	\$1.02	-	(\$1.45)	(\$1.45)
2026	(\$2.52)	\$1.02	-	(\$1.50)	(\$1.50)
2027	(\$2.56)	\$1.02	\$0.33	(\$1.54)	(\$1.21)
2028	(\$2.61)	\$1.02	\$0.43	(\$1.59)	(\$1.16)

Table 16: Cashflow Components Over the 10-Year Planning Horizon

Of immediate note is the high cost associated with the continued operation of the existing train in the first three years, which results in a \$6.21m funding gap that must be funded through public investment. **Table 17** shows the cost to each investor over this period, assuming a NZTA share at the standard 51% NZTA Funding Assistance Rate. The NZTA has not provided a formal position on whether NLTP funding is likely to be available.

Financial Year Ending	Funding Gap (\$m)	NZTA Share (\$m)	Share for Each Regional Council (\$m)
2019	\$1.83	\$0.93	\$0.45
2020	\$2.56	\$1.30	\$0.63
2021	\$1.82	\$0.93	\$0.45

Table 17: Forecast Investor Cost Impact

HRC currently contributes \$0.175m and GWRC \$0.110m, so each regional council would need to significantly increase its contribution with a NZTA contribution of the level shown in **Table 17**. The costs to each council would more than double again if a NZTA contribution was not available. A special funding arrangement may therefore be required to allow the train to continue running and maintain road and public transport service levels until the new DEMUs can be introduced.

The arrival of the DEMUs is projected to bring a reduction in operating expenditure, which along with the frequency-related patronage increase, is expected to result an operating

surplus over the remainder of the period. The full funding gap from 2021-22, inclusive of capital expenditure, will depend on the commercial arrangements that are agreed with the manufacturer of the new DEMUs. The impact on the investment partners will be dependent on that, the funding arrangement that supports the purchase, and the degree to which the capital cost is operationalised. **Table 18** provides an example, showing the 10-year planning horizon impact of operationalising the capital cost of the DEMUs over 25 years at a 6% discount rate.

Financial Year Ending	Operating Funding Gap (\$m)	Operationalised Capital Expenditure (\$m)	Funding Gap (\$m)
2019	\$1.17	\$0.66	\$1.83
2020	\$1.14	\$1.42	\$2.56
2021	\$1.10	\$0.72	\$1.82
2022	(\$1.31)	\$2.42	\$1.11
2023	(\$1.36)	\$2.22	\$0.86
2024	(\$1.40)	\$2.22	\$0.81
2025	(\$1.45)	\$2.22	\$0.77
2026	(\$1.50)	\$2.22	\$0.72
2027	(\$1.54)	\$2.55	\$1.00
2028	(\$1.59)	\$2.65	\$1.06

Table 18: Example Operationalised Capital Cost Over 25 Years (10-Year Planning Horizon)

4.8 Commercial

There are several commercial aspects to the investment proposal – those relating to the continued operation of the existing train, those related to the procurement of the new DEMUs, and those related to their operation.

4.8.1 Existing Train

The current public funding arrangement has been provided outside of a formal contractual relationship since 2015. However, the scale of public investment required to maintain operation of the existing train over the 2018-19 to 2020-21 period is substantial, and it may be appropriate to establish a formal agreement between the regional councils and KiwiRail to cover this period.

Such a contractual relationship would be consistent with the LTMA, which envisages that all services that receive public funding will be contracted, and with the NZTA requirement that the service be defined as a public transport unit in both regions' RPTP. An agreement could set clear service expectations and provide certainty around costs in a way that is fair to the investors and KiwiRail.

4.8.2 DEMU Procurement

Implementation of the longer-term DEMU related aspect of the investment proposal is dependent on the outcome of a separate GWRC business case, which will determine whether DEMUs are the best option to address a wider set of issues. That business case will identify the commercial arrangements for their procurement.

Procurement is likely to require a minimum three to four-year lead time to enable DEMU funding, design and construction, and it is unlikely that they will be available prior to the beginning of the 2021-22 financial year. The DEMUs will need to be available prior to April 2022 when the existing rolling stock would need to be withdrawn, placing a key timeframe constraint on the procurement process.

4.8.3 DEMU Operation

GWRC currently contracts the operation of its Metlink suburban rail services to Transdev Australasia. It is expected that Transdev will operate the DEMUs on the remainder of the Metlink network if DEMUs are chosen for that role, and it will be appropriate to extend that contract to include the operation of the services on Palmerston North-Wellington corridor commuter services to enable them to be efficiently operated and take advantages of economies of scale and scope.

4.9 Management

If the investment proposal proceeds as recommended, both regional councils will need to define rail commuter services on the corridor as a public transport unit in their RPTP as noted above. However, it will be important for one region to take a lead in managing the relationship with KiwiRail in the short term, particularly if the relationship is formally defined in a formal service contract. GWRC has considerable experience managing rail contracts, and it is therefore appropriate for GWRC to take a lead in managing the relationship with KiwiRail on behalf of both councils.

It will also be appropriate for GWRC lead the procurement of the DEMUs and manage their future operation. The GWRC business case will determine the appropriate project and contract management frameworks under which these will be managed.

4.10 Conclusion

The investment proposal entails the continued operation of the existing train between Palmerston North and Wellington until the beginning of the 2021-22 financial year, when it will be replaced by two new four-car DEMUs. One will then run a Palmerston North-Wellington service and the other a Levin-Wellington service, to double service frequency from Levin southwards and drive patronage growth.

The proposal has a PV net cost of \$11.35m, and direct transport benefits of \$106.74m over the 40-year evaluation period, which give it a BCR of 9.4. Assessment against the NZTA's draft 2018-21 Investment Assessment Framework gives a results alignment rating of 'High', which gives it a rank of 3 when combined with the BCR, making it eligible for NLTP funding.

Risks around dependency, timeframe, revenue, costs and public funding will need to be managed. Of note are the dependency of the DEMU aspect of the proposal on the outcome of a separate GWRC business case (dealing with wider Metlink network issues), a timeframe constraint imposed by the required withdrawal of the existing train by April 2022, and a \$6.2m three-year funding shortfall to enable its operation and maintain service levels until the DEMUs are introduced.

However, the proposal clearly responds to the problems resulting from a large and growing population and limited roading links on the corridor, and has accessibility, productivity, transport system capacity and transport system resilience benefits. These support economic growth and productivity on a high-growth corridor at a critical point on the transport network, and provide a strong case for investment. It is therefore recommended that the Passenger Rail Working Party and key investors give strong consideration to the proposal.

TDG

Appendix A

Cashflow Components

Financial Year Ending	Revenue (\$m)	Operating Expenditure (\$m)	Capital Expenditure (\$m)	Operating Funding Gap (\$m)	Funding Gap (\$m)
2019	(\$1.74)	\$2.92	\$0.66	\$1.17	\$1.83
2020	(\$1.78)	\$2.92	\$1.42	\$1.14	\$2.56
2021	(\$1.81)	\$2.92	\$0.72	\$1.10	\$1.82
2022	(\$2.33)	\$1.02	\$28.56	(\$1.31)	\$27.25
2023	(\$2.38)	\$1.02	-	(\$1.36)	(\$1.36)
2024	(\$2.42)	\$1.02	-	(\$1.40)	(\$1.40)
2025	(\$2.47)	\$1.02	-	(\$1.45)	(\$1.45)
2026	(\$2.52)	\$1.02	-	(\$1.50)	(\$1.50)
2027	(\$2.56)	\$1.02	\$0.33	(\$1.54)	(\$1.21)
2028	(\$2.61)	\$1.02	\$0.43	(\$1.59)	(\$1.16)
2029	(\$2.66)	\$1.02	-	(\$1.64)	(\$1.64)
2030	(\$2.70)	\$1.02	\$0.33	(\$1.68)	(\$1.35)
2031	(\$2.75)	\$1.02	\$0.43	(\$1.73)	(\$1.30)
2032	(\$2.80)	\$1.02	-	(\$1.78)	(\$1.78)
2033	(\$2.84)	\$1.02	\$0.43	(\$1.82)	(\$1.39)
2034	(\$2.89)	\$1.02	\$0.58	(\$1.87)	(\$1.29)
2035	(\$2.94)	\$1.02	-	(\$1.92)	(\$1.92)
2036	(\$2.98)	\$1.02	\$0.79	(\$1.96)	(\$1.17)
2037	(\$3.03)	\$1.02	\$1.05	(\$2.01)	(\$0.96)
2038	(\$3.08)	\$1.02	-	(\$2.06)	(\$2.06)
2039	(\$3.12)	\$1.02	\$1.13	(\$2.10)	(\$0.97)
2040	(\$3.17)	\$1.02	\$1.51	(\$2.15)	(\$0.64)
2041	(\$3.22)	\$1.02	-	(\$2.20)	(\$2.20)
2042	(\$3.26)	\$1.02	-	(\$2.24)	(\$2.24)
2043	(\$3.31)	\$1.02	-	(\$2.29)	(\$2.29)
2044	(\$3.36)	\$1.02	-	(\$2.34)	(\$2.34)
2045	(\$3.40)	\$1.02	\$0.43	(\$2.38)	(\$1.95)
2046	(\$3.45)	\$1.02	\$0.58	(\$2.43)	(\$1.85)
2047	(\$3.50)	\$1.02	-	(\$2.48)	(\$2.48)
2048	(\$3.54)	\$1.02	\$0.33	(\$2.52)	(\$2.19)
2049	(\$3.59)	\$1.02	\$0.43	(\$2.57)	(\$2.14)
2050	(\$3.64)	\$1.35	\$14.17	(\$2.29)	\$11.88
2051	(\$3.68)	\$1.35	-	(\$2.34)	(\$2.34)
2052	(\$3.73)	\$1.35	-	(\$2.38)	(\$2.38)
2053	(\$3.78)	\$1.35	-	(\$2.43)	(\$2.43)

2054	(\$3.82)	\$1.35	-	(\$2.48)	(\$2.48)
2055	(\$3.87)	\$1.35	-	(\$2.52)	(\$2.52)
2056	(\$3.92)	\$1.35	-	(\$2.57)	(\$2.57)
2057	(\$3.96)	\$1.35	\$0.49	(\$2.62)	(\$2.13)
2058	(\$4.01)	\$1.35	\$0.65	(\$2.66)	(\$2.01)