Peka Peka connectivity Single Stage Business Case

15 October 2018

Revision 4.0

Wellington Northern Corridor – Peka Peka Interchange

Single Stage Business Case to proceed to Pre-Implementation

More information

NZ Transport Agency
Published September 2017

If you have further queries, call our contact centre on 0800 699 000 or write to us:

NZ Transport Agency
Private Bag 6995
Wellington 6141

This document is available from the NZ Transport Agency on request.

APPROVAL

Prepared by	Internal Review completed by	Reviewed by	Endorsed by	Endorsed by
Megan Wheeler	Tony Innes	Craig Pitchford Monica Coulson	Chris Gasson	
pp 				
Date:	Date:	Date:	Date:	Date:
October 18	October 18	October 18	October 18	

REVISION STATUS

Revision number/ Date	Chapter	Author	Reviewed by	Transport Agency Review conducted by	Summary of revision
29/9/2017	1-4	Commute	Tony Innes	To Monica and Craig for Comment	Initial draft for comment
05/12/2017	All	Commute	Tony Innes	To team for comment	Full draft for comment
28/052018	All	Commute	Tony Innes	To team for comment	Revision following changes to GPS
15/10/2018	All	Commute	Tony Innes	To team for comment	Update for GPS and final IAF

Table of Contents

TABLE OF FIGURES

LIST OF TABLES

GLOSSARY OF TERMS

ABBREVIATION	TERM
AEE	Assessment of environmental effects
BCR	Benefit-cost ratio
CLoS	Customer Level of Service
D&C	Design and construct
DE	Design estimate
EEM	Economic evaluation manual
EIR	Environmental impact report
FYRR	First year rate of return
GPS	Government Policy Statement
HCV	Heavy commercial vehicle
ILM	Investment logic map
IRS	Investment and revenue strategy
KPI	Key performance indicator
LLR	Lessons learnt review
LTMA	Land Transport Management Act
NES	National environmental standards
NLTF	National Land Transport Fund
NLTP	National Land Transport Programme
NOR	Notice of requirement
ONRC	One Network Road Classification
Transport Agency (or the Agency)	The New Zealand Transport Agency
NZTS	New Zealand transport strategy
PBC	Programme Business Case
PPP	Public Private Partnership
PT	Public transport
RLT	Regional Land Transport
RLTS	Regional Land Transport Strategy

RMA	Resource Management Act
RoNS	Road of national significance
SH(#)	State Highway (number)
TA	Territorial Authority
WEBs	Wider economic benefits

EXECUTIVE SUMMARY

In February 2017 the Transport Agency opened the $400M Kapiti Expressway, a section of the Wellington northern corridor Roads of National Significance between Mackays and Peka Peka. This represented a step change in the capacity, performance and operation of the transport system in this area of the network.

As part of the expressway's implementation, a partial interchange was constructed at Peka Peka (only north facing ramps) that did not preclude the provision of south facing ramps in the future. The partial interchange was provided due to the additional cost of the south facing ramps and concerns by Kapiti Coast District Council (KCDC) at the land use impacts associated with the provision of a full interchange.

Post implementation monitoring has shown that traffic volumes have been greater than forecast and customers from the Peka Peka and Te Horo communities are becoming increasingly frustrated at the poor level of access they have to the new expressway. These customers are dissatisfied with the confusing and out of context impact the partial interchange at Peka Peka is having on their lives and believe they are living with the effects of the expressway but do not receive all the associated access benefits.

The current layout is therefore not providing the best outcome for customers in this area, nor is it providing a transport system commensurate with the level of investment in the transport system in this area of the network.

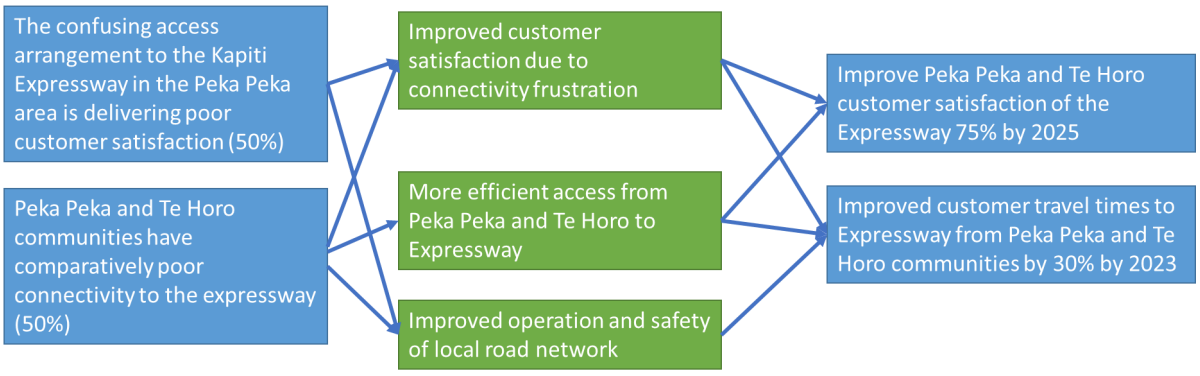
Customer insights during this project included the following:

Residents in Peka Peka were consistently dissatisfied with the additional 6-7 minutes lost with their families as a result of the circuitous route through local roads to get on and off of the new Expressway.

Customers struggled to understand why they could use the current Peka Peka interchange to go to and from the north but not to the south where most of them want to go, highlighting this is not the hallmark of a good transport system.

Businesses in Peka Peka confirmed that customers were confused by the layout and how to access the area, resulting in delays to deliveries and disgruntled customers once they have arrived.

This single stage business case has worked closely with KCDC and other stakeholders to investigate the options for improving connectivity for the Peka Peka and Te Horo communities. This resulted in alignment on the following problems, benefits and investment objectives:



These problem, benefit and investment objectives were reviewed after the 2018 GPS was confirmed. To better align with the GPS the second investment objective was reworded slightly to remove travel time references and include access:

Improved customer <u>access</u> to Expressway from Peka Peka and Te Horo communities by 30% by 2023

A number of options and alternatives were considered, including improved local road access and connections to the Expressway at both Te Horo and Peka Peka. Working with stakeholders and technical specialists, the existing Peka Peka interchange was identified as the preferred location to improve connectivity. Two options were identified from the shortlisting process and these were taken to the wider community and general public for feedback.

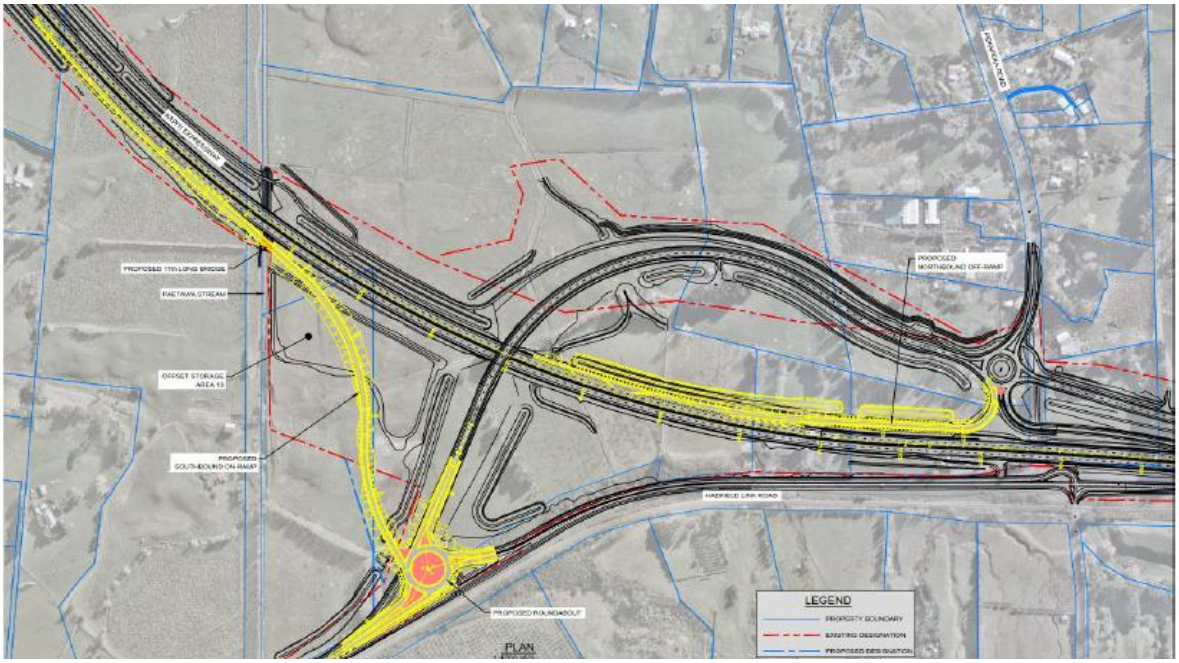
The main difference between the options were:

- Option 1 provided a more intuitive layout that delivered superior investment objective outcomes
- Option 2 provided a low cost, low level of service solution that was in the order of $10M cheaper than Option 1

Option 1, outlined below has been identified as the recommended option.

Why not Option 2?

Whilst Option 2 is the cheaper option, it requires a trade off in safety and efficiency of operation. Geometrically, the design generally meets minimum requirements but a departure would be needed for a reduced left side shoulder width under the existing underpass - at its narrowest point, 2m less than the requirement (due to a bridge abutment). This is considered to be inconsistent with the standard and quality of the rest of the Expressway and potential to lead a reduced safety performance. Option 2 also provides 25% less travel time savings and requires customers to travel north to head south, not an intuitive design.



The recommended option delivers **improved connectivity to the Expressway for the Peka Peka and Te Horo communities that is commensurate with the existing and expected standard of the Expressway** and best addresses customer frustration through the following:

ITEM	COMMENTARY
Better customer connectivity to Expressway	Option 1 delivers at least 30% travel time savings on average (approximately 4 minutes) to the communities of Peka Peka and Te Horo
Improved customer satisfaction	Option 1 provides a legible and intuitive layout commensurate with the recent Expressway standard Unanimous support from stakeholders for this option and approximately 75% of the general community preferred this option
Economic Case	Whilst other options were cheaper, Option 1 has a strong economic case (1.5 to 2.1), ensuring that the solution is a prudent investment decision
Safety	Option 1 provides a safe outcome for customers through a clear and legible layout
Wider impacts	Improving connectivity at the existing Peka Peka interchange is not forecast to adversely impact on the economic performance of Waikanae town centre, nor result in significant changes in land use (some acceleration in permitted uptake and minor intensification is predicted)

The cost of implementation of option 1 from this point is estimated at $20M. This includes an allowance of $1M for local roading improvements if required due to any changes or acceleration in land use development in the Peka Peka area.

The Investment Assessment Framework (IAF) has this project at a Priority 6, which is not particularly high on the priority list. Funding would need to be allocated before the project can be progressed further, no funding is currently allocated to this project.

Implementation is proposed through a separate measure and value contract and expected to take in the order of three years from approval to proceed, once funding is confirmed.

PART A: THE CASE FOR THE PROJECT

1 BACKGROUND

This report summarises the development and assessment of improvement options for Peka Peka Connectivity in the Kapiti Coast District. This section of the report introduces the project and summarises the previous work completed on the wider Northern Wellington Road of National Significance programme. It then moves onto discuss the project governance structure and the stakeholder consultation process.

1.1 General

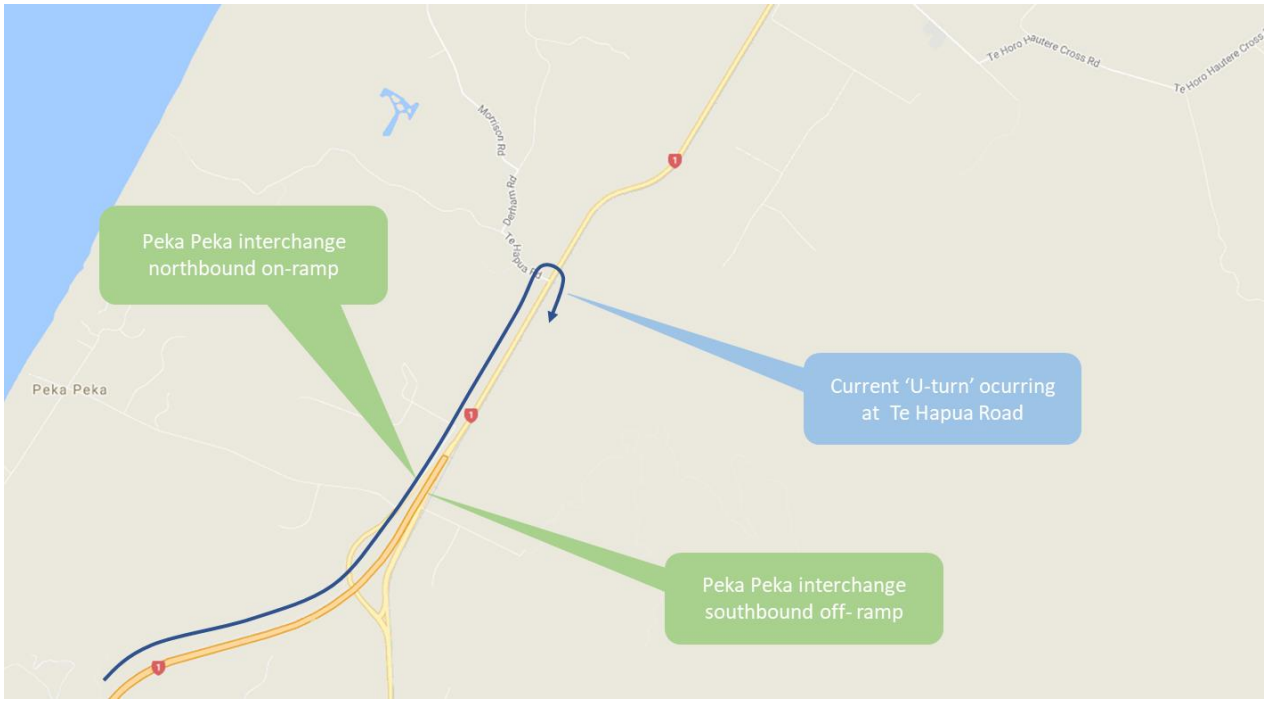
The Wellington Northern Corridor is one of the governments first RoNS projects announced in 2009 via the Government Policy Statement on land transport. The Wellington Northern corridor is currently being delivered in stages.

In February 2017, the Mackays to Peka Peka section of the Kapiti Expressway opened to traffic. As part of the post opening monitoring, the Transport Agency has reviewed operation of this section. It has becomed apparent that as the customers have become used to the altered transport network there have been some operational challenges for customers identified at the northern end of the project.

As shown in Figure 1, the project ends at Peka Peka and only north facing ramps are provided (as shown in Figure 2). This means that traffic accessing Peka Peka is required to exit at the Te Moana Road interchange, approximately 5km south of Peka Peka. This is resulting in some vehicles (Including emergency services) currently driving approximately 1.5km north (to Te Hapua Road) and undertaking a U-turn as outlined in Figure 2.

Figure 1: Mackays to Peka Peka section of the Kapiti Expressway

Figure 2 : Existing Peka Peka Expressway



A contract has recently been awarded for the extension of the expressway from Peka Peka to Otaki. This will address the U-turn issue as access to Te Hapua Road will no longer be available. The expressway extension will however not address the routing issue for Peka Peka traffic as the next interchange north of Peka Peka is at Otaki, approximately 9km northwards.

Because of these operational issues and customer feedback, the Transport Agency is assessing the connectivity for Peka Peka and its surrounding communities and investigating the long-term access arrangements for this section of the network.

The Transport Agency has met with local residents and the Mayor of Kapiti to discuss the issues and share the Transport Agency process for investigation.

This business case looks at connectivity considerations from Peka Peka through to Otaki River, south of Otaki as outlined in Figure 3.

Figure 3 Study Area

1.2 Peka Peka Connectivity Single Stage Business Case

A Single Stage Business Case identifies a preferred option that optimises value for money and the arrangements for successful implementation. It is typically used for proposals that have a relatively low level of investment and low risk profile.

This project is considered to have a low risk profile due to the previous detailed works undertaken as part of the Mackays to Peka Peka and Peka Peka to Otaki projects.

This Single Stage Business Case:

- confirms the strategic context of the organisation and how the proposed investment fits within that strategic context;
- confirms the need to invest and the case for change;
- identifies a wide range of potential options;

- determines the preferred option which optimises value for money, by undertaking a detailed analysis of the costs, benefits and risks of the short-listed options;
- prepares the proposal for procurement;
- outlines the necessary funding and management arrangements for the successful delivery of the project; and
- informs a proposal to decision-makers to approach the market and finalise the arrangements for implementation of the project.

1.3 History of Kapiti Expressway

1.3.1 Wellington Northern Corridor

SH1 between Levin and the Wellington airport is the main roading connection in, through and out of the Wellington region. It provides a critical link to the lower North Island and key regional destinations including the Wellington CBD (the region's main employment centre), CentrePort, the Interislander ferry, and the Wellington International Airport. In 2009, the Wellington Northern Corridor RoNS project was announced using a staggered implementation timeframe for each of the sections as outlined in Figure 4.

The objectives of the Wellington Northern Corridor RoNS are to:

- enhance inter regional and national economic growth and productivity;
- improve access to Wellington's CBD, key industrial and employment centres, port, airport and hospital;
- provide relief from severe congestion on the state highway and local road networks;
- improve the journey time reliability of travel on the section of SH1 between Levin and the Wellington airport; and
- improve the safety of travel on state highways.

The benefits of the investment were expressed for the region and include:

- supporting the land-use and economic growth aspirations of the region; and
- improving connectivity between regional economic hubs.

For the Peka Peka Connectivity project, the Wellington Northern Corridor RoNS project sets the context for each of the sections of the Kapiti Expressway and overall programme objectives. The RoNS objectives focus on strategic movements between key destinations in terms of safety, efficiency and reliability.

The Peka Peka and Te Horo areas are not identified as key industrial and employment centres or economic hub. However, additional connectivity could be considered to contribute to supporting the land-use and economic growth aspirations of the region.

Figure 4: Wellington Northern Corridor projects

1.3.2 Mackays to Peka Peka

In 2012 the NZ Transport Agency lodged a notice of requirement for designation and a resource consent application for the Mackays to Peka Peka project (M2PP). The application sought approval for the proposed designation of the M2PP project corridor to allow the construction, operation and maintenance of a State Highway formed to an expressway standard from north of Mackays Crossing to Peka Peka.

The final Board of Inquiry conditions confirmed local access to and from the alignment primarily via two new full interchanges - one at Kapiti Road, and one at Te Moana Road, plus partial interchanges at the northern and southern tie-ins to the existing SH1. The partial interchanges were confirmed as south-facing ramps only at the southern tie-in at Poplar Avenue, and north-facing ramps only at the northern tie-in at Peka Peka.

At the time of the design in 2011, the decision to construct a partial interchange at Peka Peka was made based on demand modelling suggesting there being insufficient demand to justify the additional cost of a full interchange. Based on KCDC's expressed concern, south facing ramps were considered to have the potential to have an adverse effect on the land use and planning in the District, which in turn could create an adverse effect on the Expressway through an increase in short trips compromising the through traffic efficiency and safety. Therefore, only north facing ramps were proposed.

In 2015, the Mackays to Peka Peka Alliance were required to make some changes to the Peka Peka Link Road. As part of this work, the Alliance considered the potential for a future interchange and developed the attached schematic as a result (see Appendix A). It is understood that the future interchange did not progress at this time due to funding constraints.

In February 2017, the Mackays to Peka Peka section of the Kapiti Expressway opened to traffic.

1.3.3 Peka Peka to Otaki

In 2014 the Transport Agency was granted approval for the Peka Peka to Otaki section of the RoNS and in November 2016 Fletchers were awarded the implementation contract. Construction of this section is forecast to be completed in 2020.

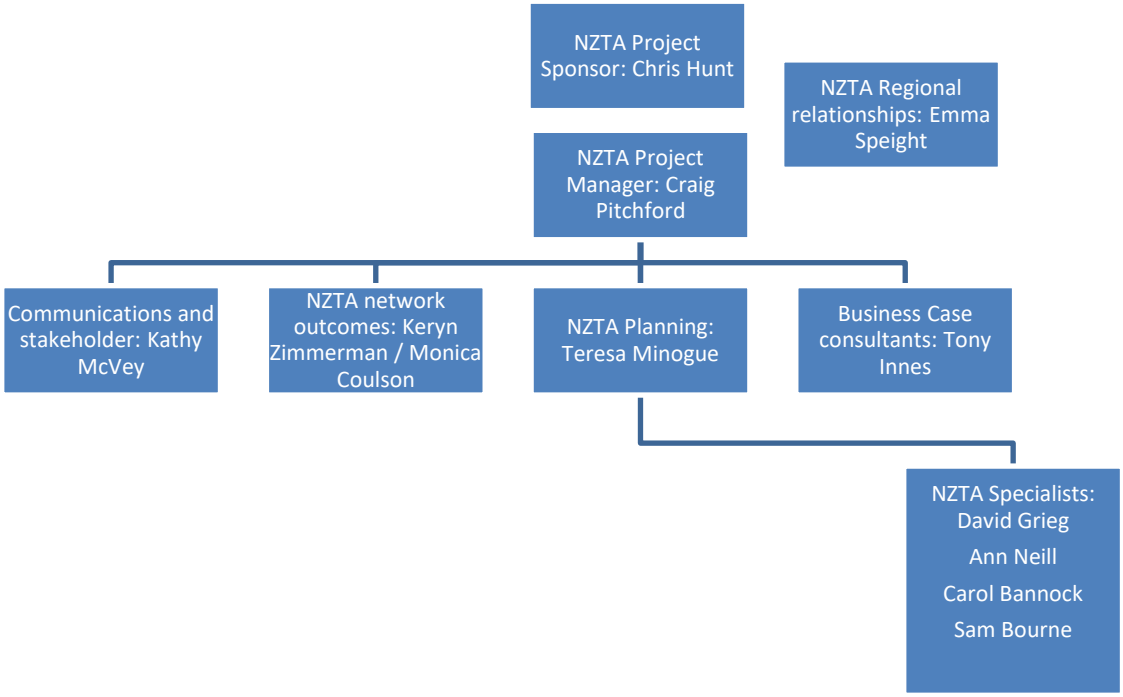
During the hearing process there was discussion from some submitters in relation to the lack of an interchange south of Otaki (Otaki was the scheme's only interchange with the current network), however the decision was approved without the requirement for any additional interchange locations to those proposed in the original application.

1.4 Project governance and organisation structure

1.4.1 Project governance

Figure 5 below details the organisational chart of people involved during this stage of the business case development.

Figure 5: Project Organisation structure



The Engagement and Communications plan (included in **Appendix C**) provides further details on the stakeholders and roles and responsibilities for the Business Case.

2 PROBLEMS AND EVIDENCE BASE

Two workshops were held in 2017 with key stakeholders to gain a better understanding of current problems on this section of the corridor. These problems can be summarised as accessibility to the Kapiti Expressway and customer satisfaction (or dissatisfaction) at the confusing nature of the current access arrangement for the Peka Peka and Te Horo communities.

The Peka Peka and Te Horo communities have lesser accessibility to the Expressway than neighbouring communities. Accessibility has been measured using travel time and the current network configuration is resulting in additional travel of between 7 minutes for Peka Peka communities and 13 minutes for Te Horo communities. The exception is the access to the Peka Peka community from the north which is similar to nearby communities along the Expressway.

Current access to and from the Expressway is confusing for customers with the partial interchange at Peka Peka only providing north facing ramps. This is creating frustration for customers of these communities who wish to travel south from Peka Peka or for northbound customers who wish to exit at Peka Peka and currently are not allowed to do so.

Addressing these problems forms the basis of the projects investment objectives.

2.1 Context

There are many contextual elements to this project that assist in the understanding of the challenges faced by the area and the resultant impact this has had on the option development and ultimate selection of the preferred option.

2.1.1 Geographical Context

Figure 6 provides the wider geographic context for the Peka Peka connectivity corridor. The area of this project is approximately 60km north of Wellington. The existing state highway and recent Expressway is located approximately 3km to the east of the western coastline and at the foot of Tararua Forest mountains.

Figure 6: Geographic context map

2.1.2 Land Use Context

Generally, the land within the study area is zoned for rural activity with residential zoning around the townships of Peka Peka and Te Horo as outlined in Figure 7.

Further to the south of the study area there increased residential, township and industrial zoning around the town centres of Waikanae and the Waikanae Beach community.

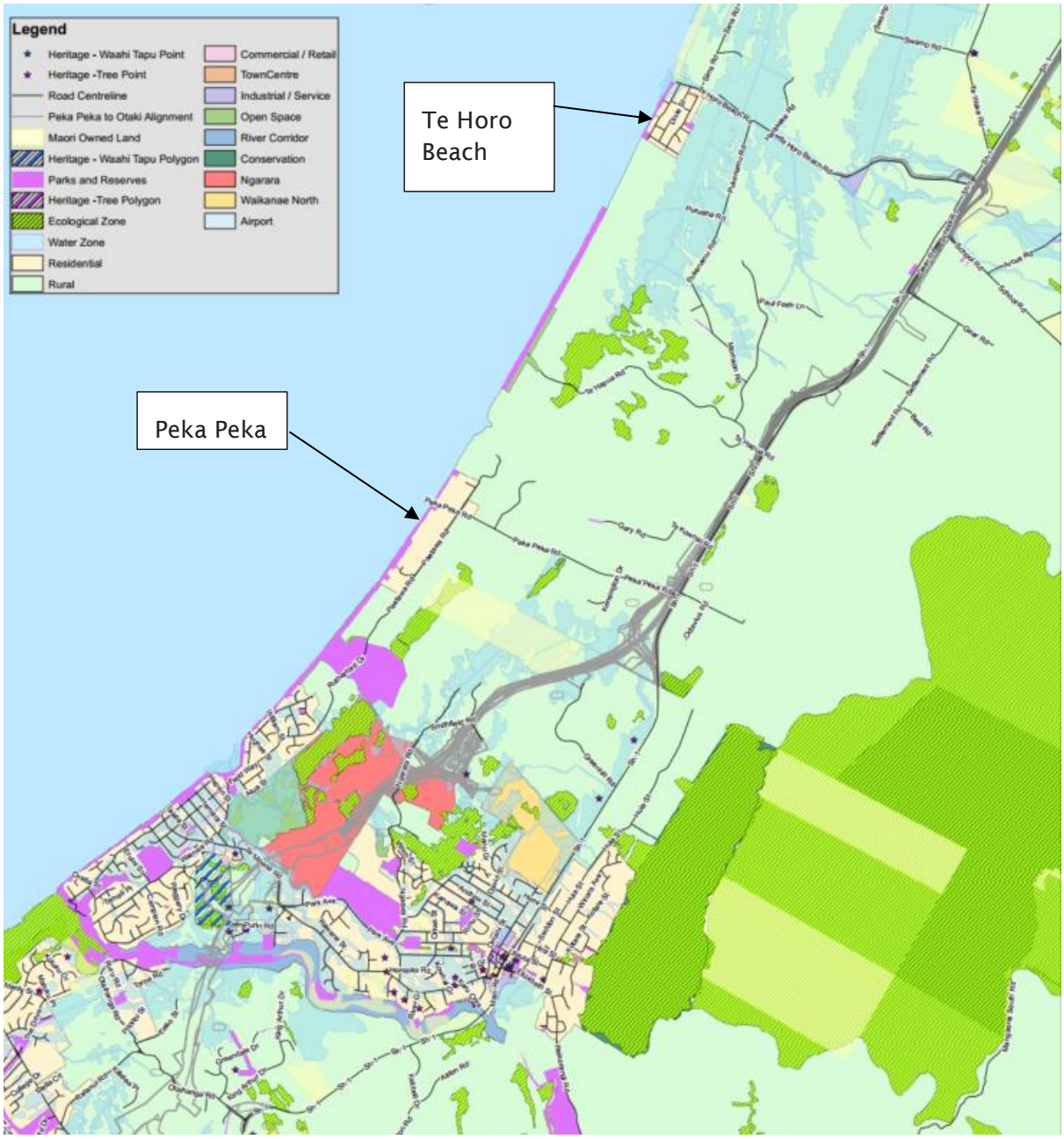
The Kapiti Coast District has experienced relatively low population growth with an annual growth rate of around 0.8%[1].

There are no current plans for future intensification of residential activity in the study area, or for inclusion of town centre zoning in either Peka Peka or Te Horo.

Given the recent and planned investment in the Kapiti Expressway and relative attraction of coastal land, there is increasing pressure on intensification of residential development in and around the Peka Peka area, including conversion of rural land to residential close to the coast. The community is reporting an increased trend in converting existing residential from holiday homes to permanent residences.

[1] Statistics NZ, 2006 population of 46,197, 2013 population of 49,104.

Figure 7 : Surrounding Land Use Zoning



2.1.3 Social Context

There is a wide range of local communities in around the study area. Within the study area are two predominant communities, Peka Peka and Te Horo. The Kapiti Coast District Council (KCDC) District Plan provides governance over land use in the study area. The wider area is defined by pockets of residential development along the coast surrounded by more expansive areas of rural zoned land. The urban area of Waikanae merges into the Paraparaumu area to the south and provides a range of land uses including residential, open space, business and industrial. Kapanui School and Waikanae School are also located to the south of the study area.

The residential area of Peka Peka (Figure 9) is a smaller residential settlement focused on the coast with surrounding lifestyle block type lots to the east further away from the coast.

The Te Horo Beach (Figure 10) settlement is a relatively confined residential settlement surrounded by rural land. School Road is further inland and to the east of State Highway 1 and includes the Te Horo school and the local town hall.

Figure 8: KCDC land use for the wider study area

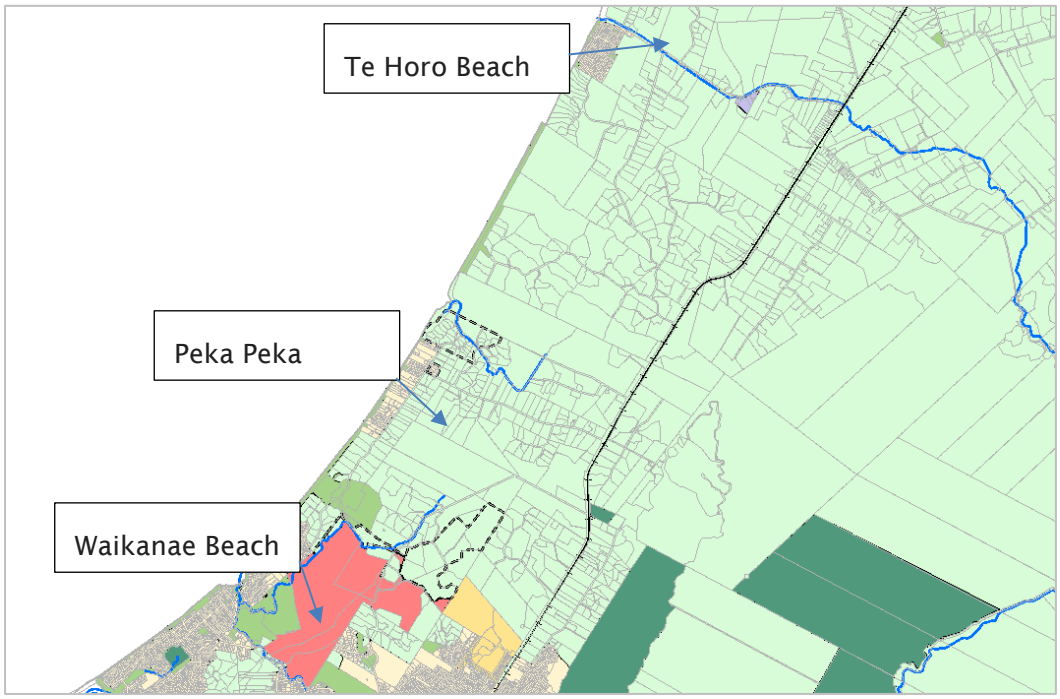


Figure 9: Peka Peka area

Figure 10: Te Horo Beach area

The KCDC publish their long-term plan which describes the council's vision for the district for 20 years and outlines the services and activities provided, the major works underway and future projects. The long-term plan includes projection for population and land use into the future. Table 1 provides a projection of dwellings in each area. As can be seen from the table, Peka Peka is forecast to experience above average levels of growth (albeit from a low baseline) with around 4.5% growth per annum forecast but remains modest in the number of houses. Te Horo is forecast to receive modest growth at around 1% growth which is more inline with the 1.5% annual growth forecast for the wider region.

Table 1: KCDC occupied dwelling projection

Projected 2006 to 2032 occupied private households by area unit under the medium projection

Census area unit	2006	2012	2016	2021	2026	2032	Change 2012-2032
Waikanae Beach	1,214	1,318	1,372	1,448	1,526	1,606	288
Waikanae East	819	926	968	1,022	1,065	1,115	189
Peka Peka	114	152	168	184	206	247	95
Waikanae Park	860	967	1,218	1,619	2,005	2,504	1,537
Waikanae West	1,677	1,758	1,824	1,843	1,882	1,916	158
Kaitawa	179	234	256	259	263	258	24
Ōtaki Forks	555	645	696	696	691	669	23
Te Horo	289	331	327	340	352	371	40
Ōtaki	2,381	2,489	2,596	2,668	2,777	2,884	396
Paraparaumu Beach North	1,264	1,372	1,469	1,513	1,542	1,567	195
Otaihanga	402	483	562	616	659	710	227
Paraparaumu Beach South	2,048	2,211	2,286	2,380	2,462	2,537	327
Paraparaumu Central	3,334	3,688	4,036	4,315	4,578	4,846	1,159
Raumati Beach	1,858	2,023	2,152	2,271	2,351	2,466	442
Raumati South	1,361	1,474	1,602	1,760	1,891	2,054	580
Paekākāriki	673	659	637	639	638	615	(44)
Kāpiti Island	-	-	-	-	-	-	-
Maungakotukutuku	315	379	413	424	434	432	53
Kāpiti Coast district	**19,343**	**21,110**	**22,583**	**23,996**	**25,321**	**26,798**	**5,688**

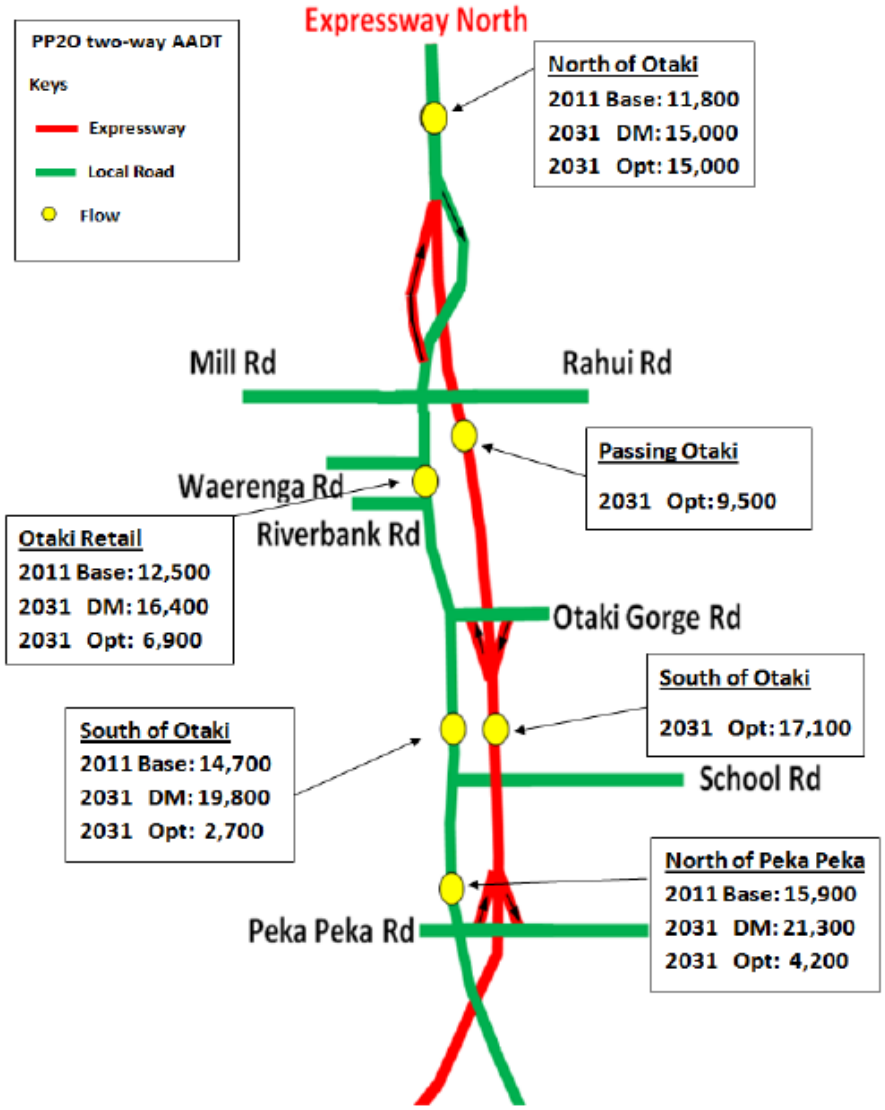
Source: MERA February 2011

2.1.4 Transportation Context

The recently complete Mackays to Peka Peka section of the Kapiti Expressway and the currently underway Peka Peka to Otaki section will change traffic volumes and patterns in the area. To understand these changes, traffic modelling was undertaken as part of the Mackays to Peka Peka and Peka Peka to Otaki projects. A project SATURN model was built drawing on demands from the regional Wellington Strategic Transport model (WTSM). Traffic volumes expected on the new expressway and surrounding network are outlined on Figure 11 for the base, 2031 do minimum (DM) and 2031 option (Opt) scenarios.

The project results in a substantial proportion of traffic diverting from the existing state highway onto the new expressway. In the 2011 model year, the expressway leads to a 11,600 vpd (57%) reduction in traffic on the existing State highway south of Peka Peka.

Figure 11: Traffic flows



In addition to the reduction in traffic expected on the existing State highway, reduced volumes are expected on several local roads as the travel patterns change because of the

expressway. The reductions experienced on the local road network are outlined in Table 2. Peka Peka Road experiences around 50% reduction in traffic as a result of the expressway and change in connectivity.

Table 2: Reductions in traffic on local road network (M2PP)

Road	2016 Reduction in Daily Flow	2026 Reduction in Daily Flow
Arawhata road	400 (5%)	200 (3%)
Te Roto Road	400 (3%)	200 (2%)
Realm Road	600 (19%)	700 (17%)
Mazengarb Road	300 (5%)	500 (8%)
Ratanui Road	2,500 (32%)	3,000 (38%)
Otaihanga road	2,500 (34%)	3,100 (36%)
Te Moana Road (West of SH1)	5,100 (48%)	6,800 (52%)
Te Moana Road (West of Walton Avenue)	1,600 (28%)	2,600 (32%)
Peka Peka Road	600 (50%)	600 (46%)

The Peka Peka to Otaki section of the expressway has a similar effect on local roads. Of relevance to this project, Te Horo Road experiences a significant reduction in traffic of 2,700 vpd or 86% reduction (daily changes on the existing SH1 in 2031 between the do minimum scenario and the 'option' scenario).

This traffic modelling has predicted an annual rate of traffic growth of approximately 1.3%[2]. Over the last five years the actual traffic growth rate has been greater at 3%[3]. This is understood to be due to an increased level of development in the wider area and the strong economic performance which has increased goods and services and tourism traffic.

In 2015 the traffic modelling undertaken as part of the M2PP and PP2O section was updated to reflect changes in the strategic model (WTSM) demands and changes to traffic volumes on the network.

[2] SH1 traffic north of Te Moana between 2021 and 2031

[3] SH1 traffic volumes at Otaki (TMS site over the 2012-2016 period)

A review of travel to work data for the wider Kapiti area[4] has shown a strong reliance on the private vehicle for travel to work, at 58% with 10% using public transport (9% by train and 1% using bus) and 10% working from home.

As part of the Mackays to Peka Peka project, a shared path has been provided along the expressway corridor. The shared path provides walking and cycling access through the corridor and connects communities along the route. As part of the Peka Peka to Otaki project, the shared path will be extended to the north towards Otaki.

2.1.5 Environmental Context

The project area is contained within the M2PP and PP2O project extents.

The M2PP project has only recently been completed and was subject to a complex suite of designation and resource consent conditions relating to a range of matters including:

- Stormwater/ ecological and Wetland impacts
- Offset mitigation removal/relocation effects.

The project area is predominantly flat and there is a high ground water level given the proximity of the coast. This results in areas susceptible to flooding and careful management of flood storage in high rainfall events will be required. Any design will also need to ensure that there are no 'barrier' effects relative to the east-west catchment flows or negative interaction with the Kapiti districts wetland systems, aquifers and bore use.

A number of streams are located in the project area and sediment runoff from earthworks during construction has the potential to adversely affect freshwater habitats and species. The project area is not directly adjacent a marine environment, however the coastal water is the ultimate receiving environment for any sediment-carrying water from the project.

The dominant ground conditions in the project area are deep peat which provides some technical challenge for road construction.

Since the opening of the Expressway, the community has expressed concerns at the resultant noise levels. This is being actively managed by the Transport Agency and indicates the sensitive nature of this issue in this area.

2.1.6 Cultural Context

Between the Waikanae River and Te Moana Road the Mackays to Peka Peka Expressway crosses land that's of great historic and cultural significant to local iwi. Whakarongotai Mārae used to be in this area in what was called the Tuku Rakau village. This whole area is waahi tapu (sacred land) and contains the Takamore Urupa, an operating burial ground, where many tipuna (ancestors) rest.

As part of the Mackays to Peka Peka project, the Agency worked very closely with iwi to make sure construction in this special place happened with respect and sensitivity. This was

[4] Statistics New Zealand Travel to Work data for Kapiti District for 2013

guided by Memoranda of Understanding with Te Atiawa ki Whakarongotai and the Takamore Charitable Trust as well as working groups with directly affected Māori landowners.

Of the Iwi in the Kapiti Coast District, the following are believed to have Mana Whenua over the study area for the Peka Peka connectivity Business Case:

- Te Āti Awa ki Whakarongotai - south of Peka Peka
- Ngāti Raukawa ki te Tonga - from Peka Peka to Otaki North

It is understood that Ngati Raukawa ki te Tonga have a current lease arrangement with the Transport Agency for land within the Peka Peka interchange.

2.1.7 Consideration during previous phases

Connectivity in the study area has been explored through the Board of Inquiry process for both the Mackays to Peka Peka and Peka Peka to Otaki projects.

During both hearings, there was evidence and discussion on the form of the Peka Peka interchange and the need for further accessibility (to that proposed by the Transport Agency) in the Peka Peka and Te Horo areas.

In summary it was acknowledged that the Peka Peka interchange did not warrant south facing maps and there was the provision made for ramps in the future. This is shown in Figure 12.

Figure 12 : Mackays to Peka Peka BOI decision excerpt

> *[311] When assessed in respect of the Project Objectives that are established, we were satisfied that the proposal is consistent with them. In particular, it is evident that the decision taken in relation to a partial interchange at Peka Peka, for example, has been influenced by "…current and future planned settlement patterns…"*
>
> *[312] It is also evident to us that through the multi-criteria evaluative process, and also the assessment of alternatives processes, a range of alternate connections and interchange arrangements have been adequately considered. Some properties, in particular those located on Leinster Avenue, will incur additional travel time effects, albeit, to some degree, these will be off-set by travel time and safety benefits elsewhere on the expressway. We accepted there are sound integrated land use planning and cost reasons to support the configuration of interchanges as are proposed. We heard that while this means only half interchanges are to be established at Poplar Road and Peka Peka Road at present, it would not necessarily preclude full interchanges being established in future where land use and traffic demands supported such connection. Overall, however, we are of the view that the net adverse traffic movement effects, while changed, will be minor. To this extent, we accept the evidence of the applicant on this point.*

The summary assessment of south facing ramps against project objectives is shown in Figure 13 and concludes that there would be transport benefits for a small number of users however the ramps did not support the land use positions of KCDC.

Figure 13 : Mackays to Peka Peka BOI transport evidence excerpt

[227.1] South facing ramps at Peka Peka would have transport benefits in terms of reduced travel times and improved accessibility to a relatively small number of vehicles in the Peka Peka area; however

[227.2] The improved access between Peka Peka and areas south could result in short trips on the Expressway that compromise through traffic efficiency and safety if retail/commercial activities established in Peka Peka. KCDC oppose such ramps because of the risk that they could encourage such development in Peka Peka

The Peka Peka to Otaki BOI decision, as shown in Figure 14, discussed not have an interchange at Te Horo (which was also supported) and there was also reference to the future proofing at Peka Peka being considered by the board in relation to the Te Horo interchange issue.

Figure 14 : Peka Peka to Otaki BOI decision exert

[690] It was also evident that an extensive evaluation system has been undertaken including consideration of an appropriately wide range of options. These were the subject of considerable community consultation and in some cases the Project was altered to reflect the responses. In the case of Te Horo, no connectivity has been proposed at this time, although the Board heard that the M2PP Project provides for future connectivity at Peka Peka if warranted.

[691] The Board notes that although there was modest support for the construction of further Expressway connectivity at Peka Peka and for a form of Expressway connectivity at Te Horo, the former is outside the jurisdiction of this Board. As far as the latter is concerned, the Board noted the level of support expressed by residents for connectivity at Te Horo was low, considering the size of the local area population. It also had regard to the long-standing opposition to development at Te Horo and Te Horo Beach in various KCDC planning documents which have been current for a number of years.

[692] Any adverse effects from the lack of Expressway connectivity at Te Horo need to be weighed against the connectivity resulting from the proposed interchanges, admittedly some distance away. In terms of the overall broad judgment, including other positive and negative effects of the Project, the Board accepts the Proposal is consistent with Transport Agency's stated objectives for which it sought the designation.

This planning history is important context when considering connectivity solutions in this area of the network.

2.2 Defining the problem

No problem statements or indeed an ILM had been previously completed for this project, or the expressway projects either side (as they came before the business case approach was adopted by the Transport Agency).

Through this SSBC (at workshop 1) problems were explored with stakeholders. The following problem statements and their associated weightings were identified and confirmed at the second workshop.

1. The confusing access arrangement to the Kapiti Expressway in the Peka Peka area is delivering poor customer satisfaction (50%)
2. Peka Peka and Te Horo communities have comparatively poor connectivity to the Kapiti Expressway (50%)

The problem identified by the project stakeholders is due to the confusing nature of access to the Expressway for Peka Peka and Te Horo communities and that this access is not as direct as other communities experience along the route. Due to the partial interchange at Peka Peka (only north facing ramps) there is an interchange shown on maps, however from the south there is no access to Peka Peka. This is confusing for visitors who can see there is an interchange on Google Maps (as an example) but cannot use it. In addition, once customers exit at Te Moana interchange (the correct interchange to access Peka Peka from the south) the signage directs you inland via the Waikanae town centre, which is counter intuitive (as Peka Peka is to the west, not towards the east which is the way the signage sends customers). Again, this is confusing and frustrating for customers.

Using the Te Moana interchange also requires an additional travel time of approximately 2-5 minutes (depending on route) as compared to access being provided directly at Peka Peka. This is causing frustration for customers.

2.3 Evidence Base

This section investigates the evidence to support the problem statements developed following the initial workshop with stakeholders.

2.3.1 Confusing Access

The Issue

Customer feedback from the Peka Peka and Te Horo communities has indicated that the current configuration of the Kapiti Expressway is impacting journey planning and access to their communities. In particular, the customers find the layout of the Peka Peka interchange confusing and frustrating.

Figure 15 below shows the access arrangement required for the Peka Peka and Te Horo communities to access the Kapiti Expressway (following the completion of Peka Peka to Otaki).

Figure 15 : Current access to Kapiti Expressway from Peka Peka and Te Horo

Residents in Te Horo wanting to travel south on the Expressway are required to travel approximately 16km to access the nearest south facing ramps. Heading northbound requires a trip through the Otaki township, or a 6km journey south to the Peka Peka interchange to head north. Neither of these options are particularly attractive and in some instances, are in fact counterintuitive.

Peka Peka residents have direct access (approximately 2.5km) to the Expressway for northbound trips, however the dominant southbound trip requires a 5.5km trip through Waikanae Beach or a signposted route of 10km trip through Waikanae town centre.

The traffic count data on Peka Peka Road indicates approximately 1000 vehicles a day less than before the Expressway was built, indicating local Peka Peka residents are travelling through Waikanae Beach to head south.

The local communities consider this discrepancy in time and trip length to be confusing and frustrating for their travel planning. The level of this frustration was confirmed at Workshop 1 of this business case. In addition, stakeholders reported:

- Local communities are now lobbying their local Members of Parliament for improvement to access
- Rat running has increased through local community streets rather than following the signposted routes
- There is concern that business is being impacted by this confusing access.

Trip Legibility

The confusing nature of the trips that stakeholders have raised is known as trip 'Legibility'. In the transport context this is defined as ***"Legibility - A legible environment makes navigation and movement easy and seamless, helping improve people's understanding, enjoyment and experience".***

The concept of good legibility of design is used throughout the transport system and across all modes. From an Expressway perspective, good legibility would include interchanges looking and feeling the same, and importantly providing for all movements. This allows people to access the Expressway from the same location as they exited and vice versa. This has been shown to provide a more understandable and enjoyable customer experience.

In this area of the Expressway there are a combination of full and partial interchanges and variable interchange spacing as outlined in Figure 16. This provides variable legibility and is understood to be as a result of balancing the needs of the local communities' access and the cost of implementation of the Expressway.

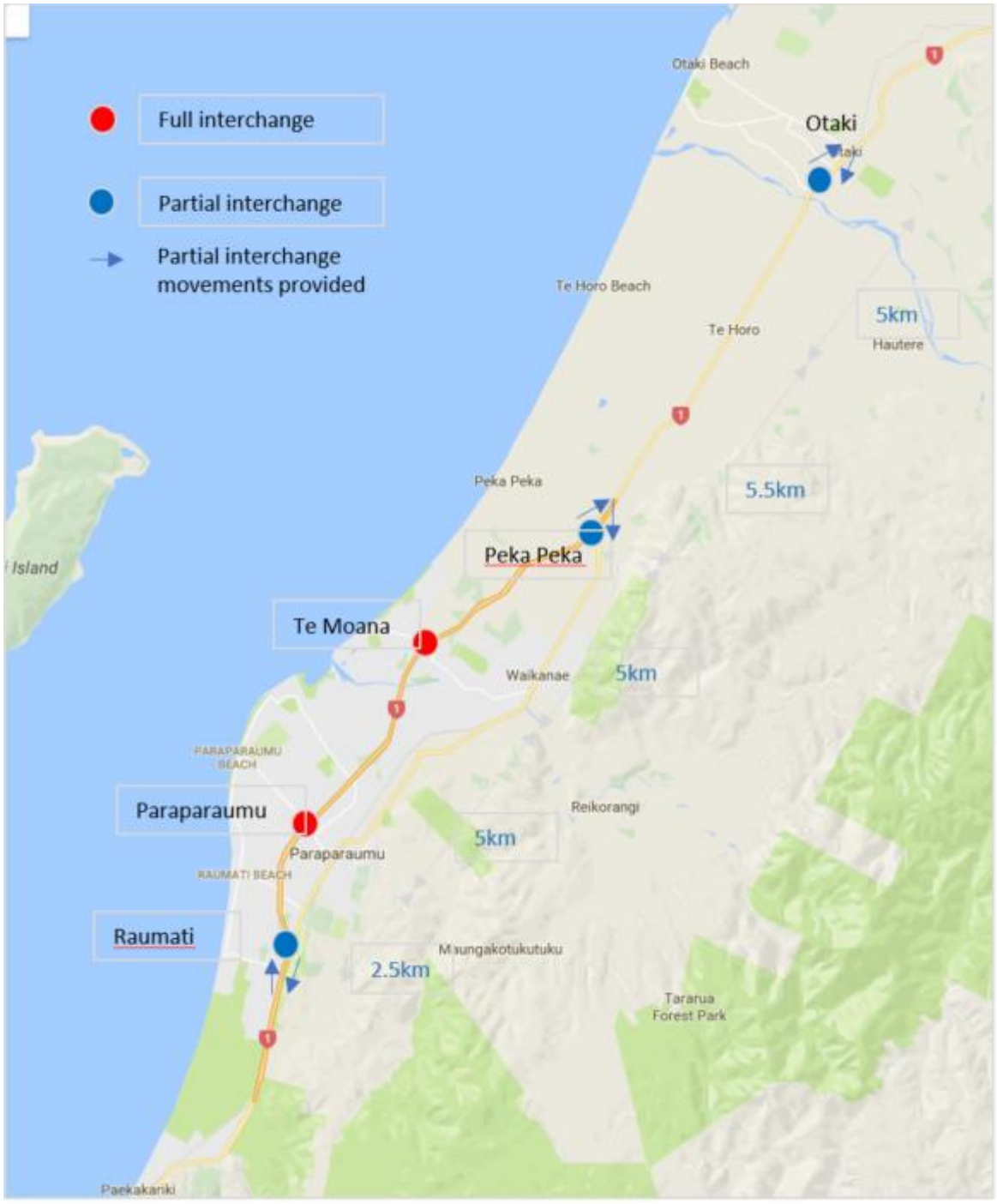
The distance between interchanges also increases the further north the Expressway travels. This is not surprising given the general reduction in population levels as you move north.

Importantly for this project, there is approximately 15.5km between the last complete interchange (Te Moana) and the next at Otaki (which is provide through two partial interchanges either side of the town centre. The Peka Peka interchange provides a partial interchange for movements to and from the north, however, it is the movements to and from the south of Peka Peka which are in fact the dominant trip destination for these communities.

There is a significant distance to retrace if an incorrect route decision is made i.e. if a driver coming from Wellington misses the exit at Te Moana to access Peka Peka or Te Horo they will have to drive an additional 10km to Otaki to be able to turn around. This will further add to driver frustration and satisfaction.

During the open days, the community often talked about missing the interchange and one business owner in Peka Peka outlined how he is unable to get delivery drivers to drop off or pick up on a Friday afternoon due to need for drivers to go through Te Moana and the delay this causes.

Figure 16 : Expressway interchanges



Problem 1 Confirmation

This evidence confirms that the customers of the Expressway in the Peka Peka and Te Horo communities are frustrated with the form and proximity of their access to the Expressway. Part of this frustration is the confusing access arrangement and the need to change their travel plan depending on the duration of travel. It is also resulting in visitors to the area being confused with the access arrangements and subsequently making inefficient travel decisions.

This confirms the problem statement:

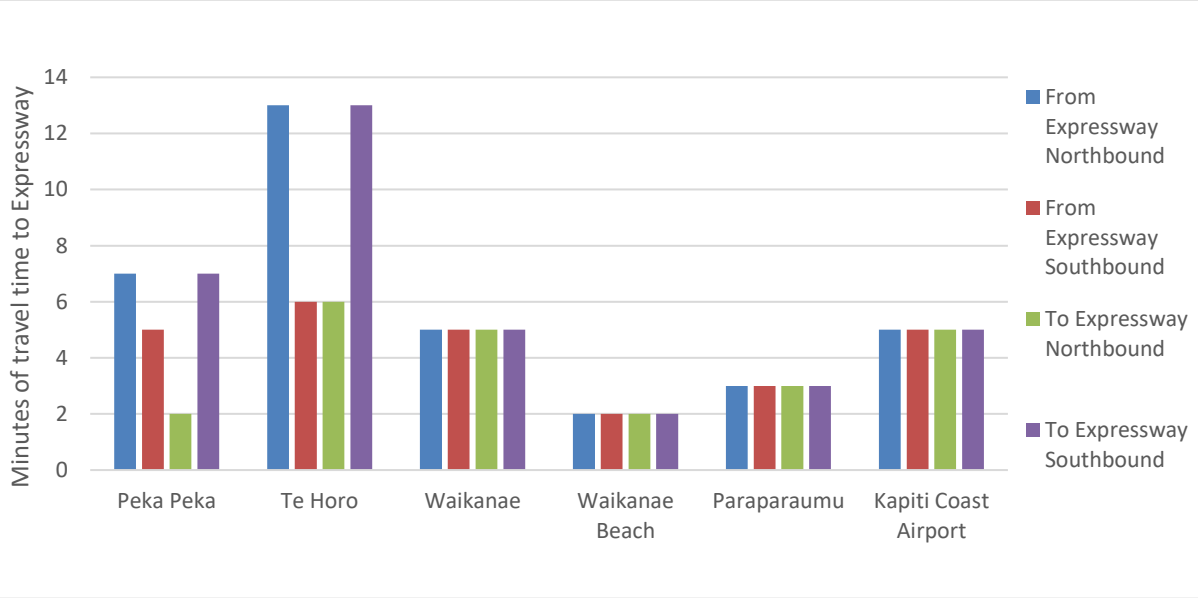
The confusing access arrangement to the Kapiti Expressway in the Peka Peka area is delivering poor customer satisfaction (50%)

2.3.2 Comparatively poor connectivity to Kapiti Expressway

As outlined above, as well as the confusing nature of the current access to the Expressway the Peka Peka and Te Horo communities consider that they have a reduced level of accessibility compared to neighbouring communities along the Expressway.

Due to the mix of full and partial interchanges along the Expressway there are different levels of access to the north and south from different communities. Figure 17 shows the travel time from the various communities to and from the Expressway.

Figure 17 : Community connectivity to Expressway



This shows that the Peka Peka community has a longer travel time to head south compared to nearby communities. It is important to note the discrepancy in travel time where direct ramps are not provided. By way of example, Peka Peka has up to a 5 minute (or 250%) difference between the northbound and southbound journey time to the Expressway. In the northbound direction the travel time is as good as any other community at approximately 2 minutes. All other surrounding communities have a consistent level of access to the Expressway.

The same pattern albeit to a larger scale occurs at Te Horo, where access to the south is worse than the north and there is a variability between these two directions of approximately 7 minutes (115%). Te Horo's access to the expressway in the southbound direction is more than double any other community along the Expressway.

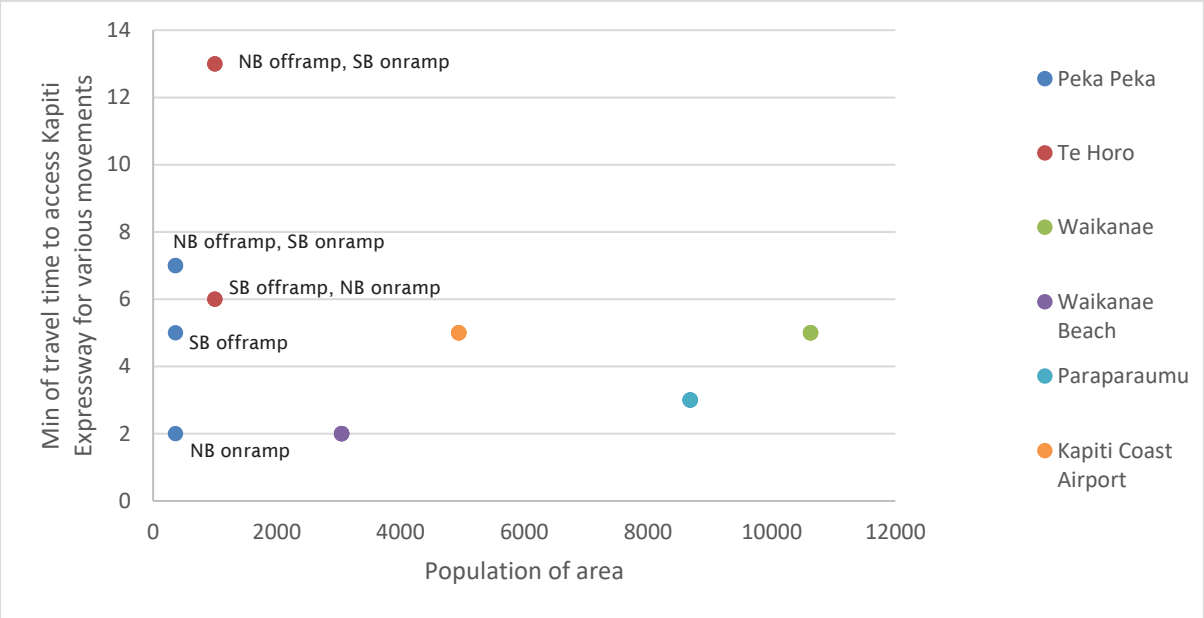
This is shown in a slightly different way in Figure 18, where travel accessibility from Wellington is shown. Wellington has been chosen as it is the closest regional centre with an international airport, hospital, significant employment and other essential services.

The map shows areas accessible with 45, 50, 55 and 60-minute time periods. The expressway provides significant travel time benefits to areas. In locations where interchanges are provided, these benefits effect a large area surrounding the interchange. South of Waikanae Beach, good accessibility means much of the surrounding area can benefit from improved travel times as a result of the expressway. Within the Peka Peka and Te Horo areas, the discrepancy between travel time on the expressway and surrounding areas widens indicating a comparatively lower level of accessibility. Trips to and from Otaki are subject to lower travel times despite being geographically 5km north of Te Horo and around 10km north of Peka Peka.

Figure 18 : Local community accessibility to Wellington

We have then considered the level of accessibility to the population size of the communities along the Expressway as it follows convention that larger communities require a higher level of accessibility. Figure 19 shows this relationship for the communities along the Expressway.

Figure 19 : Community connectivity to Expressway compared to population



The Figure shows some variation in travel time to and from the expressway across the various communities. The Peka Peka community, whilst a small population, can be seen to have increased travel time on certain movements compared with other communities. Te Horo experiences significant increases to and from the South.

Road safety

It is too early to understand with certainty what the implications of the reduced level of connectivity is having on safety. In the existing situation (pre opening of the Peka Peka to Otaki section), anecdotal evidence suggests a perceived safety issue is occurring at Te Hapua Road with vehicles using doing u turns as a result of access issues. There is the potential for an increase in local road use through more built up areas of the Waikanae Beach and Waikanae communities to result in increased accident rates. Due to sporadic accident records and uncertainty around effect of additional traffic, these effects have not been assessed formally, however it is expected a road safety benefit will be realised with provision of additional access through removal of strategic traffic from local roads.

Problem 2 Confirmation

This evidence confirms that the customers of the Expressway in the Peka Peka and Te Horo communities have longer travel times to access the Expressway when compared to neighbouring communities for travel south. This is particularly an issue for the Te Horo community where the travel time is more than double any other community to access the Expressway for southern trips. For Peka Peka there is an additional 2-5 minute travel time required compared to other community to access the Expressway for southern trips.

This confirms the problem statement:

Peka Peka and Te Horo communities have comparatively poor connectivity to the Kapiti Expressway (50%)

3 CUSTOMER AND SYSTEM OUTCOMES

3.1 Strategic outcomes

Government Policy Statement

The NZ Transport Agency is responsible for giving effect to the Government Policy Statement (GPS), which sets out the Government's strategic direction for investment in the land transport network. A updated draft GPS was released on the 4 April 2018 for engagement. The document sets out a 10-year strategic direction to drive improved performance from the land transport system. The GPS presents a change to the strategic objectives outlined in the 2015-2018 GPS. At a high level, four strategic priorities (**Error! R eference source not found.**) are identified for the land transport system. Both safety and access are identified as the key priorities, supported by value for money and environment.

Figure 20 : GPS objectives

The Transport Agency prioritises investment based on the Investment Assessment framework for the NLTP (2018-2021). The assessment considers how the problem/issue/opportunity is significant:

- in relation to the desired GPS result(s)
- in relation to the scale of the gap to the appropriate customer level of service or performance measure
- as part of an end-to-end journey
- from a national perspective (given local, regional, national perspectives)
- from a community perspective in regard to access to social and economic opportunities
- in relation to GPS timeframes ie a significant issue/opportunity within 3/10/10+ years.

There is alignment between some of the identified benefits of this project and the strategic priorities of the Transport Agency, particularly as they relate to addressing a Gap in customer level of service and contribute to an end-to-end journey for customers in the Peka Peka and Te Horo communities.

One Network Road Classification

The ONRC defines various performance outcomes and customer levels of service that should be developed for different classifications of road throughout New Zealand. The ONRC further defines various levels of customer service in relation to travel time reliability, resilience, optimal speeds, safety, amenity and accessibility.

SH1 is classified in the One Network Road Classification (ONRC) system as a High Volume National road. This is the highest classification and reflects the important role of connecting the regional centre of Wellington and its associated Port, Airport and other infrastructure with the rest of the north island. The ONRC sets out Customer Levels of Service which vary by road classification. Broadly, they relate to travel time reliability, resilience, optimal speeds, safety, amenity and accessibility with specific details to be found in the ONRC[5].

The focus in this area of the network is on through capacity for access to and from Wellington. The Expressway undertakes this function well and additional connectivity to the Expressway in this area of the network would need to ensure this strategic through function was not compromised.

Kapiti District Economic Growth Strategy

The Kapiti District Economic Development Strategy seeks to continue the development of the Kapiti economy and to create a "Thriving economy, vibrant culture and diverse community". The strategy details the elements to achieve this outcome.

The strategy identifies five key economic drivers which are most likely to have the greatest impact on our economic prosperity and competitiveness. These are designed to ensure that the district harnesses its strengths in each area and focuses efforts in those areas that require improvement.

One of those five areas is "Good connectivity: Infrastructure, digital, logistics and communities" and ensuring (that KCDC) ***"Co-ordinate our efforts to maximise short and long-term benefits of the Expressway project."***

Providing greater connectivity to the Expressway is consistent with this important district strategy.

Wellington Northern Corridor Business Case

The Wellington Northern Corridor business case was approved in 2009 by the Transport Agency board and updated in 2013. The WNC programme objectives, were as follows:

- To enhance inter regional and national economic growth and productivity

[5] https://www.Transport Agency.govt.nz/roads-and-rail/road-efficiency-group/one-network-road-classification/key-documents/

- To improve access to Wellington's CBD, key industrial and employment centres, port, airport and hospital
- To provide relief from severe congestion on the state highway and local road networks
- To improve the resilience of the transport network
- To improve safety and journey time reliability on SH1 between Levin and the Wellington airport.

Improving connectivity in and around the Peka Peka and Te Horo communities would not be inconsistent with the objectives of this corridor programme. It will be important that any additional connectivity did not adversely impact the strategic through movement of the Expressway.

Kapiti Town Centres and Connectors Transformation

In 2014, KCDC undertook a strategic case to understand the post Expressway shape of Kapiti's town centres. This identified the following problems:

- *Problem one:* Lack of quality town centre design results in a lost opportunity to catalyse growth
- *Problem two:* Lack of a main street results in economic and retail activity occurring elsewhere in the region or district
- *Problem three:* Poor transport connections result in low quality transport arrangements.

The potential benefits of successfully investing to address these were identified as follows:

- *Benefit one:* Improved social, cultural and economic public life for Kapiti communities
- *Benefit two:* Private sector investment stimulates jobs and vibrancy in the town centres
- *Benefit three:* Improved access and connection.

The strategic case identified the need to ensure that the town centres of Waikanae and Paraparaumu were carefully considered and that there was a strong case for investment in these towns to realise the benefits identified.

Improved connectivity to the Peka Peka and Te Horo communities will need to consider any potential impacts on the surrounding area.

3.2 Project Benefits

Following Workshop 1 of this business case the following benefits were identified if the problems were addressed:

- **Benefit 1:** Improved customer satisfaction due to connectivity frustrations (40%)
- **Benefit 2:** More efficient access from the Peka Peka and Te Horo communities to the Expressway (40%)
- **Benefit 3:** Improved operation and safety of local road network (20%)

The first two benefits respond directly to the problems identified. The additional benefit relates to the desire for the improved safety and operation of the local road network. As

identified in the previous problem sections of this report, there is currently rat running through residential local roads (Peka Peka residents travelling through Waikanae Beach instead of Peka Peka Road). Improving connectivity should therefore provide improved operation and safety outcomes for implied local roads.

3.3 Project investment objectives and measures

A critical component of a business case is the development of investment objectives, which provide the objectives upon which an investor in the project is seeking to achieve. These investment objectives have been derived from the benefits identified above and are used to assess the performance of potential options. They were confirmed by regional stakeholders at Workshop 1.

The identified investment objectives and the measures to determine if they are being realised are summarised in Table 3.

Table 3 : Investment objectives and measures

	Investment Objective	Objective Weighting	Measure
1	Improve Peka Peka and Te Horo communities' customer satisfaction of the Expressway by 75% by 2025	50%	Bi-annual customer satisfaction study completed at least twice before the preferred option is implemented and for at least 2 years post implementation
2	Improved customer travel times to Expressway from Peka Peka and Te Horo communities by 30% by 2023	50%	Travel time measure to the Expressway from: · Intersection of Peka Peka Road and Paetawa Road · Intersection of Te Horo Beach Road and Sims Road · Te Horo School Road

Investment Objective 1: responds to the current frustration and customer dissatisfaction at the variable (between north and southbound access to the Expressway) and confusing nature of access to the Expressway. A 75% increase in customer satisfaction has been selected as this is considered to provide a tangible increase in satisfaction. The 2025 date has been adopted as this is two years after possible implementation to give time to collect the required data.

Whilst a baseline satisfaction survey is required to accurately determine the baseline for this criterion, the recent workshops have indicated the current arrangement is delivering a low customer satisfaction level (estimated to be less than 20%). It is intended that this survey would be developed with the Transport Agency's Customer Experience and Behaviours team. Likely questions could include:

- Where do you currently live?
- Where do you travel to and how frequent are these trips?
- How has your trip changed since the opening of the M2PP Expressway?

- Do you consider there is an issue with connectivity in the Peka Peka/ Te Horo area?
- How does this affect you?
- How satisfied are you with you level of connectivity to the Expressway?

A 50% weighting has been selected as this is considered an equally important investment objective and has driven the undertaking of this business case to this stage.

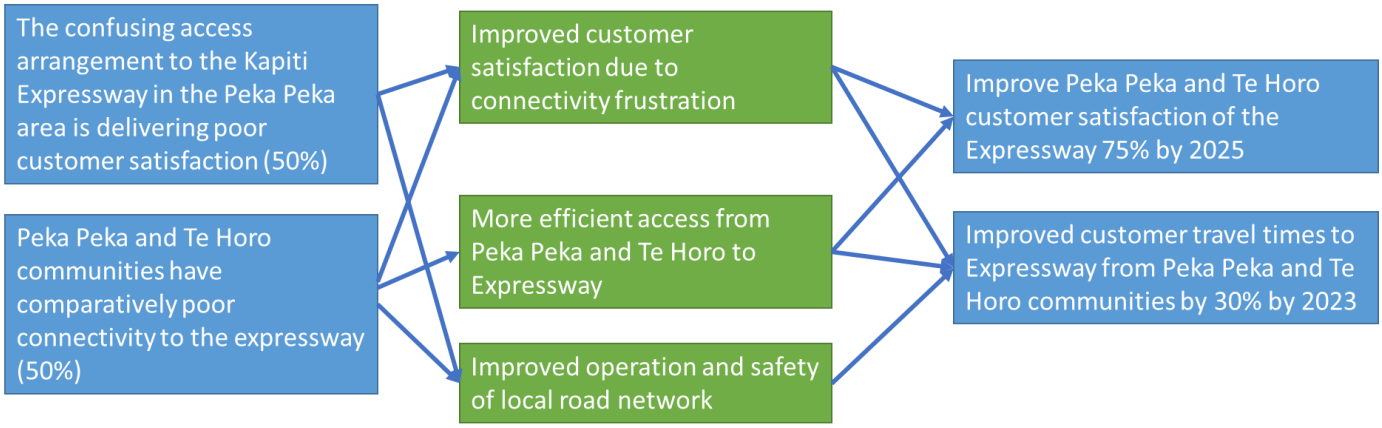
Investment Objective 2: ensures that the identified concerns with comparative accessibility to the Expressway is an investment focus. A reduction in travel time of 30% has been selected to the Expressway as this would bring the travel time more in line with that experienced by neighbouring communities. The year 2023 has been chosen to represent an obtainable timeframe to make this level of change to outcomes.

The current baseline travel time is 7 minutes for southbound movements at Peka Peka and 13 minutes for southbound movements at Te Horo.

A 50% weighting has been selected as this is considered an equally important investment outcome.

These investment objectives address the identified project problems and map well on the identified benefits as shown in Figure 21.

Figure 21 : Problem, benefit and investment objective mapping



These problem, benefit and investment objectives were reviewed after the 2018 GPS was confirmed. To better align with the GPS the second investment objective was reworded slightly to remove travel time references and include access as shown below.

Improved customer <u>access</u> to Expressway from Peka Peka and Te Horo communities by 30% by 2023

3.4 Customer Outcomes

The investment objectives would make travel clearer and more efficient for our customers. This would result in improved satisfaction levels, which are currently at low levels.

Customer insights during this project included the following:

Residents in Peka Peka were consistently dissatisfied with the additional 6-7 minutes lost with their families as a result of the circuitous route through local roads to get on and off of the new Expressway.

Customers struggled to understand why they could use the current Peka Peka interchange to go to and from the north but not to the south where most of them want to go, highlighting this is not the hallmark of a good transport system.

Businesses in Peka Peka confirmed that customers were confused by the layout and how to access the area, resulting in delays to deliveries and disgruntled customers once they have arrived.

3.5 System Outcomes

Peka Peka and Te Horo communities will be able to exit at Peka Peka (from Wellington) but to head to Wellington are required to drive through to Te Moana. This is confusing for our customers and visitors to the area.

These investment objectives would result in a more efficient transport system, with less travel on local roads through residential areas and a more intuitive connectivity outcome for users of the transport system. Solving these problems would also maximise the return on investment of the recently completed Kapiti Expressway through the provision of a more intuitive and legible transport system that made sense to our customers, thereby improving the efficiency of their trips and their level of journey satisfaction.

4 STAKEHOLDERS

Stakeholders have been involved throughout the SSBC process through workshops and/or one-on-one meetings. This engagement has built upon the existing relationship with the Council and the wider community established as part of the neighbouring Mackays to Peka Peka and Peka Peka to Otaki projects.

Public consultation was a part of this engagement through public open days in October 2017 where short listed options were presented for feedback and wider feedback was sought through a formal feedback form.

This consultation has informed the recommended option, including its location, form and function.

The preferred option will be confirmed to the wider community once endorsement of this business case is obtained.

4.1 Consultation and communication approach

An inclusive approach with stakeholders is a key aspect of the business case approach and has been used successful to date in the development of this business case. This has included engagement with key stakeholders through workshops and individual meetings on specific topics as outlined in *Peka Peka Connectivity Engagement Strategy (September 2017)*.

The public have also been consulted on the shortlisted options as part of this SSBC.

4.2 Key Stakeholders

All communications and engagement processes have adopted the principles of the International Association of Public Participation (IAP2). The *Peka Peka Connectivity Engagement Strategy* includes the following forms of engagement:

- Newsletters
- Interactive website
- Individual meetings
- Social media
- Open days
- Workshops
- Formal letters (property owners)

As well as public consultation, there has also been engagement with stakeholders that have been identified in the following groups in Table 4.

Table 4 Stakeholder Groups

GROUP	DESCRIPTION
Directly affected	Properties directly impacted by the proposed route
Immediately adjoining neighbours	Properties adjoining those that are directly affected
Balance of potentially affected properties	Other properties within proximity to the alignment that could potentially be affected by the project (by visual, noise or other temporary effects).
Area wide organisations	Includes government agencies (national, regional and local including emergency services), non-government organisations (NGOs) and advocacy groups (including road user groups and business groups) with wider interest interests (that is, beyond individual properties).
Mana whenua	Iwi in the Kapiti Coast District
Wider community of interest	Any other person expressing an interest in the Project, irrespective of location

The specific stakeholder groups for this SSBC included:

- Kapiti Coast District Council
- Greater Wellington Regional Council
- Te Ati Awa – south of stream
- Ngati Raukawa – north of stream
- Nga Hapū o Ōtaki
- Otaki Community Board
- Waikanae Community Board
- Peka Peka Community Group
- Kapiti Chamber of Commerce
- M2PP Community Liaison Group
- PP20 Community Liaison Group
- M2PP project team
- PP2O project team

4.3 Stakeholder engagement

4.3.1 Mana Whenua engagement

Mana Whenua have been invited to all project workshops and there have been one on one discussions with the Transport Agency throughout the project. Mana Whenua are particularly interested in ensuring the same principles agreed for the Expressway project are applied to this project.

4.3.2 Stakeholder engagement

One-on-one meetings with stakeholders have been held as required to understand key issues and technical aspects of the project. In addition, two combined workshops have been held for the stakeholder groups identified above. These were held at the Kapiti Hockey Pavilion on:

- Workshop 1 – 15th November 2017
- Workshop 2 – 21st November 2017

4.3.3 Public consultation

Public consultation was undertaken as part of this business case development. This occurred through public open days on the 28th and 29th of October 2017 and wider feedback through a formal feedback form. This consultation has informed the recommended option, including its location, form and function.

The preferred option will be communicated to the community once this SSBC is endorsed.

Subsequent sections of this report will outline the outcomes of this consultation which has shown strong support for the project generally.

In addition, the consultation process for the Peka Peka connectivity project is documented and implemented through an Engagement and Communications Plan included in Appendix C. Consultation is a fundamental part of the project and to date has actively involved KCDC, key stakeholders, Tangata Whenua, directly affected landowners and the community. A variety of communication techniques has been used to consult with all parties, including open days, feedback forms, site meetings, newsletters, and phone discussions. The Plan is a “live” document that will be changed (if necessary) as the project develops and as the consultation process continues.

5 ALTERNATIVES AND OPTION ASSESSMENT

Eighteen long listed options were developed with stakeholders to address the connectivity issues identified at Peka Peka. Through a robust technical assessment and option evaluation process, these options were reduced to three short listed options which were taken to a public open day.

The community confirmed that improvements were required for local communities to access the expressway and that Peka Peka was the preferred location for these improvements.

Further technical analysis showed that the final two shortlisted options both addressed the investment objectives and were economically viable. Each option had a number of merits and technical challenges however on balance, it is recommended that Option 1 is the preferred option.

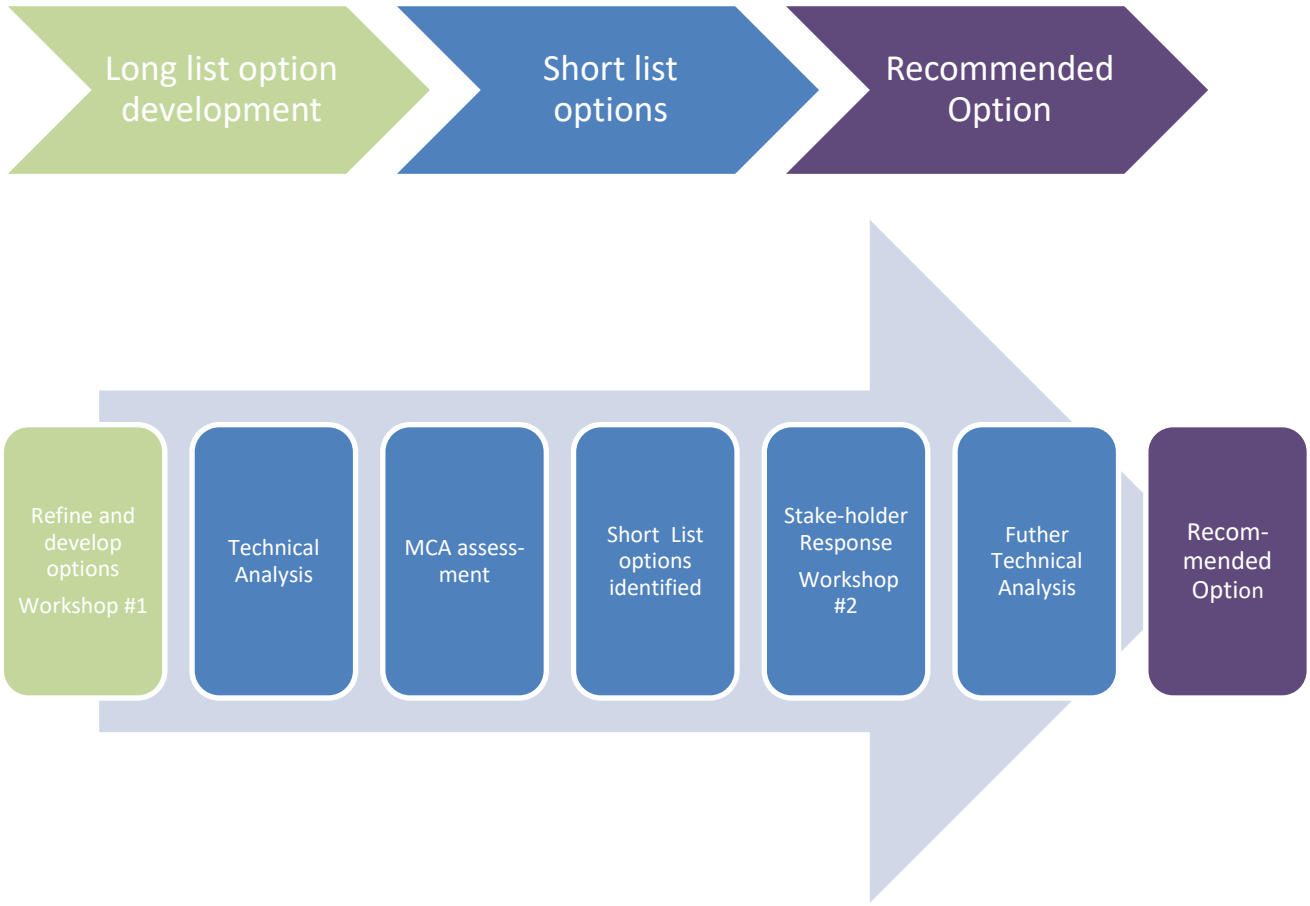
5.1 Option Development and Assessment Process

A structured process has been used to identify the preferred option as outlined in Figure 22. Options and alternatives have been developed to address the problem statements and deliver the investment objectives as agreed with stakeholders.

The methodology adopted for this process was:

1. High level project options were developed with stakeholders at Workshop 1;
2. Options further developed by project team;
3. Preparation of assessment criteria by project team, based on Transport Agency guidelines;
4. MCA session undertaken with wider project team to identify shortlisted options;
5. Public engagement on options;
6. Further analysis and option refinement; and
7. Presentation and endorsement of recommended option assessment with stakeholder at Workshop 2.

Figure 22 Option development process



5.2 Option Assessment

Assessment criteria were taken from NZ Transport Agency business case guidelines for option evaluation as a starting point and used to evaluate the identified options and alternatives with respect to their relative ability to deliver against the agreed investment objectives for the corridor and their potential impacts. Through engagement with KCDC, two additional assessment criteria were added, being:

- **Built Environment** - Extent to which the option impacts the character of the surrounding land (outside of what is anticipated in the District Plan)
- **Economy** – Impacts on Waikanae town centre

A third consideration raised by KCDC related to cost of local infrastructure upgrades (if any). Whilst not a specific criterion, this cost information has been used and assessed for short listed options.

This MCA allowed the options to be ranked (based on unweighted assessment), with the ranking then informing the option shortlisting process.

The assessment criteria agreed for this project and endorsed by the stakeholders is shown in **Appendix B**.

The assessment criteria have been grouped according to headline categories, relating to investment objectives, ability to be implemented and an assessment of effects and opportunities. The ability for an option to be implemented was further broken down into feasibility, affordability and public / stakeholder support. The assessment of effects and opportunities was broken down into cultural heritage, environmental, social and community wellbeing, economy and safety considerations. The criteria are detailed in Table 5

Table 5: Assessment criteria

Objective 1 – Improved customer travel times to Expressway from Peka Peka and Te Horo communities by 30% by 2023 (50%)
Objective 2 – Improve Peka Peka and Te Horo communities customer satisfaction of the Expressway 75% by 2025 (50%)
IMPLEMENTABILITY
Feasibility
Affordability
Stakeholders/Customers
ASSESSMENT OF EFFECTS
Safety
Cultural and Historic Heritage
Built Environment
Natural Environment
Social
System Integration
Economy

An assessment of all the options was undertaken for each criterion. A seven-point assessment system was used, ranging from +++ for a strongly positive performance to --- for a strongly negative performance in comparison with the do minimum as outlined in Table 6.

Table 6 : MCA scoring criteria

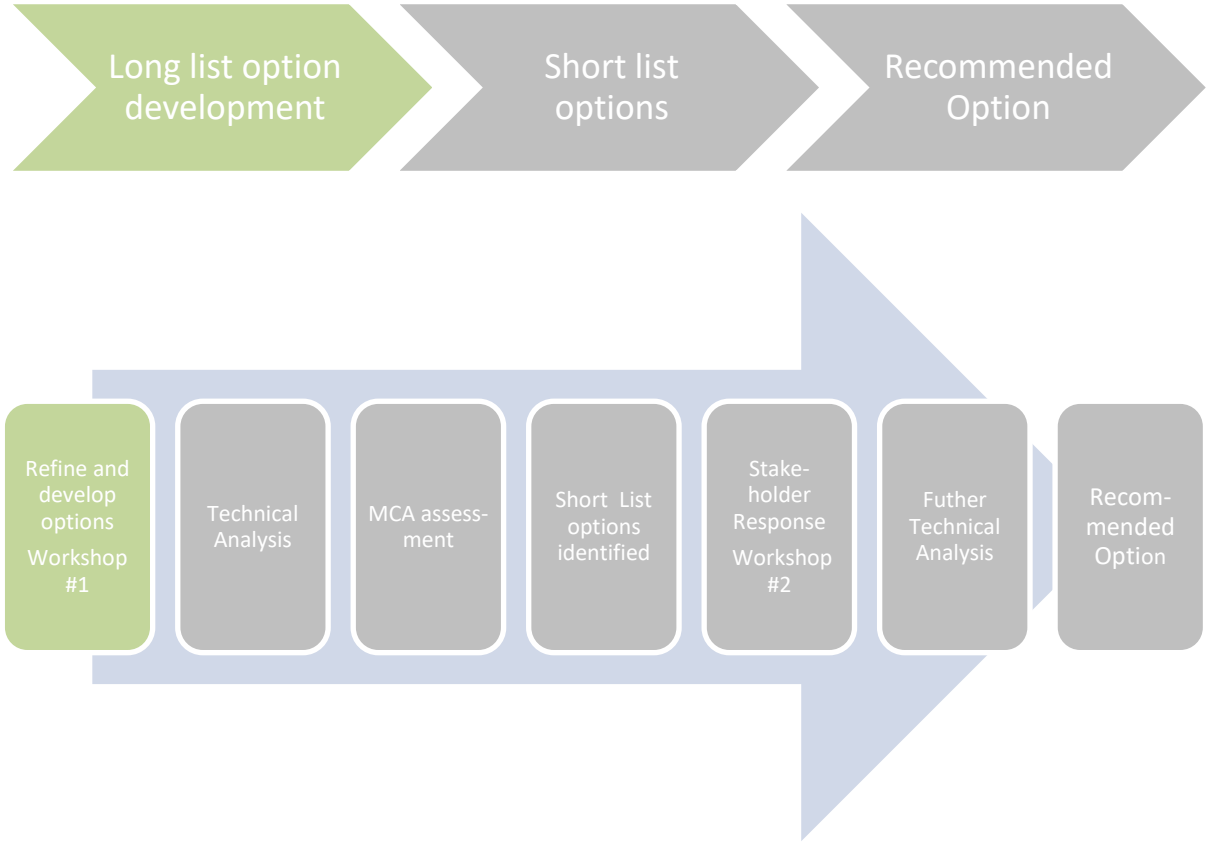
Rating	Definition	Score
Significantly positive	Significant positive impact, likely resulting in long term improvements	+3
Moderately positive	Moderate positive impact, which may provide improvements and opportunities	+2
Slightly positive	Minor positive impact	+1
Neutral	Similar impact to the do-minimum	0
Slightly adverse	Minor adverse impact, which can be mitigated or managed	-1
Moderately adverse	Moderate adverse impact, that may be managed or mitigated	-2
Significantly adverse	Significant adverse impact with serious long-term effects	-3

5.3 Long List Option Development

5.3.1 Process

The process for the development of the long list is shown in Figure 23.

Figure 23 Long List Option Evaluation Process



Option development occurred in two phases.

- **Phase 1** was at Workshop 1 on 15th September 2017. The stakeholder group discussed initial ideas and concluded that there were three broad types of options with additional specific alternatives within each of these options. The three options identified included:
    - Local road improvements – improving connectivity through improved local road infrastructure
    - Peka Peka Interchange options – improving connectivity through the completion of movements at this partial interchange
    - Te Horo options – improving connectivity through provision of a new interchange at this location
- **Phase 2** involved the technical team adopting these ideas and developing design alternatives and options in more detail

5.3.2 Long List Options

From the two-phase process outlined above, a total of 18 options were developed as outlined in Figure 24.

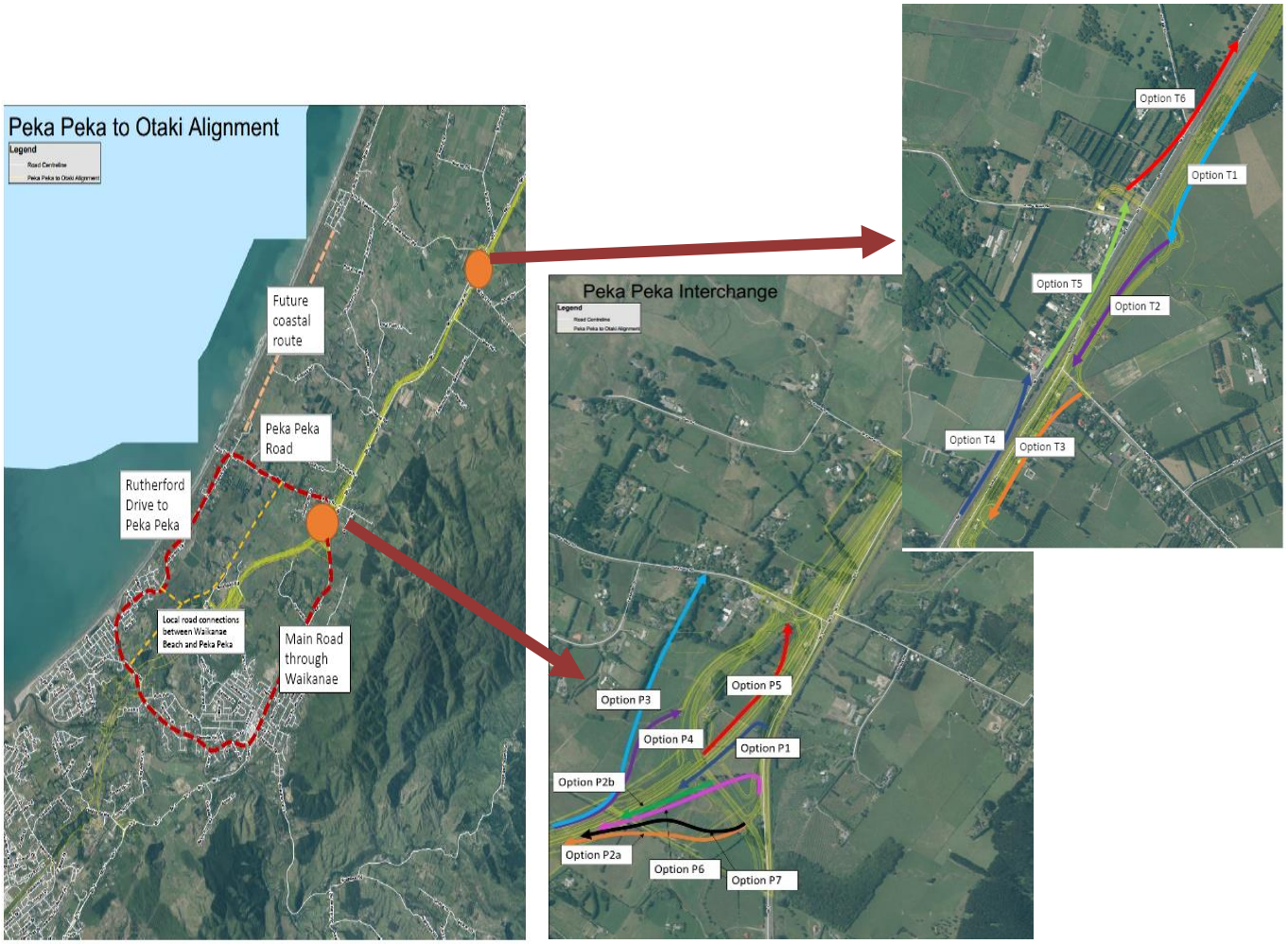


Figure 24 : Long list option diagram

The options developed are summarised in Table 7. Options were group by individual movement type (i.e. southbound on-ramp vs southbound no ramp) to allow different combinations for options to be grouped to form implementable options.

Appendix D includes more detailed plans on the options outlined above.

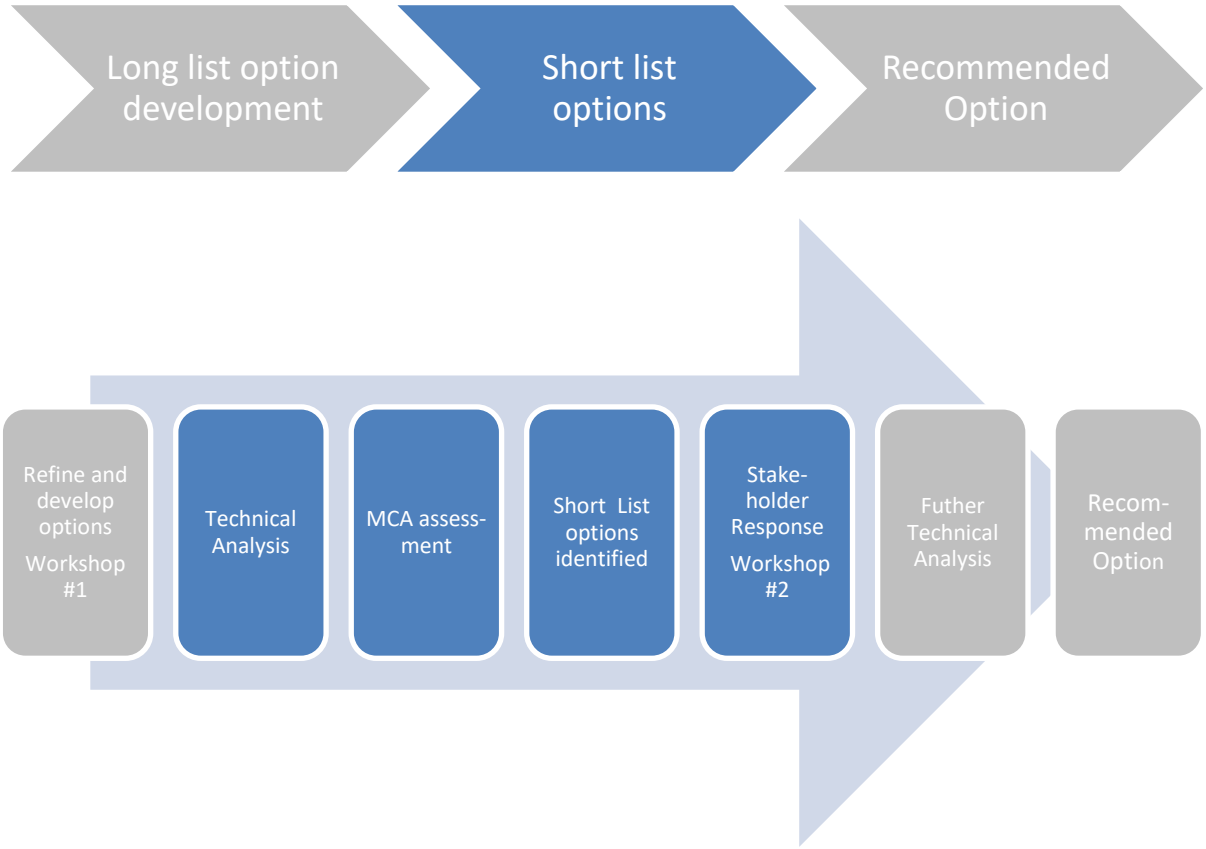
Table 7 : Long List Options

Option Type	Movement	Identification	Description
Local Road	Rutherford Drive		Enhancements to Rutherford Drive to improve access to Te Moana interchange
	Main Road		Improvements to the main road through Waikanae town centre
	Ngarara farm arterial		New link from Ngarara development to local road network in the north
	Future coastal route		Development of a new link along the coast linking Te Horo and Peka Peka
Peka Peka	Southbound On-ramp	P1	Access from Hadfields link Road to Expressway
		P2a	Access from Hadfields/Peka Peka intersection onto Expressway
		P2B	Access from Peka Peka Road overbridge onto Expressway
		P6	Overbridge from Hadfields onto Expressway
		P7	Refinement of option 2a to reduce land
	Northbound Off-ramp	P3	Link from Expressway directly onto Peka Peka Road, west of current roundabout
		P4	Link from Expressway directly onto Peka Peka Road at overbridge
		P5	Link from Expressway directly onto Peka Peka Road at current roundabout
Te Horo	Southbound Off-ramp	T1	New Ramp at proposed PP2O overbridge linking Te Horo with existing SH1
	Southbound On-ramp	T2	New Ramp at proposed PP2O overbridge linking Te Horo with existing SH1
		T3	New ramp at School Road intersection (would require relocating proposed PP2O bridge
	Northbound Off-ramp	T4	New ramp at School Road intersection (would require relocating proposed PP2O bridge
		T5	New Ramp at proposed PP2O overbridge linking Te Horo with existing SH1
	Northbound On-ramp	T6	New Ramp at proposed PP2O overbridge linking Te Horo with existing SH1

5.4 Long List to Short List

The process for discarding projects to create a shortlist is shown in Figure 25

Figure 25 Long list to short list process



5.4.1 Technical Assessment

From the long list of options identified, the options were further developed and ESR screens were undertaken. These screens identified areas for additional analysis and technical assessment, including:

- Stormwater
- Property
- Environmental
- Land use response

In addition, KCDC also expressed the desire to understand the implications for the Waikanae town centre and the surrounding local infrastructure, including potential upgrade costs. The ESR screens are included in **Appendix E.**

The following sections detail the technical assessments undertaken and additional details on how the MCA was applied.

Stormwater

One of the more significant technical issues in the project area is stormwater management and flooding. The low-lying area is prone to flooding as the ground water level is just below the surface. There are existing areas of flood storage located in and around the Peka Peka interchange and considerable flooding risks have been identified in the Te Horo sector.

A desktop stormwater assessment of the option long list was undertaken and this is provided in **Appendix F**.

This concluded:

- Local road options can manage any stormwater impacts appropriately
- Peka Peka interchange options carry stormwater risk with lost flood storage mitigation a likely issue on many of the options. This is will likely result in the two existing 'dry' flood storage areas, being converted to 'wet' storage areas (wetlands)
- Te Horo has similar stormwater challenges as Peka Peka.

Stormwater management is one technical area where different options at a certain location (such as the southbound on-ramps at Peka Peka interchange) had different effects. Therefore, these effects were reflected in the MCA assessment with a range of rankings depending on the severity of the effect

Property

There are a number of sensitive property issues in this area of the transport network. These issues include on-going private property negotiations for other projects, Mana Whenua land implications and existing lease arrangements and crown owned property implications.

The initial assessment indicated that the Peka Peka interchange options would generate the least property risk due to the existence of a partial interchange and adjacent Transport Agency landholding. Te Horo was considered to carry significant property risks due to the complexity of current property negotiations, the interface between Kiwirail and the roading network, Mana Whenua land interests in and around the Te Horo area and the presence of commercial operations.

The Local road network options were considered to have moderate property implications given the likely need for road widening and properties required to new road alignments

Environmental

The environmental impacts for the MCA analysis related to ecology and the streams in the area. There was also consideration of other impacts including potential cultural impacts and noise.

Existing consent conditions at Peka Peka provide clear rules for mitigation required to off-set any impacts on streams. As such, the Peka Peka options for this project that further impact the Paetawa stream were considered likely to require mitigation for the stream. These options would also bring noise closer to the residents in the land holdings to the south east of the Peka Peka interchange.

Te Horo options were considered to have stream impacts and localised noise considerations. No major environmental effects were reported for the local road options.

Land use response

During stakeholder discussions a concern was raised that there could be unintended consequences of improved connectivity to the land use in the area. An analysis was undertaken to understand what this impact could be. In summary it concluded that the most likely land use response would be:

- Local road options were considered unlikely to drive a change in land use.
- Peka Peka options could accelerate residential intensification of the surrounding area by approximately 200 dwellings by possibly 10 years earlier.
- Te Horo options could accelerate residential intensification of the surrounding area by approximately 250 dwellings by possibly 10 years earlier.

This analysis informed the evaluation of the option long list, but was even more useful in the assessment of potential implications of the recommended option (once identified). The details of this assessment are included in **Appendix G**.

Waikanae Town Centre

For the long list to short listing process an initial assessment on the potential implications on Waikanae town centre was undertaken based on the likely transportation effects of the options.

This assessment is provided in **Appendix H** and concluded that:

- **Local road options** would be unlikely to have an impact on the Waikanae town centre.
- **Peka Peka options** could reduce the traffic through Waikanae by around 16% which is considered a minor impact.
- **Te Horo options** could reduce the traffic through Waikanae by around 7% which is considered a minor impact.

Overall, it was considered that there has been an economic impact from the implementation of the Expressway itself, however the incremental change from these additional connectivity options is considered minor.

A more detailed assessment was undertaken after the short list options were identified.

Costs

Long list options were costed by Bond CM as outlined in **Appendix I** to enable comparison between the on-ramp and off-ramp options**.** Commute transportation compiled the local road network costs from similar projects. A summary of costs is shown in Figure 26.

Figure 26 Long List Costs for option comparison

OPTION	DESCRIPTION	BASE ESTIMATE COST
P1 Southbound On	New ramp to existing roundabout. Uses existing SH1 Expressway underpass	$3,500,000
P2A Southbound On	New ramp outside designation. New structure over stream	$7,300,000
P2B Southbound On	New ramp inside designation. New structure over stream	$7,500,000
P5 Northbound Off	New ramp to existing roundabout.	$3,500,000
P6 Southbound On	New ramp through new underpass and onto expressway	$8,800,000
P7 Southbound On	New ramp within designation – variant of P2A	$7,800,000
T1 - Southbound Off	New ramp through PP20 area at Te Horo local overbridge	$5,500,000
T2 - Southbound On	New ramp through PP20 area at Te Horo local overbridge	$5,900,000
T3 - Northbound Off	New ramp through PP20 area at Te Horo local overbridge	$7,600,000
T4 - Northbound On	New ramp through PP20 area at Te Horo local overbridge	$6,300,000
Rutherford Drive	Upgrade to existing road	$1,000,000
Main Road	Upgrade to existing road	$3,000,000
Ngarara Farm arterial	Upgrade to existing road	$5,000,000
Future coastal route	New route	$10,000,000

5.4.2 Option Evaluation

Using technical assessment, the ESR screens and the expertise of the team an assessment was undertaken of all the long list options against the evaluation criteria. This was reviewed at an options evaluation session on 12 October which included technical specialists from the consultant team, the Transport Agency and KCDC. This assessment is summarised in Figure 27.

Appendix D contains a more detailed assessment of the options.

Figure 27 : Long List Option Assessment

Peka Peka Connectivity	Options																			
Business Case		Peka Peka Sthbd On Ramp					Peka Peka Nthbd Off Ramp			Local Road				Te Horo Sthbd	Te Horo Sthbd On Ramp		Te Horo Nthbd Off Ramp		Te Horo Nthbd
	Do Nothing	Option P1	Option P2a	Option 2B	Option P6	Option P7	Option P3	Option P4	Option P5	Rutherford Drive	Main Road	Ngarara Farm arterial	Future Coastal route	Option T1	Option T2	Option T3	Option T4	Option T5	Option T6
	DM	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11	O12	O13	O14	O15	O16	O17	O18
Customers																			
International visitor		0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic visitor		0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0
Local customer		0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0
Freight customer		0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0
Investment Objectives																			
Objective 1 – Improved customer travel times to Expressway from Peka Peka and Te Horo communities by X% by 20XX	0	++	++	++	++	++	++	++	++	+	0	+	+	++	++	++	++	++	++
Objective 2 – Improve Peka Peka and Te Horo communities customer satisfaction of the Expressway X% by 20XX	0	++	+++	++	++	+++	++	+++	++	0	0	0	0	++	++	++	++	++	++
IMPLEMENTABILITY																			
Feasibility																			
How straightforward is it to implement this alternative / option, including social, cultural and environmental interventions (eg additional planting)?	0	-	--	--	--	--	--	-	-	--	--	--	---	--	--	---	---	--	--
Are any novel/untried/leading edge technologies involved?	0	-	-	-	-	-	-	-	-	0	0	0	0	-	-	--	--	-	-
Are there any technical risks involved in developing or implementing this option?	0	--	--	-	-	--	-	-	--	-	-	-	-	-	-	--	--	-	-
What is the level of complexity in gaining statutory approvals and how significant are the costs of mitigation?	0	-	--	--	--	--	--	-	--	--	--	--	---	--	--	---	---	--	--
Is a new designation or alteration required?	0	0	--	0	0	-	---	--	0	--	--	--	---	0	0	---	---	--	--
Could the option include activities prohibited under the policies and rules of the District or Regional Plan?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Are there significant hazards associated with the option which pose a H&S risk in design, build and final product?	0	---	0	0	0	0	0	--	0	-	-	-	-	-	-	-	-	-	-
Can safety be developed into the design process to control it?	0	--	0	0	0	0	0	-	0	-	-	-	-	-	-	-	-	-	-
Affordability																			
Are there any factors that might affect the ability to operate or maintain the option over its projected life without major additional costs?	0	0	0	0	0	0	0	0	0	-	-	-	-	0	0	0	0	0	0
Can capital costs of the option be funded (e.g from the NLTP, NEA, TIF)?	0	-	--	--	---	--	---	--	-	-	-	-	---	--	--	--	--	--	--
What is the likely BCR?	0	-	--	--	---	--	---	--	-	--	--	--	---	--	--	---	---	--	--
Stakeholders/Customers																			
How acceptable is the option?	0	+	0	0	+	0	+	+	+	0	-	-	--	0	0	0	0	0	0
Are there real or anticipated objections from the community or stakeholders?	0	0	0	0	0	0	--	0	0	0	0	0	--	0	0	0	0	0	0
ASSESSMENT OF EFFECTS																			
Safety																			
To what extent will the option enhance safety for different types of transport users?	0	--	0	-	-	0	0	0	0	-	-	-	-	0	0	0	0	0	0
What is the impact on personal safety / security?	0	--	0	-	-	0	0	0	0	-	-	-	-	0	0	0	0	0	0
What is the impact on fatal / serious injuries?	0	--	0	-	-	0	0	0	0	-	-	-	-	0	0	0	0	0	0
Cultural and Historic Heritage																			
Does the ESR screen indicate the option could impact on cultural and iwi values?	0	--	--	--	--	--	--	--	--	-	-	-	--	--	--	--	--	--	--
Built Environment																			
To what extent does the option impact on the built environment, including urban design, landscape character and visual amenity	0	-	-	-	-	-	--	-	-	--	--	--	--	--	--	--	--	--	--
Extent to which the option impacts the character of the surrounding land (outside of what is antipated in the District Plan)	0	-	-	-	-	-	-	-	-	0	+	0	-	--	--	--	--	--	--
Natural Environment																			
To what extent does the option impact on the natural environment as described in the ESR screen?	0	-	-	-	-	-	--	-	-	0	0	0	---	--	--	--	--	--	--
Social																			
Does ESR screen indicate the option could affect accessibility for the public, including access to jobs, communities, shops, services and other facilities?	0	++	++	++	++	++	++	++	++	-	-	-	--	++	++	++	++	++	++
Does ESR screen indicate the option could result in significant risk to human health related to noise, air quality or contaminated land?	0	0	-	0		-	-	-	0	-	-	-	-	-	-	--	--	-	-
How does the option impact on surrounding dwellings (severence and noise effects)	0	0	--	0	0	-	---	--	0	-	-	-	---	-	-	---	---	-	-
Will additional property purchases be required?	0	0	--	0	0	-	---	--	0	-	-	-	---	-	-	---	---	-	-
Are there property risks to delivery and can they be effectively managed?	0	0	-	0	0	-	--	-	0	-	-	-	---	-	-	---	---	-	-
Is there any Maori land required as part of the project?	0	-	-	-	-	-	-	-	-	0	0	0	--	0	0	0	0	0	0
Does the option affect other infrastructure providers (will agreements need to be entered into with service providers)?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
System Integration																			
Are there any wider transport system effects?	0	+	++	+	+	++	+	++	+	+	+	+	+	+	+	+	+	+	+
Does ESR screen indicate Urban and Landscape design impacts?	0	0	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
How well does the option meet the forecast transport demand?	0	++	++	++	++	++	++	++	++	+	+	+	+	+	+	+	+	+	+
Economy																			
How does the option impact economic growth?	0	+	+	+	+	+	+	+	+	0	0	0	0	+	+	+	+	+	+
How well does the option enhance the development potential of adjacent land / attract new jobs / help existing businesses?	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Impact on the Waikanae Town Centre	0	-	-	-	-	-	-	-	-	0	+	0	0	0	0	0	0	0	0
Ranking by sub group (ie Peka Peka On ramp)	0	4	2	4	3	1	3	2	1	1	3	2	4	1	1	2	2	1	1
Ranking all options	2	7	5	7	6	4	16	3	1	13	15	14	19	9	9	17	18	11	11
Cost		$3.5	$7.3	$7.5	$8.8	$7.8	$9.0	$8.0	$3.5	$1.0	$3.0	$5.0	$10.0	$5.5	$5.9	$8.5	$9.3	$7.6	$6.3

Peka Peka Connectivity	Options																		
Business Case		Peka Peka Sthbd On Ramp					Peka Peka Nthbd Off Ramp			Local Road				Te Horo Sthbd	Te Horo Sthbd On Ramp		Te Horo Nthbd Off Ramp		Te Horo Nthbd
	Do Nothing	Option P1	Option P2a	Option 2B	Option P6	Option P7	Option P3	Option P4	Option P5	Rutherford Drive	Main Road	Ngarara Farm arterial	Future Coastal route	Option T1	Option T2	Option T3	Option T4	Option T5	Option T6
Objective 1 – Improved customer travel times to Expressway from Peka Peka and Te Horo communities by X% by 20XX	0	++	++	++	++	++	++	++	++	+	0	+	+	++	++	++	++	++	++
Objective 2 – Improve Peka Peka and Te Horo communities customer satisfaction of the Expressway X% by 20XX	0	++	+++	++	++	+++	++	+++	++	0	0	0	0	++	++	++	++	++	++
IMPLEMENTABILITY																			
Feasibility	0	-	-	-	-	-	-	-	-	-	-	-	--	-	-	--	--	-	-
Affordability	0	-	-	-	--	-	--	-	-	-	-	-	--	-	-	--	--	-	-
Stakeholders/Customers	0	0	0	0	0	0	-	0	0	0	-	-	--	0	0	0	0	0	0
ASSESSMENT OF EFFECTS																			
Safety	0	--	0	-	-	0	0	0	0	-	-	-	-	0	0	0	0	0	0
Cultural and Historic Heritage	0	--	--	--	--	--	--	--	--	-	-	-	--	--	--	--	--	--	--
Built Environment	0	-	-	-	-	-	--	-	-	-	-	-	--	--	--	--	--	--	--
Natural Environment	0	-	-	-	-	-	--	-	-	0	0	0	---	--	--	--	--	--	--
Social	0	0	-	0	0	0	-	-	0	-	-	-	--	0	0	-	--	-	-
System Integration	0	+	+	+	+	+	+	+	+	0	0	0	0	0	0	0	0	0	0
Economy	0	0	0	0	0	0	0	0	0	0	+	0	0	+	+	+	+	+	+
Ranking by Subset		4	2	4	3	1	3	2	1	1	3	2	4	1	1	2	2	1	1
Overall Ranking	2	7	5	7	6	4	16	3	1	13	15	14	19	9	9	17	18	11	11
Cost		$3.5	$7.3	$7.5	$8.8	$7.8	$9.0	$8.0	$3.5	$1.0	$3.0	$5.0	$10.0	$5.5	$5.9	$8.5	$9.3	$7.6	$6.3
BCR																			

The key conclusions of this assessment were:

1. Peka Peka interchange options were the best performing of all options considered.
2. Local Road options were the worst performing all options. Local Road options were therefore discounted from shortlisting early for the following reasons:
    - Local road options do not achieve the project objectives.
    - There are significant impacts that have been identified for communities.
    - Road safety issues around the local road network.
3. At Te Horo, full interchanges were considered only. No partial interchanges were considered (i.e. south facing ramps) as this would reproduce the confusing nature of access issue at the current Peka Peka interchange and fail to achieve the project objectives whilst still providing most of the adverse impact.
4. Te Horo options performed better than the local road options, but not as well as the Peka Peka options. The forecast impacts were also considerable, including:
    - Impacts on the Te Horo community (built environment, property, noise, character).
    - Greater risks associated with consenting (as a new project).
    - Timing and implementation challenges with the ongoing PP2O project in terms of property purchase, design and construction timeframes, commercial negotiations with an existing D&C contract already in place to delivery an overpass bridge at School Road.
    - The cost is in the order of two to three times the cost of Peka Peka options.
    - Storm water complexities associated with stream impacts and flooding.
5. Peka Peka options generally performed the best, however some options were comparatively better than others, including;
    - Peka Peka northbound off-ramp
        - Option P3 had considerable property and social impacts and was therefore eliminated from short listing contention early.
        - Option P4 had difficulties from a geometric perspective associated with the intersection at the existing overbridge and impacts on the landscape and the extent of the additional designation required.
        - Option P5 performed the best of all the northbound off-ramp options.
    - Peka Peka southbound on-ramp
        - Option P1was a low cost completely within designation on-ramp option that carries risks around geometric standards and safety.
        - Option P2a has potential noise, property and flooding risks, however delivers strongly against the objectives. This option is the 2nd best performing on-ramp option.
        - Option P2b was discounted early due to the geometric constraints of the option.
        - Option P6 carries a considerable cost and will be risky to implement, for a similar level of performance as other options.
        - Option P7 was developed to reduce the potential property impacts of Option P2a, like option P2a this option performs well against the project objectives. This option is the best performing on-ramp option at Peka Peka.

An interesting outcome of this MCA of the long list was that all options except one (being the off-ramp Option P5 at Peka Peka) were ranked worse than the do minimum, indicating there is an impact of achieving the outcomes sought.

The above assessment assumes no weighting of the criteria. Sensitivity testing was then undertaken. This included a doubling of a specific weighting compared to all other criteria. As shown in Figure 28 this changes some specific rankings, however does not fundamentally change the overall pattern. Key differences from this sensitivity testing include:

1. Local Road options continue to generally perform the worst.
2. Peka Peka interchange options generally continue to perform the best.
3. The Do minimum becomes the best performing option if feasibility, affordability, cultural, built environment and natural environment are weight more heavily.
4. Option P5 remains the best performing option for the majority of tests, dropping to as low as third in a single test.

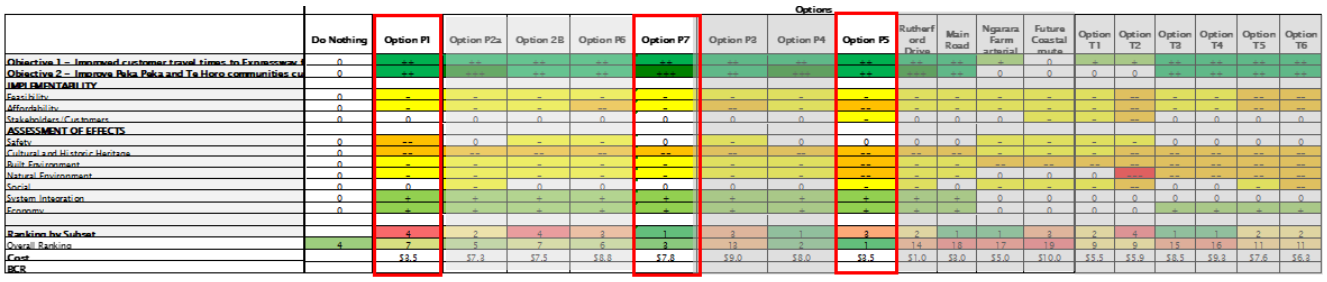
Figure 28 : Option long list sensitivity testing

	Do Nothing	Option P1	Option P2a	Option 2B	Option P6	Option P7	Option P3	Option P4	Option P5	Rutherford Drive	Main Road	Ngarara Farm arterial	Future Coastal route	Option T1	Option T2	Option T3	Option T4	Option T5	Option T6
	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM
Sensitivity Testing																			
Objective 1 – Improved customer travel times to Expressway from P	8	7	4	6	5	3	13	2	1	14	18	16	19	9	9	15	17	11	11
Objective 2 – Improve Peka Peka and Te Horo communities custome	8	7	4	6	5	2	13	1	3	16	18	17	19	9	9	14	15	11	11
Feasibility	1	8	5	7	6	3	16	4	2	13	15	14	19	9	9	17	18	11	11
Affordability	1	6	5	7	8	4	16	3	2	13	15	14	19	9	9	17	18	11	11
Stakeholders/Customers	3	7	5	8	6	4	16	2	1	13	15	14	19	9	9	17	18	11	11
Safety	2	10	5	7	6	4	13	3	1	14	18	16	19	8	8	15	17	11	11
Cultural and Historic Heritage	1	7	5	7	6	4	16	3	2	9	15	12	19	10	10	17	18	13	13
Built Environment	1	7	5	8	6	4	16	3	2	9	12	13	19	10	10	17	18	14	14
Natural Environment	1	7	5	8	6	4	16	3	2	9	11	10	19	12	12	17	18	14	14
Social	2	7	5	7	6	3	16	4	1	13	15	14	19	9	9	17	18	11	11
System Integration	5	7	4	8	6	3	14	2	1	13	16	15	19	9	9	17	18	11	11
Economy	2	7	5	7	6	4	16	3	1	13	14	15	19	9	9	17	18	11	11

5.4.3 MCA Shortlisting

Based on the assessment undertaken above three sub-options were shortlisted a shown in Figure 29

Figure 29 Shortlisted Options



The process for arriving at this short list was:

1. Local Road options were the worst performing all options. Local Road options were therefore discounted from shortlisting for the reasons outlined in the previous section of this report.

2. Te Horo were then discounted from shortlisting as they did not deliver the project outcomes any better than the Peka Peka options and importantly are forecast to be considerably more expensive and have a greater impact on the natural and built environments.
3. Of the Peka Peka off-ramp options:
    - **Option P5 performed the best of the northbound on-ramp options and was retained for shortlisting.**
    - Option P3 had considerable property and social impacts and was therefore eliminated from short listing contention.
    - Option P4 had difficulties from a geometric perspective associated with the intersection with existing overbridge and with impacts on the landscape and the extent of the additional designation required and was therefore eliminated given the strong performance of Option P5.
4. Of the Peka Peka on-ramp options:
    - **Option P1 was a low cost completely within designation on-ramp option that carries risks around geometric standards and safety and was therefore retained for shortlisting.**
    - Option P6 carries a considerable cost and will be risky to implement, for a similar level of performance as other options and was therefore discarded.
    - Option P2b was discounted early due to the geometric constraints of the option.
    - Option P2a This option is the 2nd best performing on-ramp option however was discarded at this stage as Option P7 is a refinement of this option and offers less impact.
    - Option P7 was the best performing on-ramp option at Peka Peka and was therefore retained for shortlisting.

The on-ramp and off-ramp options were then combined to form the best performing two full options for shortlisting, being:

- **Option 1** – Includes off-ramp option P5 and on-ramp option P7
- **Option 2** - Includes off-ramp option P5 and on-ramp option P1

These are shown in Figure 30 and Figure 31 below.

Figure 30 : Short listed Option 1

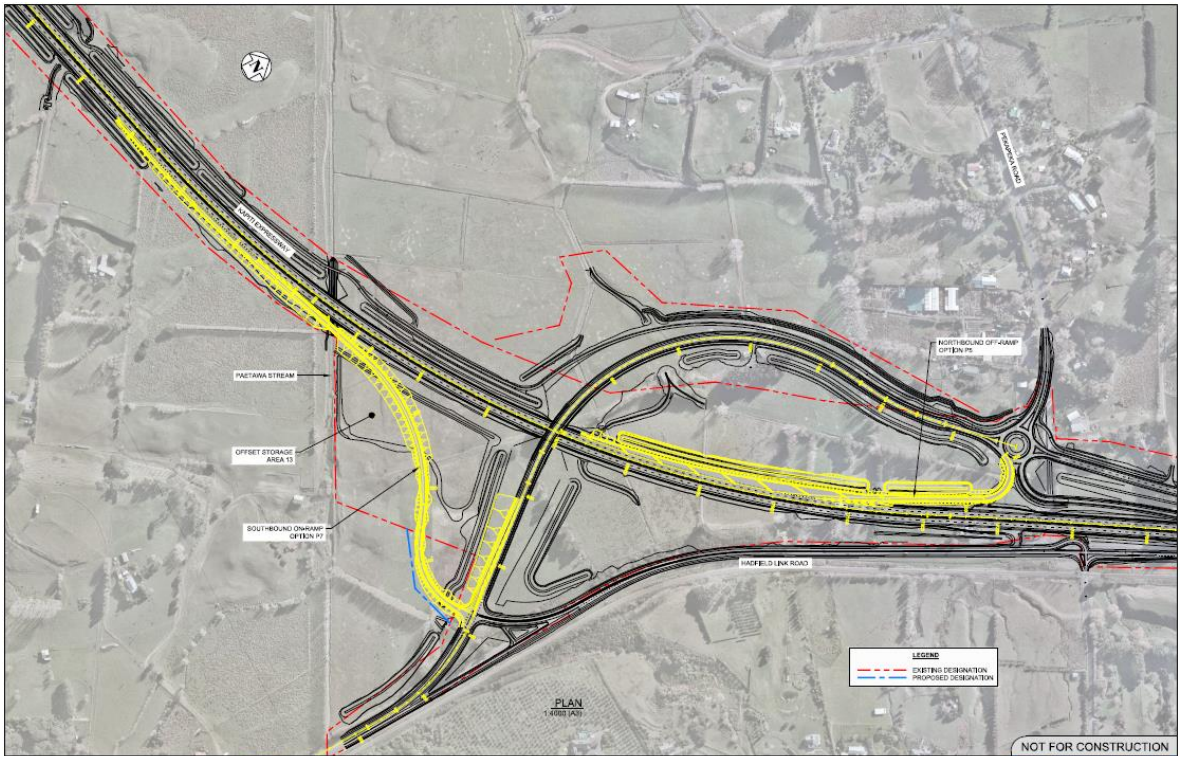
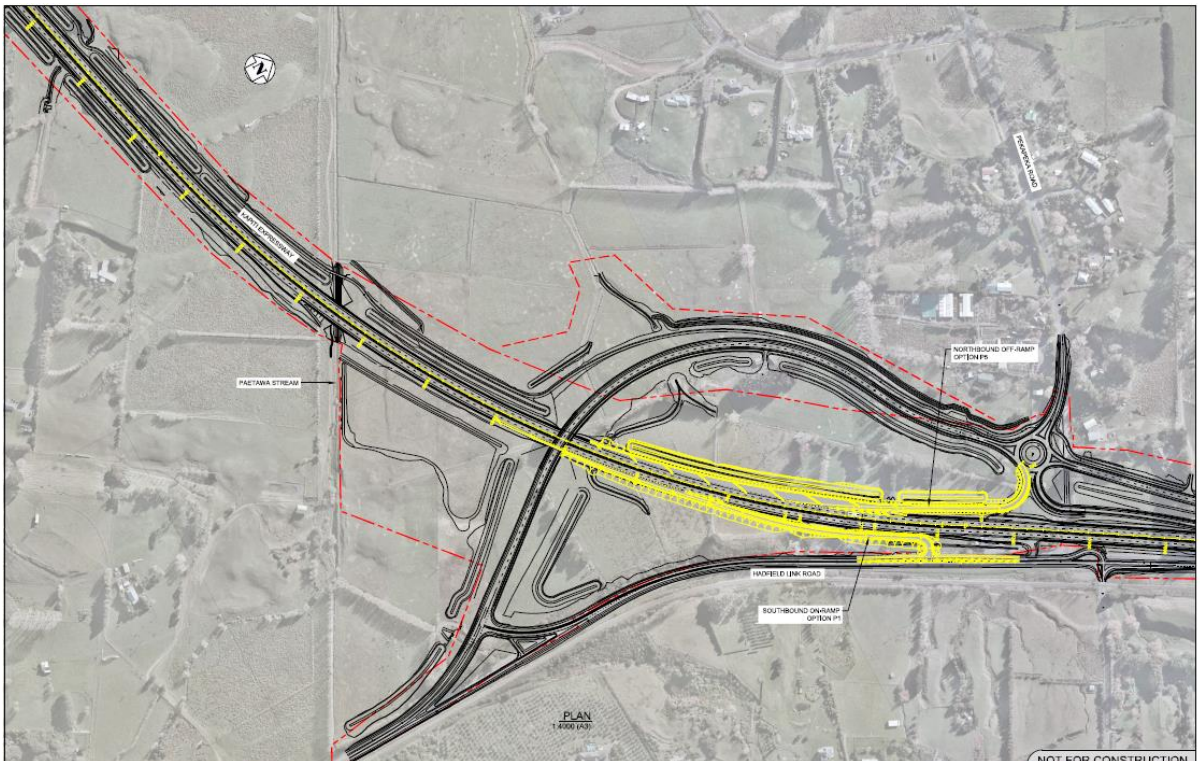


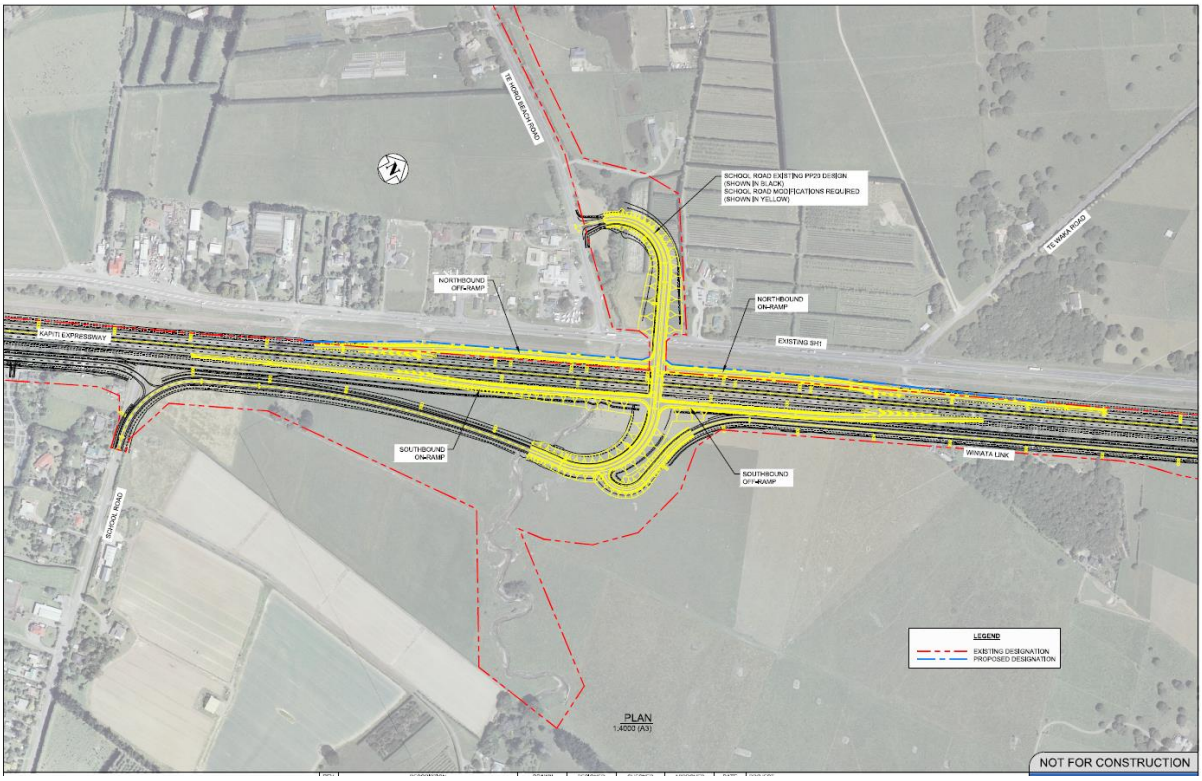
Figure 31 : Short Listed Option 2



5.4.4 Additional Shortlisted Option for Public Open Day

Only two options were shortlisted during the MCA process, however, following further discussion with Stakeholders, it was decided to also present the best Te Horo Option at the Public open day. Whilst Te Horo did not perform as well in the MCA process, the team considered it was still important to present a Te Horo option to the public to understand if there were any other compelling reasons that Te Horo should be retained in the short list. Therefore, the third and final short-listed option is shown in Figure 32.

Figure 32: Short listed Option 3



5.5 Community Response

5.5.1 General feedback

The Connecting Peka Peka project joined with the Peka Peka to Otaki Expressway (PP2O) team to hold two public open days:

- Saturday 28th October at the Maoriland film Hub in Otaki Main Street
- Sunday 29th October at the Te Horo Hall

The two projects are considering transport improvements for the same section of the community, so it was considered sensible to run the sessions concurrently and reduce the potential for stakeholder fatigue.

The open days were very well attended with 700 attendances on Saturday and 500 on Sunday.

Representatives from the Transport Agency and key experts from the team were at both sessions to man the information stations and run a series of presentations. In addition to the individual discussions with stakeholders, 78 written feedback forms were also completed.

The full feedback report is included in **Appendix K** and a summary of the feedback includes:

- Most people who responded were from Peka Peka and Te Horo and a smaller proportion from Waikanae.
- Overwhelming support to improve connectivity to the Te Horo and Peka Peka communities.
- The most common concerns related to limited connectivity and access issues. Secondary issues included ramp configuration, distance and time to the expressway and noise.
- Of the people who identified an option preference, the Peka Peka location was significantly preferred in comparison with Te Horo. There was very little concern at there not being improved connectivity to the Expressway at Te Horo.
- Support for Option 1 was based on the intuitive layout and safety of the design solution.
- Support for Option 2 was based on ease of implementation, less impact on neighbouring properties and lesser cost.

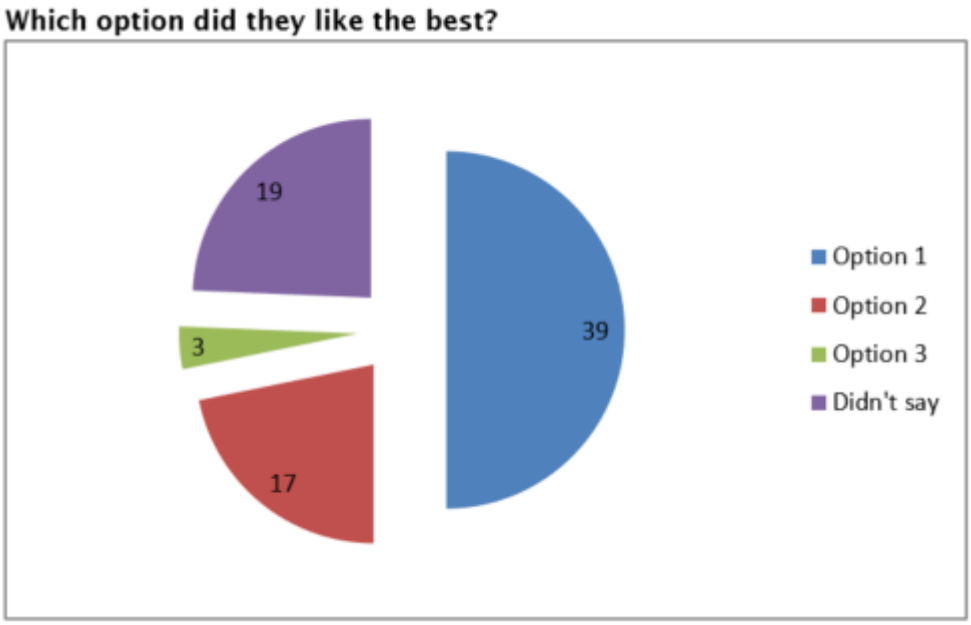
Overall Option 1 had stronger support as outlined in

Figure 33 below, however the overriding response was to do something (i.e. Option 1 was preferred but very few respondents were against Option 2).

Figure 33 shows the response from members of the public during the open days[6]. This is based on formal response forms. This aligns well with information records of discussions held by the project team across both days.

[6] Extracted from *Feedback summary from Connection Peka Peka Information open day document*

Figure 33: Community response to short listed options



The verbatim feedback received throughout the sessions can be summarised into some common themes.

- Doing nothing is not an option. The community would generally prefer Option 1 but would welcome Option 2 if it meant the project would proceed.
- Option 1 is supported as it is a more intuitive option and Hadfield road is already considered confusing. Respondents suggested the inclusion of a roundabout for the southbound on-ramp.
- The community feels that it is being disadvantaged as it has had to absorb the associated disbenefits of the expressway (such as noise, visual impact etc) however its own access to the expressway is restricted so they are not receiving the corresponding benefit of the infrastructure.
- The community is concerned about further noise associated with additional ramps. Many respondents requested upgraded road surfacing as part of the mitigation.
- There were some concerns regarding visual amenity and retention of local character.

5.5.2 Specific feedback

As well as the general comments above specific comments and questions on the options presented were also provided by the community.

Option 1

- A roundabout at the new on-ramp intersection with Peka Peka Road would be more practical.
- Noise impacts on the community and houses to the south east will be worse due to closer proximity of accelerating vehicles needs to be mitigated.
- Is there an opportunity to alter the geometry of the on-ramp to reduce the impact (and cost) of works through the flood area?

Option 2

- On-ramp geometry is very tight, what sized vehicles can make this movement?
- Will the merge on-ramp be safe, it seems short?
- There will be less impact on residents with this option due to prevailing winds (noise) and proximity to existing infrastructure.
- This is not a very intuitive option as drivers are required to head north to go south.

Other

- There was general acceptance that an interchange was not needed at Te Horo given the impact and cost.
- There were multiple questions on the implementation timeframe and the need to ensure improved connectivity is in place prior to the opening of the Peka Peka to Otaki section.

These comments have been considered in the refinement of options post the community engagement.

5.6 Revision of Shortlisted options

Following the open days, it was clear that the community preferred the Peka Peka location compared with Te Horo.

The technical assessment of the Te Horo option supported this view with:

- Complex land issues identified as the roading layout was outside Transport Agency designation and within Kiwirail designation.
- The road layout would require major revisions for the current PP20 design at School Road which is consented and currently undergoing detailed design.
- Two main streams cross the transport corridor and would be affected by a Te Horo option.
- Estimated costs are at least double that at Peka Peka as there would need to be four ramps to ensure the connectivity aims of this project are achieved.

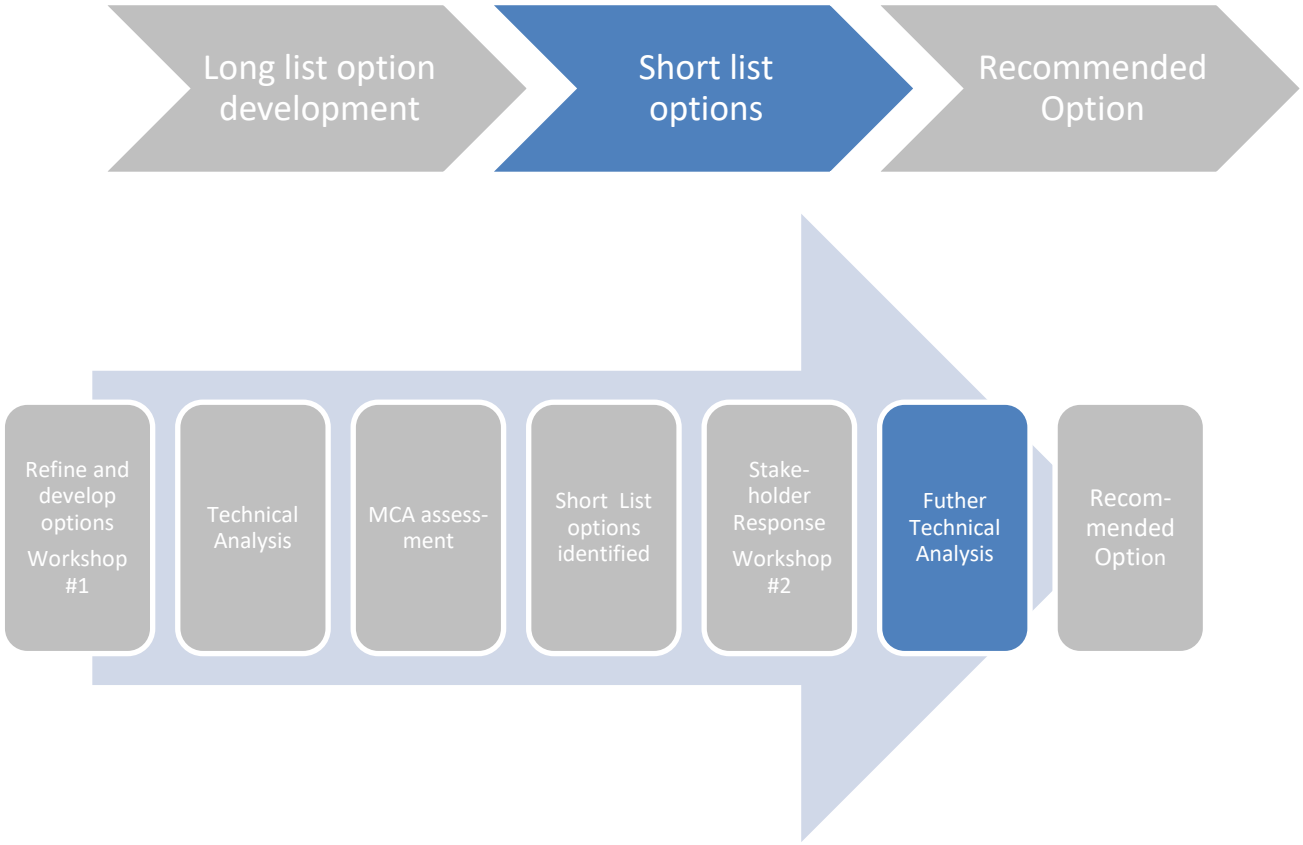
The full technical assessment on Te Horo is included in **Appendix D**.

Therefore, with limited community support, significant technical challenges and a high cost it was decided to remove the Te Horo options from further option refinement. As such Option 1 and Option 2 at Peka Peka were confirmed as the final shortlisted options.

5.7 Short List Option Refinement

The process for selecting the recommended option is shown in Figure 34Figure 23.

Figure 34 Further short list refinement



The remaining options in the short list were Option 1 and Option 2 and both are located at the existing partial interchange at Peka Peka.

Further technical work was undertaken for these options with respect to geometric design, stormwater, noise, costs and economic performance and this is reported in the following sections.

5.7.1 Geometric design

The initial geometric design work had shown that the design solutions at this location were more cost effective and less disruptive to implement and generally fitted within existing Transport Agency designation or within land currently owned by the Transport Agency.

Both shortlisted options incorporate a northbound off-ramp to enable traffic traveling from Wellington to the Kapiti Coast area to exit the expressway at Peka Peka and a southbound on-ramp to enable Kapiti coast traffic to enter the expressway at Peka Peka and travel towards Wellington.

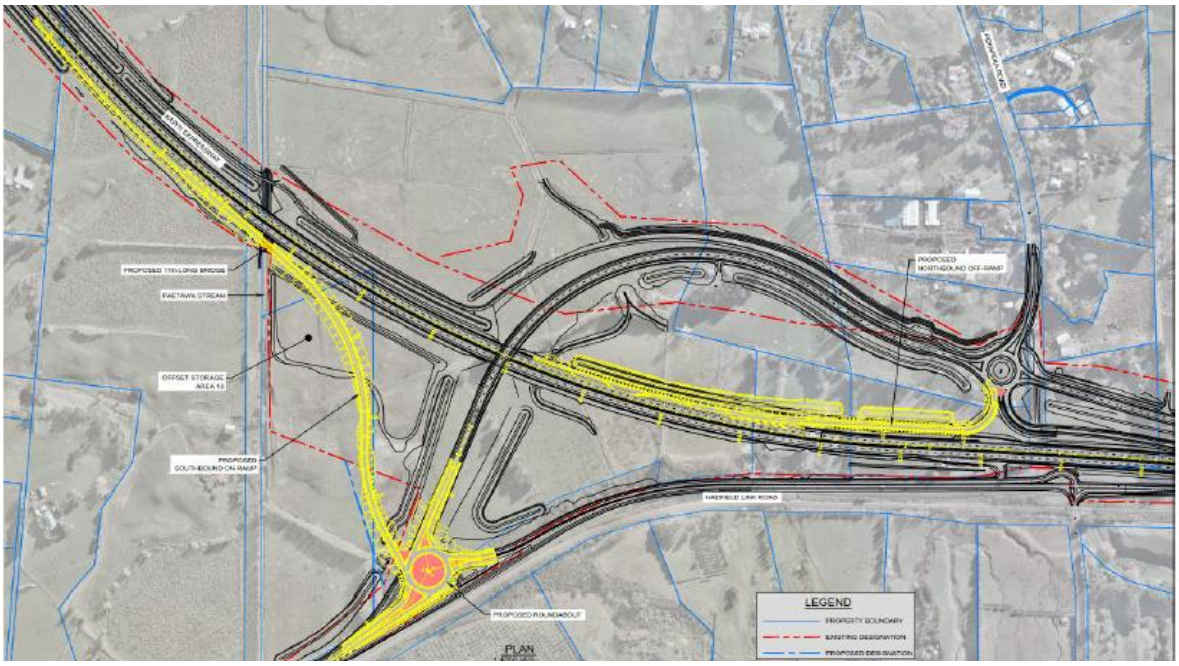
The northbound off-ramp is consistent in both shortlisted options. The two options differ in the location of the southbound on-ramp.

Both options provide connectivity for the currently "missing" south-facing ramps not provided for in the current Peka Peka partial interchange, effectively creating a full interchange with all four movements at Peka Peka. A detailed report is included in

Option 1

Option 1 is the combination of the northbound off-ramp previously referred to as 'Option P5' and the southbound on-ramp previously referred to as 'Option P7' in the earlier option identification (refer Appendix J) and is illustrated below.

Figure 35 Option 1 - refined



Northbound off-ramp

The northbound off-ramp design provides a simple and effective solution for adding the exit provision, with minimal changes to the existing road layout and within the existing designation for the expressway.

The design meets all geometric standards and has only one major constraint of the bridge length at the underpass location. Further discussions with James Hughes from the Transport Agency have been undertaken to develop the best design solution. The auxiliary lane exit proposed therefore provides the best balance between sight distance and deceleration.

The existing drainage devices located immediately adjacent to the carriageway require relocation. The design illustrates equivalent sized devices in a comparable location but would need to be reassessed during detailed design

Southbound on-ramp

The southbound on-ramp avoids the constraint of the existing expressway underpass by locating the on-ramp to the south of the main arterial road. Following feedback at the open day it is proposed that the existing intersection of Hadfield Link Road (which also carries the southbound off-ramp traffic) with the main road would be modified to include access to the

new on-ramp. The design currently incorporates a new roundabout at this location, almost mirroring the layout for the opposite movements. The operational requirements of this would need to be validated during detailed traffic assessment. This option does require an alteration to the existing designation for the first 140m of the on-ramp, however it would still be located within Transport Agency owned land.

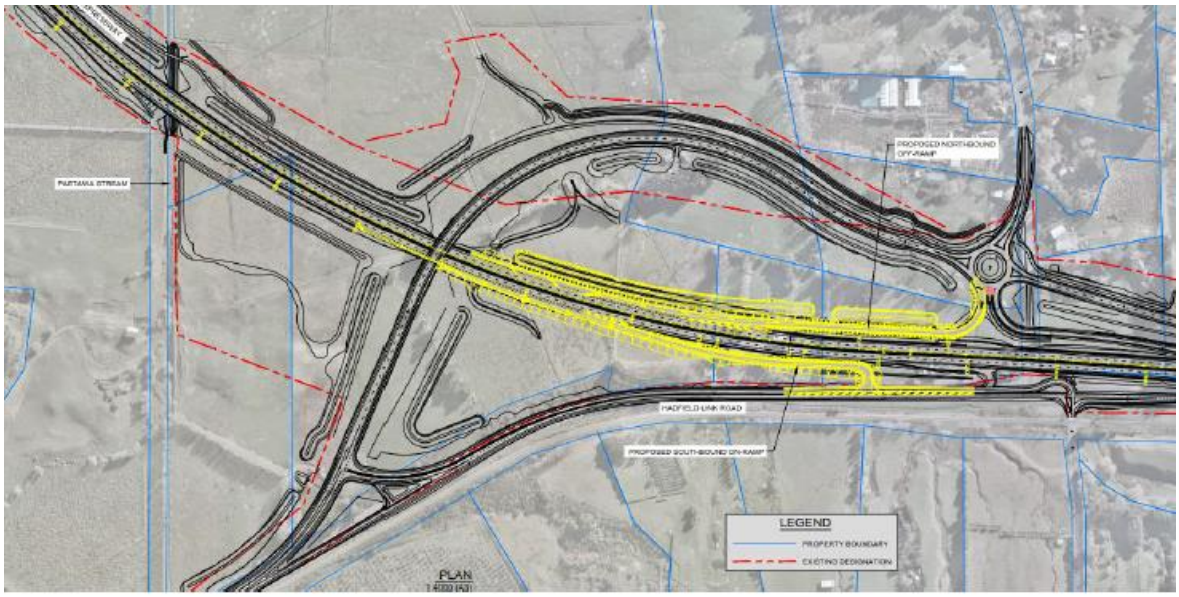
A critical issue associated with this option is the existing drainage infrastructure associated with the Mackays to Peka Peka section of the expressway near the Paetawa stream which would need to be moved with this location of on-ramp. It is unlikely that this could be achieved within the existing designation. A potential solution would be to extend the current design bridge over the Paetawa stream from 16m to 220m, which would span the stormwater offset area. It would add significant cost but would mitigate or even eliminate the stormwater issues related to the ramp.

Another issue that this option presents is the possible noise impact to residential properties located on private land immediately adjacent to, and to the south of, the NZ Transport Agency land in which the ramp would be located. Advice from acoustic specialists indicates that the noise impact could be mitigated through use of a solid TL4 concrete barrier located on the south side, and/or provision of an OGPA surface, for the 500m length of the on-ramp.

Option 2

Option 2 is the combination of the northbound off-ramp previously referred to as 'Option P5' (as with Option 1) and the southbound on-ramp previously referred to as 'Option P1' in the earlier option identification (refer to Attachment B), as illustrated below.

Figure 36: Option 2 – refined



Northbound Off-ramp

The Northbound Off-ramp is identical to that in Option 1, as described above.

Southbound on-ramp

The Southbound On-ramp (previously Option P1) passes beneath the existing expressway underpass. The ramp intersection with Hadfield Link Road has been located as far north as possible to enable the maximum possible acceleration length from the on-ramp intersection with Hadfield Link Road. The design incorporates a new intersection with a free left turn, and a give way controlled right turn bay into the ramp, from Hadfield Link Road.

This on-ramp design provides a cost-effective solution, requires minor changes to the existing road layout and is within the existing designation for the expressway. It is however less intuitive and will require Peka Peka traffic to travel in a large anticlockwise loop to access the on-ramp.

Geometrically, the design for the off-ramp meets all required geometric standards, except a departure would be needed for a reduced left-side shoulder width under the existing underpass. The shoulder width at its narrowest point would be 1.0m, 2.0m less than the required 3.0m width. It would not be possible to provide the full shoulder requirement without widening the SH1 underpass, which would probably require reconstruction of the bridge and southern abutment.

The proposed layout for the on-ramp has been subject of discussion with the Transport Agency to understand if there are any fatal flaws. Whilst the reduced shoulder width was not discussed as an issue, the on-ramp layout, particularly the use of Hadfield Link Road for on-ramp traffic was raised as a potential issue. The concern is that this link road has not been designed for general two-way traffic, particularly the type and volumes that an on- and off-ramp combination would require. Despite this, our assessment suggests that modification of this road could be undertaken to provide for all traffic movements in a safe and readable manner within the existing road corridor.

As described in the Option 1 on-ramp discussion, we are aware that stormwater management is very critical in the area adjacent to the Peka Peka Interchange. This on-ramp location, proposed in Option 2, will also affect the existing drainage which will therefore require modification / relocation, though it is anticipated that these would be minor and therefore the current design does not attempt to resolve stormwater design changes.

5.7.2 Stormwater assessment

An initial stormwater analysis was undertaken by AWA environmental to inform the stormwater impacts of the long list of options. This determined that the new ramps proposed at Peka Peka would all cross existing attenuation ponds and swales constructed to meet the consent conditions for Mackays to Peka Peka (M2PP) section of the expressway and therefore different levels of mitigation would be required. This was reflected in the MCA assessment.

A further stormwater review was undertaken by Iain Smith who is the stormwater lead for the M2PP team. He reviewed Option 1 and 2 and provided an assessment of how these options would interact with the existing stormwater treatment provided at the Peka Peka as part of consent conditions.

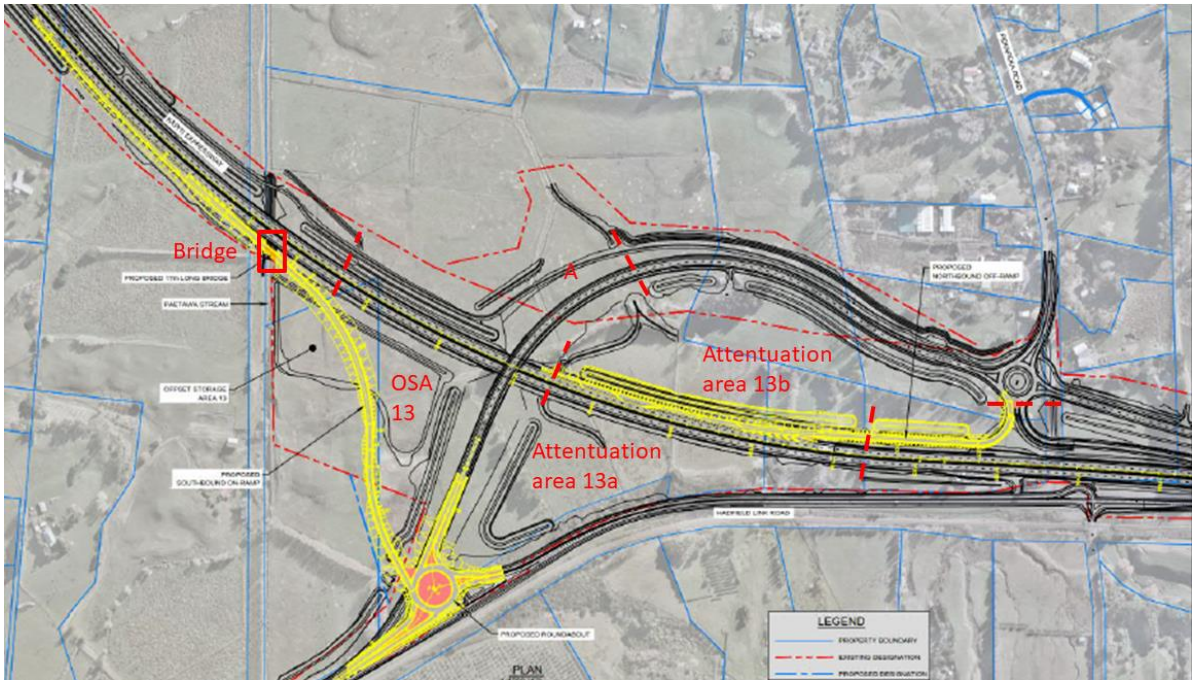
Overall it was not considered that either of the Options had fundamental flaws. There will however be some challenges for detailed design such as consenting approach,

constructability and options will need to be tested in the KCDC/Transport Agency models for compliance purposes. Option 1 will potentially require more costly remediation measures than Option 2 and this has been reflected in the Option costings. An allowance for Option 2 wetland risk has been incorporated into the economic assessment.

Option 1: Stormwater

The existing stormwater attenuation areas are shown on Figure 37.

Figure 37 Existing stormwater at Peka Peka – Option 1



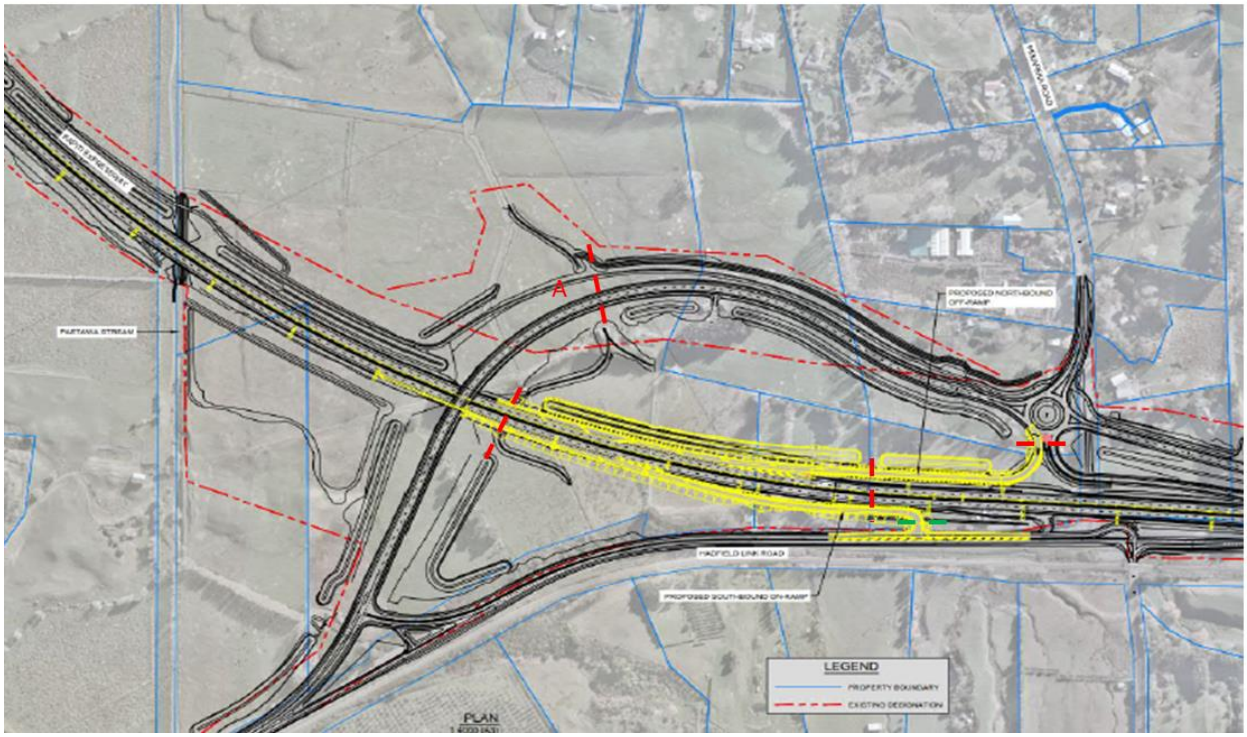
The review showed several mitigation measures could be expected with the implementation of this option:

- Loss of attenuation area 13B will need to be offset. For visual and Iwi impacts, an internal wetland might be appropriate which would add cost for planting.
- Loss of storage to OSA13 will require replacement and likely to require additional land.
- Increased runoff will require offsetting peak flow discharged at point “A”. This may have technical challenges to achieve upstream of the Paetawa stream bridge.
- Swales would be required to treat and attenuate the northbound off- ramp runoff.
- An embankment across OSA 13 will alter the efficacy of the storage area which could be a fundamental issue. Could be mitigated with additional land to offset the provision of a bridge. Note this bridge suggestion has been considered as a possible variation to the design.
- Loss of secondary flow paths running parallel to expressway adjacent the new southbound on-ramp will need to be replace and may require a land take.
- Culvert lengthening will result in loss of watercourse which will require off setting
- New bridge as shown on the map may have insufficient room to divert stream flows so could have constructability issues unless it can be diverted through another culvert.

Option 2: Stormwater

The existing stormwater culverts are shown on Figure 38

Figure 38 Existing stormwater at Peka Peka – Option 2



The review showed several mitigation measures could be expected with the implementation of this option:

- Loss of storage will need to be offset. For visual and Iwi impacts, an internal wetland might be appropriate which would add cost for planting.
- Increased runoff will require offsetting peak flow discharged at point "A". This may have technical challenges to achieve upstream of the Paetawa stream bridge.
- Swales would be required to treat and attenuate runoff from both ramps. The southbound ramp could provide a greater challenge due to location.
- Culvert lengthening will result in loss of watercourse which will require off setting.
- New culvert at start of southbound ramp will result in loss of water course which will require offsetting.

5.7.3 Noise

Noise is a major community concern for Peka Peka and a noise assessment has been undertaken for the two short listed options.

The assessment included reviewing the alignment options and testing their effects into the "as built" computer noise model for the Mackays to Peka Peka section of the expressway. No mitigation measures were included in the modelling, except for TL5 barriers on the bridged sections of the ramps.

The full results of this assessment are included in Appendix L, but the results can be summarised as:

- Overall, both ramp options cause equally indiscernible noise level changes when compared against the "as built" option. This is due to the traffic volume on the ramps being very small compared with the main expressway traffic.
- There is generally no difference between Option 1 and Option 2.
- One dwelling at Greenhill road is predicted to have noise in within Category B of NSZ6806 criteria for the as built, but this will be mitigated by the provision of OGPA in that area and noise will reduce to be within Category A.

Therefore, no further mitigation measures are required for noise.

5.7.4 Consenting strategy

The consenting pathway for the shortlisted options has been assessed. The full report is included in **Appendix M** but in summary:

- Both options would follow a similar consenting pathway strategy.
- This pathway would require an extension of the M2PP designation footprint and an alteration to designation would be required.
- Either option would require changes to the M2PP site specific management plans (SSMP), in particular SSMP11, which addresses a range of both designation and resource consent conditions in an integrated manner. Amendments to the Stormwater compliance report would also be expected.
- Compliance would be achieved by re-certification of the amended management plans.
- The current level of assessment suggests that with the implementation of appropriate mitigation measures both options would likely not result in significant adverse effects

It is noted that a "stand alone" suite of resource consents was considered as an alternative pathway. However, it was considered that as this Project is located within the M2PP designation, there would still need to be alterations to the M2PP management plans as well as developing new consents and therefore be a less desirable approach.

5.7.5 Cost assessment

Bond CM prepared initial costings for the long list of options to inform the MCA Process. Following option refinement more detailed costings have been estimated for Option 1 and Option 2. The pricing estimates use indicative market rates as at November 2017 and do not include for escalation or GST.

The main assumptions for the options are shown in Figure 39.

Figure 39 Bond CM Cost assumptions for Option 1 and 2

Option 1:

Ramp	Description
P5 - Northbound Off	New ramp approximately 300m long, from Kapiti Expressway to existing Roundabout at Peka Peka Road.
P7 - Southbound On	New ramp approximately 600m long, from Hadfield Link Road / Old SH1 road bridge approach road, through to Kapiti Expressway. This includes a new bridge over the Paetawa Stream, and an elevated embankment through/above wetland constructed during the McKays to Peka Peka (M2PP) project

This is as indicated on Drawing PP-DRG-GA-00-005, Revision B

With 2 possible sub-Options for Option 1. These are:

Option 1 Sub-Option	Description
SO#1 – Noise Mitigation	Revise the roadside barriers from steel to concrete with an increased height, to mitigate expressway noise.
SO#2 – Wetland Impact Mitigation	Extend the P7 Paetawa Stream bridge to be a 220m long, single lane concrete bridge over the wetland. This replaces embankment and associated pavement over the same area.

Option 2:

Ramp	Description
P5 - Northbound Off	New ramp approximately 300m long, from Kapiti Expressway to existing Roundabout at Peka Peka Road.
P1 - Southbound On	New ramp approximately 400m long, from Hadfield Link Road to join the Kapiti Expressway north of the Hadfield Link Road.

The comparative estimates for these options are:

Option	Base Estimate	Expected Estimate (P50)	95th Percentile Estimate
Option 1: P5 + P7	$13.57M	$16.96M	$19.51M
Option 1 with SO#1	$13.68M	$17.10M	$19.67M
Option 1 with SO#2	$18.44M	$23.06M	$26.51M
Option 1 with SO#1 and SO#2	$18.56M	$23.207M	$26.67M
Option 2: P5 + P1	$4.74M	$5.92M	$6.81M

This price excludes land purchase, consenting costs, Transport Agency managed costs and contractual or commercial impacts to varying the current PP2O contract.

Therefore, to allow a comprehensive assessment of the economic performance of the options the following allowances have been provided for these line items as shown in Table 8. This includes an allowance for possible local road improvements. If development occurred at a quicker rate there may be a need for KCDC to upgrade Peka Peka Road to include shoulder widening. Option 2 could require additional upgrades at Hadfields Road.

Table 8 Additional Option costs

COST ITEM	OPTION 1 ($M)	OPTION 2 ($M)
Land purchase	0.5	0.1
Professional services/consenting	1.0 -2.0	1
Transport Agency management	0.5	0.5
Wetland - (Northbound off -ramp and Option 2 southbound on-ramp)	0.5	1.5
Local road improvements (Peka Peka road or Hadfields Road)	1	1
TOTAL ADDITONAL COSTS	**3.5 -4.5**	**4.1**

The total estimated capital expenditure (CAPEX) costs for the options are shown in Table 8. Option 1 contains a range which includes with and without the bridging option for stormwater mitigation.

For the purposes of economic assessment, the Operational expenditure (OPEX) costs have been assumed as the following:

- Annual operational cost of 1% of CAPEX
- Every 10 years, a more substantial maintenance intervention is required at 4% of CAPEX (e.g. reseal or storm water remedial work)

Total costs in Net Present Value is provided in Table 9.

Table 9 Total cost estimates

COST ESTIMATE	OPTION 1 ($M)	OPTION 2 ($M)
Bonds capex estimate	17.1 – 23.2	5.92
Additional delivery cost	3.5-4.5	4.1
TOTAL CAPEX COST	**20.6 – 27.7**	**10**
Operational cost (40 years, undiscounted)	9.5 – 12.7	4.6
Total cost (NPV)	**21.4 – 28.8**	**10.4**

Option 1 with the noise and wetland impact mitigation is estimated to cost between $21-$29m which is significantly more expensive than Option 2 which is estimated around $10m.

It is expected that Option 1 could have further value engineering work before confirming the final design and cost.

5.7.6 Economic evaluation

Transport modelling

Transport modelling has been used to assess the effects of the shortlisted options and allow the calculation of benefits for each Option. For this project, two transport models have been referenced:

- The Kapiti Transport Model (KTM) is a Saturn model and has been used to test the options; and
- Wellington Transport Strategic Model (WTSM) has been used to provide the demand for the KTM.

The KTM model used is based on a 2015 base year, an update since the original project modelling was undertaken. Models were run for the AM, IP and PM peak periods for 2021, 2031 and 2041.

The Do-Minimum scenario assumes the full Kapiti Expressway is in place including the Mackays to Peka Peka section (already constructed) and Peka Peka to Otaki section (currently under construction).

A sensitivity scenario has also been undertaken to assess the effect of additional development in Peka Peka. This scenario has not been used in the economic calculations, but the results have informed potential effects on the surrounding road network.

Economics

The economic evaluation has been undertaken according to the Transport Agency Economic Evaluation Manual (EEM).

This evaluation includes benefits associated with travel time and vehicle operating costs. From an economic perspective the safety impacts for these two options are considered neutral. A review of safety records in the study area, including analysis of alternative routes such as Rutherford Drive, Main Road (Waikanae Town Centre), Te Hapua Road and Peka Peka Road has not indicated the presence of any significant safety issues. Consequently, road safety issue is not included in the investment objectives for this Connecting Peka Peka project. Therefore, safety has not been included in the benefit stream for this assessment.

A peer review was undertaken by Julie Ballantyne from Traffic Design Group.

The results of the economic evaluation are shown in Table 10.

Table 10: Economic evaluation of options

ECONOMIC EVALUATION	OPTION 1	OPTION 1 (HIGH RANGE COST)	OPTION 2
Benefits (NPV)	$44,480,000	$44,480,000	$37,240,000

Costs (NPV)	$21,390,000	$28,760,000	$10,400,000
BCR	**2.1**	**1.5**	**3.6**

Option 1 has a BCR of between 1.5 – 2.1 and Option 2 has a BCR of 3.6.

An incremental analysis has been carried out between Option 2 (lower cost) against Option 1, which provides a higher level of overall benefits. Results are provided in Table 11.

Table 11: Incremental benefit cost ratio

INCREMENTAL BCR	OPTION 1
Additional Benefits (NPV)	$7,240,000
Additional Costs (NPV)	$10,990,000
Incremental BCR	**0.7**

The incremental analysis suggests the additional money associated with Option 1 over and above the Option 2, provides a benefit cost ratio of less than 1. The additional costs outweigh the additional benefits associated with Option 1.

More details on the economic assessment are attached in Appendix N.

5.7.7 Summary of short list option refinement

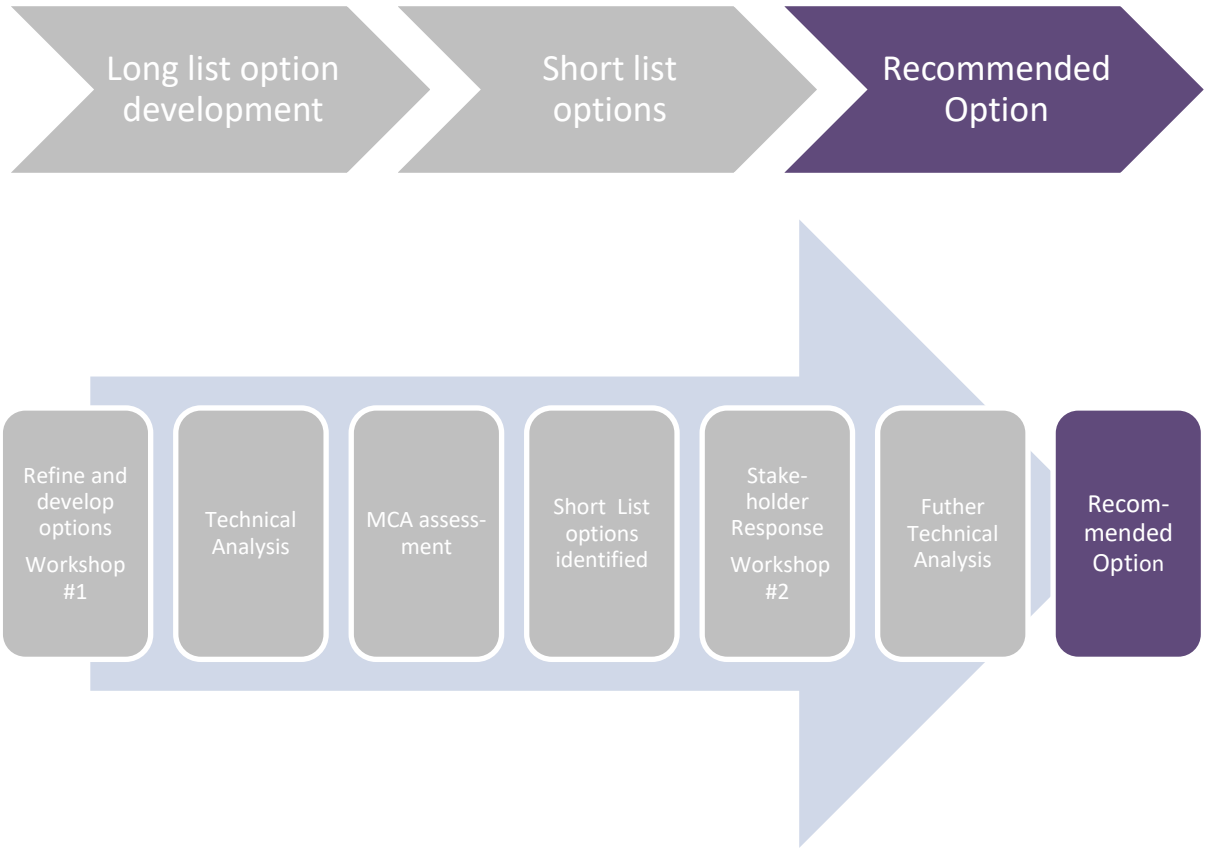
To inform the selection of a preferred option, each assessment criteria has been compared between the Options to determine the relative merits and challenges. This is shown in Table 12 .

Table 12 Comparison of assessment criteria between options

ASSESSMENT CRITERIA	OPTION 1	OPTION 2	STRONGER OPTION
Community Feedback	Preferred option by community	Community would support if it was a choice between the project proceeding or status quo.	Option 1
Route	The southbound on-ramp is intuitive. The northbound off-ramp is the same for both options.	The southbound on-ramp for Option 2 is less intuitive and results in customers having to loop back on themselves to access the motorway The northbound off-ramp is the same for both options.	Option 1
Geometric Design	Option 1 avoids the constraints of the existing expressway but	Option 2 is within the existing expressway designation and	Option 1

	does involve work outside of the current designation. There are some technical challenges with the bridging infrastructure.	does not require additional land purchase. There are constraints with the overhead bridge which will result in a departure of standards. There is potential concern with using Hadfields road to access the on-ramp.	
Road safety	Improved road safety as it removes strategic traffic from the local road network. The interchange complies with NZTA standards.	This option is considered to have a higher geometric design and safety risk. The tight radii onramp and departure required on the expressway shoulder increase risk.	Option 1
Stormwater	Stormwater mitigation measures will be required which is likely to involve wetlands and land purchase. Significantly higher costs to de risk this option as the southbound on-ramp could require a 220m long bridge to avoid the offset storage area below.	Stormwater mitigation measures will be required which is likely to involve wetlands and land purchase. This is comparatively less risk than Option 1	Option 2
Noise	Overall noise can be mitigated. Will require OGPA to mitigate noise. Additional noise effects for neighbours adjacent the southbound on-ramp and TG4 barriers will be required.	Overall noise can be mitigated. Will require OGPA to mitigate noise. Ramps are closer to existing motorway, so noise effects are considered less than Option 1.	Option 2
Consenting strategy	Amendment to existing M2PP management plans	Amendment to existing M2PP management plans	No difference
Cost	Range of costs $21.4-28.8 depending on whether a bridge structure is required for mitigation	Cost is estimated as $10.4m which is over three times less than Option 1	Option 2
Economic evaluation	BCR 1.5-2.1 (depending on stormwater mitigation solution). Note the incremental BCR of Option 1 over the cheaper Option 2 is 0.7, so additional costs outweigh the additional benefits.	BCR 3.6	Option 2

5.8 Selection of Recommended Option



5.8.1 Assessment against investment objectives

Two problem statements have been confirmed for the Connecting Peka Peka project.

1. The confusing access arrangement to the Kapiti Expressway in the Peka Peka area is delivering poor customer satisfaction (40%)
2. Peka Peka and Te Horo communities have comparatively poor connectivity to the Kapiti Expressway (60%)

This has resulted in two investment objectives for the project as detailed in Table 13.

Table 13 Investment objectives

	Investment Objective	Objective Weighting
1	Improve Peka Peka and Te Horo communities' customer satisfaction of the Expressway by 75% by 2025	50%

2	Improved customer access to Expressway from Peka Peka and Te Horo communities by 30% by 2023	50%

Both Option 1 and Option 2 satisfactorily address the investment objective of reducing travel time to the Expressway. Both options also provide the "missing" south facing ramps to complete the Peka Peka interchange which will improve connectivity for the communities and markedly improve customer satisfaction. Option 1 however addresses both criteria in a more comprehensive way, with a high acceptance rate from the community and an estimated additional 1.20 minutes/ vehicle travel time savings compared with Option 2.

5.8.2 Stakeholder feedback at Workshop 2

The Stakeholder group convened on 21 November at Workshop 2 and were presented with a summary of the:

- Long listing process
- Short listing process
- Community response
- Short listed option refinement

They were also shown a comparison table between the options as shown in Table 14.

Table 14 Considerations for option evaluation

CONSIDERATION	OPTION 1	OPTION 2
Investment objectives	Better	
Implementation impacts		Better
Safety outcomes	Better	
Average travel time savings	Better	
Costs	$21-$29m	$10m
BCR	1.5-2.1	3.6

Following this information session Stakeholders were separated into two groups to discuss the merits and challenges of both options and to recommend a preferred option.

Full documentation of the groups discussions is included in **Appendix N** and can be summarised as:

- Both groups unanimously recommended the implementation of Option 1
- It was considered that Option 1 had better safety performance, more intuitive design and best future proofing for additional land development.
- The group had significant concerns for Option 2 with respect to safety concerns at the narrowed shoulder at the end of the merge and the performance of the local roads adjoining the on-ramp.

- **It was also considered that a high standard expressway has been built and the quality of this infrastructure should not be reduced for a short-term gain. The group identified Option 1 as being the most commensurate with the existing infrastructure**.
- The Stakeholders recognised the large cost differential between Option 1 and 2 and agreed that Option 1 should have a value engineering focus for the on-ramp design.
- The Stakeholders preferred implementation of both ramps as one project parallel to the M2PP project

5.8.3 Selection of preferred option

It is clear, that both Option 1 and Option 2 each satisfactorily address the investment objectives. Both options also achieve a positive BCR meaning the projects are economically viable.

However, when comparing the options, both have merits and technical challenges and the analysis in Table 15 highlights the key trade-offs between the options:

Table 15 Key trade-offs between the options

TRADE-OFF BETWEEN OPTIONS	COMMENTARY
Accessibility (Average travel time savings)	Option 1 has 19% more benefits than Option 2 in the traffic modelling indicating the proposed route of Option 1 is more beneficial for the road network. It therefore considered better addresses Investment Objective 1
Option 1 is a more intuitive route	Option 1 is an intuitive and legible interchange design which has the least impact on existing local roads. Option 2 will always require traffic to “”travel north, to head south” which means it is less effective at achieving Investment Objective 2
Option 1 has a lower safety risk.	Option 2 requires use of Hadfield Link Road, a tight radii corner and a reduced width of shoulder south of the southbound onramp hence is considered to have a higher safety risk than Option 1.
Option 2 is significantly cheaper than Option 1	Option 2 is significantly cheaper than Option 1, but it carries a much higher risk with respect to safety. A detailed safety audit would help further define technical solutions to address the safety concerns. An allowance has been made in the assessment for local road upgrades, but the safety audit results may suggest other improvements which could add further cost to Option 2. The worst case could be that the existing overbridge abutment would need to be moved to create additional space for the shoulder which would be at a significant cost and could result in Option 2 being discarded. Option 1 requires a value engineering focus for the southbound on-ramp to determine the most cost-effective solution to mitigate the flood risk. This could result in a reduction of cost.

	It is likely that even with value engineering there could still be a substantial cost difference between the options. However, there is potential for the economic performance of Option 1 to further improve
Option 1 requires more mitigation of impacts	Both options can satisfactorily mitigate the noise impacts. Both options also require mitigation for stormwater, however Option 1 requires more mitigation that Option 2 for the southbound on-ramp.

Therefore, taking all the information into account, due to its intuitive route with maximum travel time savings potential and higher safety performance, the following is recommended;

1. Option 1 is implemented to improve the Peka Peka connectivity; and
2. As part of the pre-implementation phase a value engineering exercise should be completed for the southbound on-ramp with a focus on reducing the costs of its implementation.

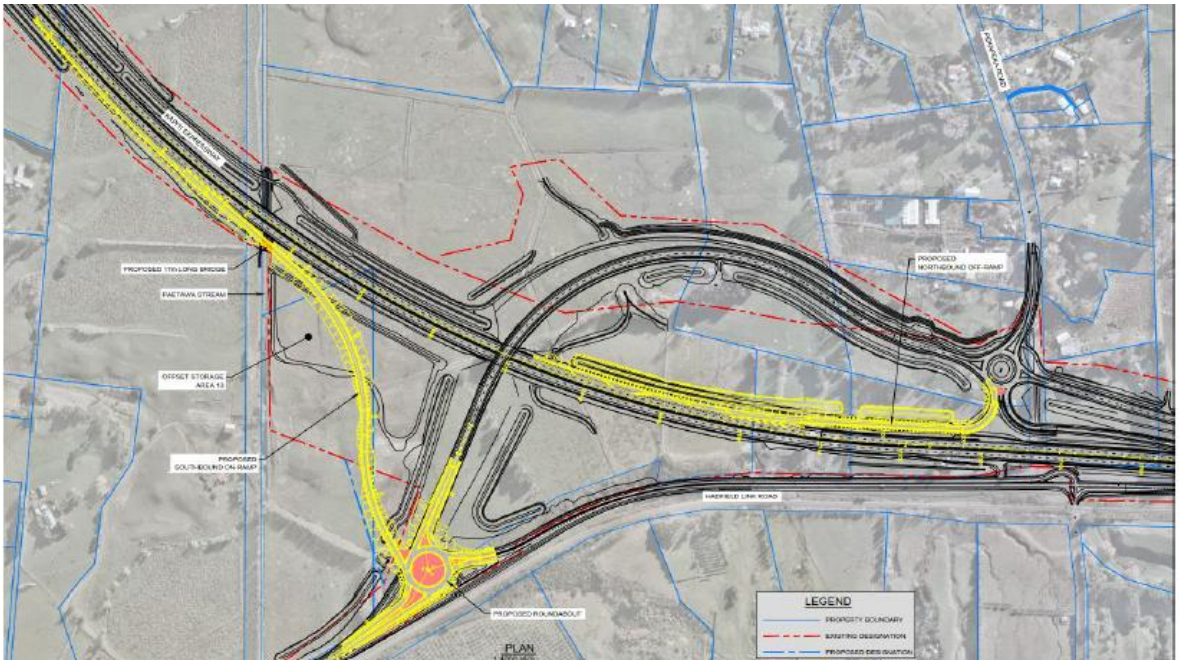
6 RECOMMENDED PROJECT OPTION

This section presents the recommended project option that has resulted from the assessment of alternatives and options. It reflects the assessment undertaken against the investment objectives and range of criteria to determine the option which best achieves the identified benefits and desired outcomes for the project. The recommended project option is **Option 1**.

6.1 Description

As outlined in the previous section, Option 1 provided the best solution to complete the Peka Peka interchange. It was assessed to be the most intuitive, perform better from a safety perspective and have the greatest potential for travel time savings. The recommended project option is shown in Figure 40.

Figure 40 Recommended Option



The two sections of this interchange design are:

- Provision of a northbound off-ramp at Peka Peka interchange
- Provision of a southbound on-ramp at Peka Peka interchange.

As part of this process the core activities that will need to be delivered include:

- Specimen design for both ramps
- Value engineering for the southbound on-ramp design to determine the optimum solution for managing existing stormwater treatments and mitigate the effects of the new ramp
- Further development of Consenting strategy
- Pre- implementation reporting

6.2 Benefits

The recommended option delivers improved connectivity for Peka Peka and Te Horo communities and delivers benefits against all the projects investment objectives.

6.2.1 Legibility

Investment objective 1 is to improve Peka Peka and Te Horo customer satisfaction of the Expressway by 75% by 2025.

The intuitive design will complete the existing interchange at Peka Peka and therefore remove the frustrations reported by customers with respect to the current confusing access arrangement. In addition, the new ramps will divert strategic transport trips from the regional road network onto the Expressway thus improving the operation and safety of the local road network.

Customer satisfaction will be measured post implementation through feedback forms. Interim feedback from customers at the open day indicate that the provision of this option is preferred by most respondents.

6.2.2 Access

Investment objective 2 is to improve customer access to the Expressway from Peka Peka and Te Horo communities by 30% by 2025.

This option provides the highest reduction in travel time savings across the network. The trips using the ramps are from a dispersed area and on average, the travel time savings in the transport model is in the order of 4 minutes per trip. Table 16 shows the estimated travel time savings for two key routes to the Expressway in 2021 meet or exceed the desired 30% saving.

Table 16 Estimate travel time savings

LOCATION	EXISTING ESTIMATED TRAVEL TIME (MINUTES)	AVERAGE TRAVEL TIME SAVINGS (MINUTES) 2021	% SAVING
Peka Peka to Te Moana	7	4	57%
Te Horo to Te Moana	13	4	30%

6.2.3 Estimated change in traffic flows

Whilst not specifically an investment objective, it is beneficial to understand the projected change in traffic flows following the implementation of Option 1. Overall, it is expected that the traffic will **reduce** on the key local routes surrounding the interchange as detailed in Table 17. SH1/Old road between Peka Peka and Te Horo is predicted to have a 25% increase over the Do Minimum due to traffic from Te Horo using this road to access the Expressway. This is however significantly less than the existing traffic using SH1 so is considered to have a negligible effect.

Table 17 Projected change in traffic flows

Traffic flows (vpd)	Existing 2015			Do Minimum 2021 (M2PP and PP2O) (A)			Peka Peka Option 1 2021 (B)			Difference (B)- (A)		
	AM peak hour	PM peak hour	ADT	AM peak hour	PM peak hour	ADT	AM peak hour	PM peak hour	ADT	AM peak hour	PM peak hour	ADT
Peka Peka Road	**208**	**216**	2654	164	251	2394	155	186	2221	-9	-165	-173
SH1/Old Road between Peka Peka and Te Horo	**1408**	**1410**	17215	295	304	3323	336	358	4155	41	54	832
Te Horo Beach Road	**56**	**59**	694	299	336	3569	299	336	3569	0	0	0
School Road	**264**	**305**	3178	231	267	2719	231	267	2719	0	0	0
Rutherford Drive	**94**	**79**	987	92	166	1376	40	54	609	-52	-112	-767
Main Street (Waikanae)	**1839**	**1908**	22908	824	687	9243	714	605	7727	-110	-82	-1516

6.2.4 Use of Expressway for short trips

The transport model has been analysed as to the origin the destinations of trips using the Peka Peka south facing ramps. The analysis indicates almost no traffic uses the expressway for short trips between Peka Peka and Te Moana interchange as a result of the connection. Traffic using the Peka Peka Ramps comes from the rural area around Peka Peka and north towards Te Horo and Te Horo Beach with destinations in Paraparaumu and areas to the south.

6.3 Implementability

Overall, the two ramps that form Option 1 are relatively small and straightforward projects.

There are two main technical challenges:

- There is history of deep peat excavations as part of the M2PP project. This can be easily managed when offset from the Expressway, however if this needs to occur next to a live lane then construction becomes more complicated. In this instance sheet piles to support the existing Expressway would likely be required which would add complexity to the construction methodology and require additional time.

- Replacement of existing stormwater management devices for the new ramps could be complex in the constrained environment as new stormwater systems need to be operational before the existing ones can be decommissioned.

6.3.1 Constructability

There are many considerations with respect to constructability:

Southbound on-ramp

- Most of the construction will be offline so it is expected to only cause minor traffic impacts during construction
- The offline nature of this ramp will aid the technical challenges associated with deep peat excavations
- The location of the new bridge of Paetawa Stream is in close proximity to the Expressway so will require temporary traffic management which may cause some disruptions
- Piling for this option may have some associated noise but as traffic volumes are low it is likely this could be undertaken during the day rather than at night
- The proposed roundabout at the start of the on-ramp might cause some disruption to local traffic movements, however this might not be immediately required which will be determined at the value engineering stage.

Northbound off-ramp

- This will probably require a shoulder closure for the duration of the construction of this ramp. It is likely that interim full lane closures could be required depending on the stage of construction. However, as traffic volumes on this part of the network are relatively low, this might be able to be undertaken during the day to avoid night working and help reduce costs of working.
- There is an existing northbound emergency access off the motorway at Peka Peka which may be difficult to keep operational in its current form during construction. This would need to be assessed as part of the tender process.
- The offramp construction is in a small “island” area only accessible of the expressway or the main road. Therefore all truck movements will be required directly from these roads. This traffic management will need to be evaluated as part of the contractors tender.

6.4 Assessment of Effects

The assessment of effects takes an RMA lens over the recommended option assessing against Safety, Cultural and Heritage, Built Environment, Natural Environment, Social, System Integration and Economy.

6.4.1 Safety

The surrounding area at Peka Peka does not have a reported existing safety issue. As detailed in section 6.2, the recommended option will reduce traffic on most locations of the local road network which will be of benefit for local road users. The design of both ramps meets accepted road design standards and the southbound on-ramp was considered to have the least safety risk when compared with other options.

6.4.2 Cultural and historic heritage

The option has been assessed against impact on cultural and Iwi values and is identified as having a very high likelihood of uncovering archaeological matters. The option is however generally located in areas that have already been disturbed by M2P earthworks and drainage/wetland works and therefore the effect is considered to be minor.

Lovat House (Historic Place Category 2) is located approximately 1km to the north east of the location (29 Hadfield Road) and will not be affected by this option.

6.4.3 Built environment

The partial Peka Peka interchange has already been constructed as part of M2PP and thus has already significantly altered the character of the surrounding land. The recommended option is providing additional road but overall it is not considered that this will further affect the character of the area.

The location of the southbound on-ramp is closer to properties to the south east of the interchange and may have minor visual amenity impacts. Noise modelling shows there will be an indiscernible difference to noise due to the low traffic volumes on the ramps.

The location of the additional ramps at this location are considered to potentially lead to an increase in the rate of development of the Peka Peka and Hadfield Road areas over what has been envisaged by the District Plan.

The option is generally located within existing roading designation or on additional Transport Agency owned land. Depending on the final design solution for the southbound on-ramp there could be some modest land purchase required to facilitate additional stormwater facilities or wetlands. In addition, the expansion of the stormwater treatment area for the northbound off-ramp may require land currently under lease to iwi in terms of an arrangement made for the M2PP project. This may have to be renegotiated to achieve access to this land.

6.4.4 Natural environment

There are likely to be some minor adverse environmental impacts as a result of this project. This relates to the need to widen the road in some sections, and potentially some new land required for stormwater mitigation. The project is however located on land that has already been modified as part of the M2PP project. Therefore, it is considered these effects can be mitigated with replacement planting, preservation of wetlands and adherence to M2PP conditions and agreed strategies.

6.4.5 Social

Overall the recommended option has been assessed as providing social benefits through enhanced accessibility for residents and businesses. The option will provide full movement accessibility from the Kapiti Expressway to the local road network and improved access for emergency vehicles. As it is located adjacent the existing expressway alignment it will not have any cumulative effects on community severance.

6.4.6 System integration

The recommended option has improved legibility and provides more efficient access to the Expressway for local communities. It will benefit the wider transport network through the reduction of traffic on some of the surrounding local roads. It was considered to best cater for the forecast transport demand due to growth anticipated in the Peka Peka, Hadfield Road and northern Waikanae areas.

6.4.7 Economy

It is considered that the recommended option will contribute to economic growth in the region through improved accessibility to both the Expressway and local business areas. It is expected to have a negligible economic impact on the Waikanae Town Centre.

6.5 Statutory requirements

It is assumed that the project will follow the conventional path through the statutory approvals process. Accordingly, the approval pathway will require alterations to existing M2PP designations and resource consents.

The M2PP Project is the subject of an extensive suite of designation conditions and resource consents. The approvals mechanism employed for the M2PP project was to subdivide the project into geographic "sectors" with SSMPs developed for each sector. The Project is largely within the footprint of SSMP11. The SSMP illustrates the key built elements of the project and the various mitigations proposed with respect to ecological, stormwater and other environmental effects within the SSMP. The SSMP integrates both designation and consent conditions and provides a mechanism by which compliance with the various conditions may be confirmed. This certification process involves both the territorial and consent authorities.

The approvals pathway is expected to include:

- Notice of Requirement (NOR) to Kapiti District Council to alter the M2PP designation.
- No additional resource consents in addition to those granted for the M2PP project.
- Modifications to the elements of the M2PP project that require on-going compliance for the treatment and mitigation of stormwater and possibly M2PP conditions that address ecological and cultural matters.

6.6 Asset management

There will be increased maintenance and operations for the increased pavement area and increased road barriers. This will be a small addition to the existing maintenance operation of the state highway. No special maintenance is required. The existing NOC contract will be responsible for this maintenance.

6.7 Stages and sequencing

The northbound off-ramp is a cost effective, efficient solution which should be straightforward to build and is expected to have only minor consenting issues. Therefore, it could be constructed first in the construction programme and opened while the preparatory works were being undertaken for the southbound on-ramp. This would mean the benefits for the northbound traffic could be realised earlier.

Consideration was given to only providing the northbound off-ramp and completing the on ramp at a later date. Whilst this approach has benefits in spreading the fundability of the project, it is not favoured or recommended for the following reasons:

- A key driver of this Project is to complete the interchange and provide improved access to the communities of Te Horo and Peka Peka, providing a part solution on top of a partial interchange only increases the legibility challenges in the area, creating potentially even greater confusion for customers (particularly new to the area)
- Increased cost. Whilst the off ramp is the cheaper component of the total Project, there would be increased inefficiencies of effectively creating two projects of small scale. A cost premium of at least 10% is envisaged as a result of this increased inefficiency.
- By proposing a staged solution and approval for part of the recommended option, the case for the overall Project is weakened, reducing the risk of any funding being made available.

It is therefore recommended that the implementation of the Project occurs at the same time and the proposed on and on ramp are not separated and delivered separately over different time periods.

6.8 Joint working

The Option 1 improvement works are located at the existing Peka Peka Interchange which was part of the M2PP project and at the southern end of the PP2O project which is currently under construction. However, it is considered that this project is of a sufficient scale to warrant a stand-alone project rather than being included in either the M2PP or PP20 contracts. It is expected that there will need to be a close interface between the contractor and the M2PP and PP2O teams to ensure the sharing of technical information, ground conditions and stormwater connections.

6.9 Do-minimum option

The Do-minimum option against which the recommended option has been assessed includes the completed M2PP and PP2O sections of the Expressway as shown in Figure 41 and Figure

Figure 41 Do-minimum option – Mackays to Peka Peka

Figure 42 Do-minimum option – Peka Peka to Otaki

7 RECOMMENDED OPTION: ECONOMIC ANALYSIS

7.1 Economic summary of recommended project

This section details the economic analysis for the preferred option as defined in the Transport Agency EEM. It uses a 40-year evaluation period and assumes a 6% discount rate.

Full details of the economic analysis are included in **Appendix O**, but the summary of the assessment is included in Table 18 below.

Table 18: Economic Summary of recommended project option

TIMING		
Earliest Implementation Start Date	2018	
Expected Duration of Implementation	3 years	
Economic efficiency	Option 1 (Low cost)	Option 1 (High cost)
Time Zero	1 July 2018	
Base date for Costs and Benefits	1 July 2017	
Present Value of Total Project Cost of Do Minimum	$0m	$0m
Total Project Cost of Recommended Option (NPV)	$21.4m	$28.8m
Benefit of Recommended Option (exc. WEBs) (NPV)	$44.5	$44.5m
BCR	2.1	1.5

7.2 Derivation of costs

A cost estimate of the recommended option has been undertaken by BondCM. The 50% percentile cost estimate has been used for the economic valuation.

The low estimate includes the cost of the option plus an allowance for noise mitigation barriers and the high estimate includes further wetland mitigation by bridging the southbound on-ramp. This is detailed in Table 19.

Table 19 BondCM cost estimate

BONDCM ESTIMATE	OPTION 1 ($M) LOW	OPTION 1 ($M) HIGH
Option 1	17.1	23.2

This price excludes land purchase, consenting costs, Transport Agency managed costs and contractual or commercial impacts to varying the current PP2O contract. Therefore, to allow a comprehensive assessment of the economic performance of the options the following allowances have been provided for these line items as shown in Table 20 and Table 21.

Table 20 Additional Option costs

COST ITEM	OPTION 1 ($M)	OPTION 2 ($M)
Land purchase	0.5	0.1
Professional services/consenting	1.0 -2.0	1
Transport Agency management	0.5	0.5
Wetland – (Northbound off -ramp and Option 2 southbound on-ramp)	0.5	1.5
Local	1	1
TOTAL ADDITONAL COSTS	**3.5 -4.5**	**4.1**

Table 21 Total cost estimates

COST ESTIMATE	OPTION 1 ($M)	OPTION 2 ($M)
Bonds capex estimate	17.1 – 23.2	5.92
Additional delivery cost	3.5-4.5	4.1
TOTAL CAPEX COST	**20.6 – 27.7**	**10**
Operational cost (40 years, undiscounted)	9.3 – 12.7	4.5
Total cost (NPV)	**21.4 – 28.8**	**10.4**

7.3 Tools and data to assess economic benefits

The economics have been developed using available data and excel spreadsheets. Detailed transport modelling has been undertaken as part of this assessment as detailed in Section 5.7.6. The EEM and associated worksheets and factors have been used in calculating the benefits and costs of the project.

The following benefit streams have been assessed and are outlined in more detail below:

- Travel time cost
- Vehicle operating cost

A review of safety records in the study area, including analysis of alternative routes such as Rutherford Drive, Main Road (Waikanae Town Centre), Te Hapua Road and Peka Peka Road has not indicated the presence of any significant safety issues. Consequently, road safety issue is not included in the investment objectives for this Connecting Peka Peka project. Therefore, safety has not been included in the benefit stream for this assessment.

7.4 Sensitivity analysis

Sensitivity testing has been undertaken to assess changes to some underlying assumptions made in the assessment and a cost sensitivity. Full results are outlined in Appendix N but overall indicates that the BCR ranges between 1.6-2.8. Therefore, the reported BCR range of 1.5-2.1. is within the conservative end of the range.

Table 22: Sensitivity testing

SENSITIVITY TEST	BCR
Travel times based on Urban Strategic	2.1
Travel times based on Rural Strategic	1.6
Cost increase 25%	1.7
Costs reduce by 25%	2.8
Benefits from Weekdays only	1.7

7.5 Investment Assessment Framework

The project was assessed using the NZ Transport Agency Investment Assessment Framework (IAF) for the 2018-21 National Land Transport Programme. The assessment uses the two-factor assessment considering Results Alignment and Cost-Benefit Appraisal.

An assessment profile of **Medium** / 1.5-2.1 has been determined with a **priority ranking of 6.**

7.5.1 Results Alignment

The Peka Peka connectivity business case is focused on local access to the Wellington Northern Corridor RONS route which is a key transport link for the region.

This Single Stage Business Case has identified two problems:

1. The confusing access arrangement to the Kapiti Expressway in the Peka Peka area is delivering poor customer satisfaction
2. Peka Peka and Te Horo communities have comparatively poor connectivity to the Kapiti Expressway

Result alignment considers how these problems align with the results sought under the GPS.

GPS assessment

A summary of the draft GPS (2018/2019) strategic direction is shown in Figure 43.

Figure 43 Summary of GPS

Source: MOT GPS 2018/2019

The four strategic priorities identified in the GPS are:

- safety
- access
- environment
- value for money.

Safety and access are the key strategic priorities for the Government. These key priorities are supported by the priorities of environment and value for money. A summary of the draft GPS (2018/2019) strategic direction is shown in Table 23.

There is additional focus for putting infrastructure in place to support high growth urban area, supporting the local economies and supporting resilient connections.

Table 23 GPS assessment

	GPS STRATEGY / OBJECTIVE	PROJECT ASSESSMENT
Access	A land transport system that provides increased access for economic and social opportunities	The GPS talks about provision efficient access and effective transport choice. The Peka Peka project provides effective access for the Peka Peka and Te Horo communities allowing connection to the strategic road network and reducing traffic on local routes. The study area is void of employment, business or significant tourism activity. The residential catchment in the study area is not planned to accommodate significant growth.

		The GPS outlines a focus on sustainable economic development of the regions. Tourism and primary industries are the focus of this economic development. The Peka Peka project does not serve any significant areas contributing to economic growth or tourism.
	A land transport system that enables transport choice and access	The Peka Peka project provides a choice of routes to the communities of Peka Peka and Te Horo and provides the ability of these people to make use of the Kapiti Expressway. However, the intention within the GPS is on transport mode choice rather than route choice. Due to the location and lack of public transport in the area, the project only effects access for vehicles, therefore not providing additional transport choice.
	A land transport system that is resilient	The Peka Peka Project provides an additional route to and from the Peka Peka and Te Horo communities improving resilience. However, given the current availability of multiple routes and lack of evidence suggesting a current resilience problem, the project is not considered to contribute to this objective.
Road safety	Reduction in DSI	The Peka Peka connectivity Business Case is not intended to address a problem with regards to Road Safety. Evidence does not suggest a problem with regards to crashes on the local road network on routes used by the Te Horo and Peka Peka communities. The options considered for connectivity provide some benefit for road safety through shifting traffic from the local road network onto the strategic road network.
Environment	A land transport system that reduces the adverse effects on the climate, local environment and public health	The Peka Peka project has positive effects through reduction of traffic through the Waikanae Town Centre and on Rutherford Drive. Shifting of strategic traffic onto the expressway has positive noise, air quality and amenity outcomes for these areas. The effects of the project are mitigated through noise walls, and appropriate storm water mitigation.
Value for money	A land transport system that delivers the right infrastructure and services to the right level at the best cost	The Peka Peka project achieves a BCR of over 2 indicating value for money is achieved. Environmental benefits from removal of traffic from local road are unable to be quantified but contribute to the overall value of the project.

Overall the Peka Peka project provides a contribution to the first of the three 'Access' objectives. Whilst the project provides increased access for economic and social opportunities, the scale of the contribution is limited.

Safety did not form an investment objective for the project but was a key differentiating factor when selecting between short list options as some of the shortlist options compromised on safety elements to reduce construction cost. Environment and value for money were key considerations during the assessment and design of each option.

Customer Levels of Service assessment

As defined in the ONRC, a National route like the Expressway, makes the largest contribution to the social and economic wellbeing of New Zealand by connecting major population centres, airports and facilitating freight. The Expressway is a high-quality facility which generally achieves the desired ONRC outcomes.

This project however is not related to the Expressway facility itself, but rather addresses access to this strategic road network infrastructure. Therefore, the problems are related to how this strategic traffic is required to use regional road networks rather than specific ONRC criteria.

The main source of customer level of service has come directly from the customers through stakeholders and open days and has clearly identified an access problem for the local communities. This is supported through additional evidence as detailed in Table 24.

Table 24 Customer level of service

CLoS	Project assessment
Mobility (travel time reliability, resilience of the route)	Section 2.3.2 details the discrepancies between the Peka Peka and Te Horo communities travel time to access the expressway when compared with neighbouring communities. This shows there is a significant gap in the system performance for local access to the Expressway.
	As detailed in Section 2.3.1, with the existing M2PP and PP2O designs, there will be approximately 15km distance between Te Moana and Otaki interchanges. Should a northbound driver miss the turn off or be unable to exit at Te Moana interchange, then significant re-routing is required to access Peka Peka and Te Horo. This is considered an identified gap in the system. There are two existing potential routes to access the communities from the Expressway which offers some resilience, however neither are direct access and both require extensive use of the local road and incur additional travel time. Addressing the problem of connectivity at Peka Peka will improve access to the Expressway, add resilience to the local communities' journeys and redirect strategic traffic onto the strategic road network.
Accessibility (land access and road network connectivity)	The location of interchanges along the expressway accords with this CLoS outcome of less interchanges in rural environments. However, as it is a partial interchange the effectiveness of this interchange is reduced. The effects of this is shown in Figure 18 which demonstrates the reduction in accessibility for the Te Horo and Peka Peka communities. This shows there is an identified gap in the system which would benefit from improvement

It is considered that there is a significant gap in the travel time reliability for the Peka Peka and Te Horo communities and a clearly identified gap for accessibility and reliability. However, as this significant gap and its associated benefits is only attributable to a smaller number of people, on balance, it is considered that the overall customer level of service for this project is an **identified gap.**

Using the IAF assessment criteria outlined in Figure 44 below the Project meets the LOW criteria for safety and MEDIUM for the access criteria. For the access criteria both regions and cities access has been assessed at the Peka Peka and Te Horo areas site on the cusp of both. The rationale for the assessment against these criteria is summarised as follows:

- **Safety** – The projects provides small improvements to the safety in the area for motorists. There is no existing substantive safety issue to result in a medium rating
- **Access (Regions and Cities)** – As outlined above the communities of Peka Peka and Te Horo will experience improved operational efficiencies through improved access to the Kapiti Expressway. This provides a commensurate level of service with nearby communities and completes a partial interchange, addressing an operational deficiency for customers.

Figure 44 : IAF assessment summary

GPS PRIORITIES	LOW	MEDIUM	HIGH	VERY HIGH
	A low results alignment may be given if the activity addresses one or more of the following criteria:	A medium results alignment may be given if the activity addresses one or more of the following criteria:	A high results alignment may be given if the activity addresses one or more of the following criteria:	A very high results alignment must only be given if the activity addresses one or more of the following criteria:
Safety - a safe transport system free of death and serious injury	• address safety gaps with reference to the ONRC	• addresses safety issues presenting a medium crash risk[6], affecting communities subject to medium safety risk, and/or in Safer Journeys area of medium concern	• addresses safety issues presenting a high crash risk, affecting communities subject to high safety risk, and/or in Safer Journeys area of high concern • addresses safety issues presenting a high societal consequence risk	• implements a speed management approach focusing on treating the top 10 percent of the network that will result in the greatest reduction in deaths and serious injuries • targeting areas of high collective risk with high DSI reduction measures that achieve a DSI reduction of at least 40%
Access to opportunities, enables transport choice and access, and is resilient - Thriving regions	• address identified resilience gap or impediments to accessing social and economic opportunities	• addresses an identified gap in an approved RED programme • addresses significant resilience gap or impediment to access on regionally important social and economic connections • supports priority elements in agreed integrated land use and multi-modal plans in regions • makes best use of key corridors that prioritise regional freight and tourism • provides operational efficiencies to reduce the costs of meeting appropriate levels of service without impacting benefits adversely	• enables a significant regional economic development opportunity in an approved RED programme • addresses significant resilience gap or impediment to access on nationally important social and economic connections • addresses a gap in an approved RED programme in high priority RED regions • makes best use of key corridors that prioritise national freight and tourism • provides significant operational efficiencies to reduce the costs of meeting appropriate levels of service without impacting benefits adversely	
Access to opportunities, enables transport choice and access, and is resilient - Liveable cities	• address identified resilience gap or impediments to accessing social and economic opportunities	• addresses significant gap in access to social or economic opportunities • address identified gap in access to new housing in medium growth urban areas • addresses identified resilience risk to continued operation of the network • addresses significant gap in integrated intermodal and user information, and significant deficiencies in network operation • provides operational efficiencies to reduce the costs of meeting appropriate levels of service without impacting benefits adversely	• supports high priority elements in agreed integrated land use and multi-modal plans • address significant gap in access to new housing in high growth urban areas • addresses a significant resilience risk to continued operation of key corridors • makes best use of key corridors that prioritise multi-modal use and freight • provides significant operational efficiencies to reduce the costs of meeting appropriate levels of service without impacting benefits adversely	
Environment - Reduce adverse effects on the climate, local environment and public health		• enables reductions in harm to the environment and people, particularly arising from land transport-related air pollution, noise, and impact of construction and ongoing use of transport infrastructure on water quality and biodiversity • addresses long term reductions in greenhouse gas emissions from land transport	• addresses significant reductions in harm to the environment and people, particularly arising from land transport-related air pollution, noise, and impact of construction and ongoing use of transport infrastructure on water quality and biodiversity • addresses long term significant reductions in greenhouse gas emissions from land transport	

In summary the Project meets the threshold for a **Medium Results Alignment Rating.**

7.5.2 Cost- Benefit Appraisal

The Benefit Cost Ratio (BCR) has been used to assess the efficiency of the improvement activities for this project. A peer review of this calculation has also been undertaken to ensure the robustness of the assessment.

As reported in Section 7.1 the preferred option has a range of **BCR between 1.5-2.1** depending on the stormwater mitigation measures that are required.

7.5.3 Assessment Profile and ranking

A summary of the assessment profiling is included in Table 25

Table 25 Assessment Profile

Assessment Factor		Rating
Results Alignment	Assessment of how well the problem/issue/opportunity identified aligns with results identified in the Government Policy Statement and guided by the Long Term Strategic View	Low / **Medium** / High / Very High
Cost-Benefit Appraisal	Assessment of the whole-of-life benefits and costs based on the Economic Evaluation Manual for improvement activities	For Improvements, benefit-cost ration ratings of: 0-0.9/**1-2.9**/3-4.9/5-9.9/10+

The two assessment factors of Results Alignment and Cost-Benefit Appraisal are brought together to form an assessment profile that determines a proposal's ranking as shown in Figure 45. This correlates to a **ranking of 6** for this project.

Figure 45 Transport Agency Prioritisation of Projects

RESULTS ALIGNMENT	COST BENEFIT APPRAISAL	PRIORITY ORDER
Very high	L/M/H/VH	1
L/M/H	Very high (BCR 10+); PV_EoL	2
High	High (BCR 5-9.9)	3
High	Medium (BCR 3-4.9)	4
Medium	High (BCR 5-9.9)	4
High	Low (BCR 1-2.9)	5
Medium	Medium (BCR 3-4.9)	5
Medium	Low (BCR 1-2.9)	6
Low	High (BCR 5-9.9)	7
Low	Medium (BCR 3-4.9)	8
Low	Low (BCR 1-2.9)	Exclude

8 FINANCIAL CASE

8.1 Project delivery costs

As outlined previously in this report a cost estimate of the preferred option has been undertaken by BondCM.

Property costs of approximately $0.5M are also considered possible should the stormwater mitigation require additional land for wetlands or flood storage.Value engineering will need to be undertaken as part of future stages of the project with an emphasis on the southbound on-ramp to determine the best way to mitigate the stormwater effects.

8.2 Ongoing operations and maintenance costs

Operations and maintenance costs for the preferred option have been considered in the project's development.

For the purposes of economic assessment, the Operational expenditure (OPEX) costs have been assumed as the following:

- Annual operational cost of 1% of CAPEX
- Every 10 years, a more substantial maintenance intervention is required at 4% of CAPEX (e.g. reseal or storm water remedial work)

All maintenance costs will be attributed to the Transport Agency.

8.3 Project revenues

There are no project revenue streams considered from a funding perspective for this project. The works provided are generally travel time reliability and connectivity improvements which do not easily support any additional revenue mechanisms such as tolling and therefore no consideration has been given at this time to additional revenue sources for the roading component of the option.

8.4 Funding options

This project is categorised as a road improvement and would be eligible for consideration of funding under the NLTF process. No third-party funding is required. It is considered beneficial for this work to be undertaken parallel to the PP2O contract which is currently under construction.

8.5 Financial risk

The substantive financial risk are shown in Figure 46.

Figure 46 Financial risk:

FINANCIAL RISK	COMMENTARY
Overall estimate uncertainty	The level of design is evolving quickly, with the estimate based on the current level of design (concept design) outlined in this business case. There is therefore a financial risk that the project estimate is inaccurate.
Value engineering for stormwater mitigation for southbound on-ramp	The stormwater mitigation could range from additional wetlands/ flood storage to a full bridge for the southbound on-ramp. A range of costs has been included in the assessment to reflect this uncertainty, however the final solution has not yet been determined which could have an impact on the cost of the project.

PART B: READINESS AND ASSURANCE

9 COMMERCIAL ANALYSIS

9.1 Introduction

This project is of a sufficient scale to warrant a stand-alone project rather than an extension to the existing M2PP and PP2O projects. Implementation of the project will require careful planning and execution to ensure the commercial success of the project.

9.2 Output- based specification

This project focusses on delivering the outcomes sought for the corridor and this will form a key part of the specification of the next steps in this project's implementation.

9.3 Implementation strategy

It is proposed that this project is tendered using a **Measure and Value** contract as the size of the project is likely to attract a range of medium to large contractors creating a competitive tendering environment and driving value for money. It is not a particularly complex design so there is limited opportunity for innovation and transfer of risk which are the main benefits of other tendering options. Other implementation options have been considered and the benefits and dis-benefits of these are summarised in Table 26.

Table 26: Implementation options summary

PROCUREMENT OPTION	ADVANTAGES (AGAINST MEASURE & VALUE)	DISADVANTAGES (AGAINST MEASURE & VALUE)
Design and Construct	▪ Greater risk transfer to contractor ▪ Process drives innovation	▪ Time – similar to Measure and Value ▪ Cost – Likely to be higher due to higher cost of bidding ▪ Options are not particularly complex so less need for innovation or risk transfer
M2PP or PP2O alliance	▪ Single contract operating in corridor ▪ Existing knowledge of corridor and interfaces with existing infrastructure ▪ Could mobilise quickly as team in place	▪ Cost – removes the competition so likely to result in lower value for money. Alliance commercial structure has additional costs compared to other contracting arrangements. ▪ No significant risks to mitigate reducing benefit of corridor knowledge and Alliance structure.
Measure and Value	▪ Defined scope of works ▪ Value for money	▪ Investigation – Higher level of design before implementation tendering required

The timing of the works is currently uncertain due to the unknown availability of funding.

9.4 Risk allocation and transfer

The recommended procurement model of Measure and Value retains most of the risk with the Transport Agency. Any design changes or changes due to typical exclusions such as soil or ground conditions would be the Transport Agencies responsibility. However, it is expected that during the design process these risks can be adequately assessed and subsequently mitigated through good design.

9.5 Payment mechanisms

Payment is expected to be as per the standard agreed conditions of contract with Transport Agency.

9.6 Contract length

Option 1 is estimated to have in the order of a 6-month design period and 12-18 month construction period.

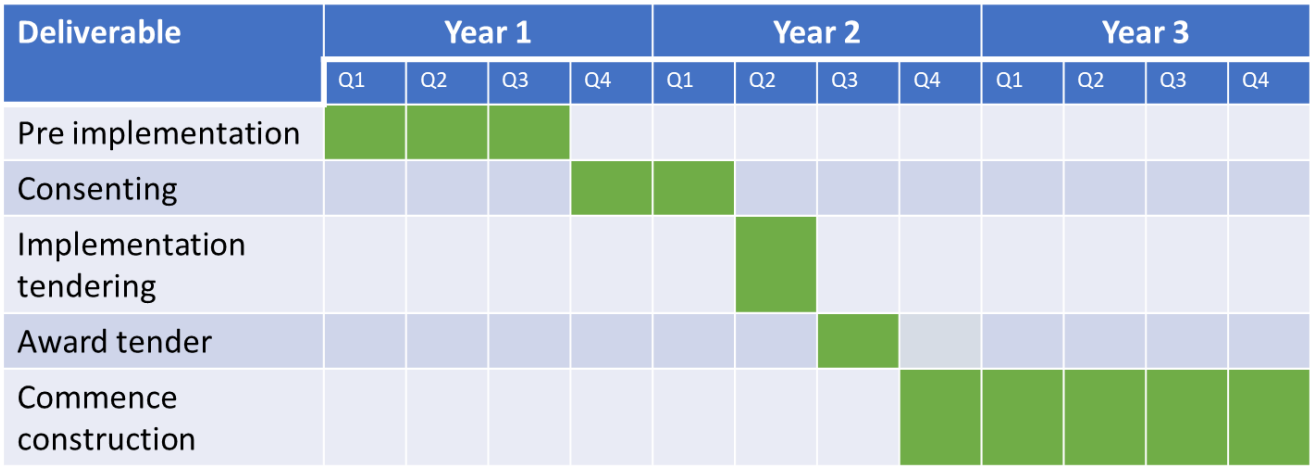
9.7 Contract management

Contract management would be by the nominated project lead for the Transport Agency.

9.8 Schedule

Given the IAF priority of 6 it is likely that funding through the NLTF will need to be secured. This could take 12-24 months depending on other priorities. If funding was secured a three year period to implementation is forecast as shown in Figure 47.

Figure 47 Schedule for future work



This is considered an ambitious schedule to complete the project in parallel and is predicated on receiving early confirmation of funding.

10 MANAGEMENT CASE

The project will be managed by the Transport Agency.

10.1 Assurance and acceptance

The Transport Agency has documented processes and policies for independent road safety audits, structures design reviews, internal and external roading, environmental (including urban and landscape design reviews). These will be used, where appropriate.

10.2 Change control

The Transport Agency has documented policies and procedures on scope change with financial delegations set out in the Transport Agency Instruments of Delegation. These change controls will be adhered to during the delivery of the Project.

Escalation to the appropriate scope committees will be undertaken as required to ensure that any initiated scope change is given full value-for-money considerations, as any significant change in scope post-financial close is likely to have considerable and long-term portfolio implications.

10.3 Cost management

The project will be implemented by the Transport Agency and will rely on Transport Agency systems and processes developed to manage the costs appropriately. It is expected that the Transport Agency nominated lead will have overall cost control for the project.

11 LESSONS LEARNED AND POST-IMPLEMENTATION MONITORING

11.1 Lessons learned

Lessons learnt from this project will be fed back into the Transport Agency's project development and delivery lifecycle through several different mechanisms and levels of project and Transport Agency management. These include a Lessons Learnt Review (LLR) and Contract Management Review processes.

The contractor will lead and drive this process on all its activities and will report to the nominated Transport Agency Project Lead.

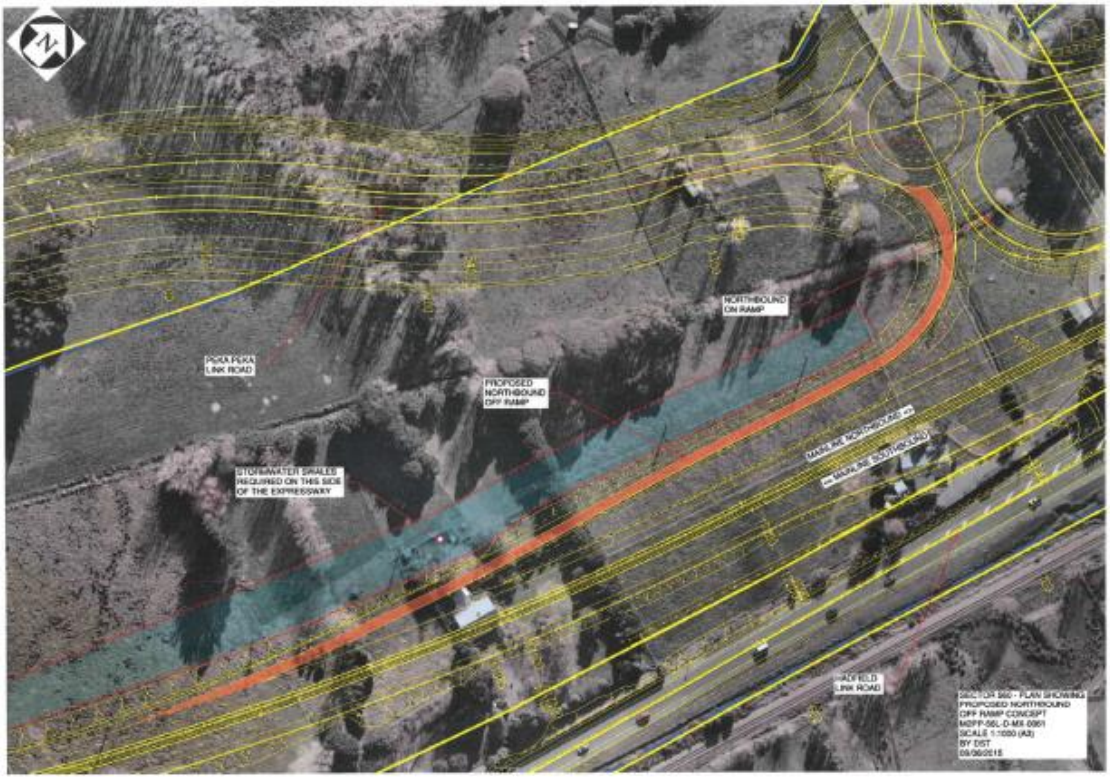
11.2 Post-implementation monitoring: approach and schedule

The IO's are presented in section 3.3 above. Monitoring the achievement of these objectives will be a continuous process as the project progresses through detailed design, construction and operation. This will be undertaken annually.

A detailed post construction monitoring regime will be developed for the project at the appropriate time to assess whether the outcomes envisaged have been delivered. This benefits realisation assessment will then allow lessons learnt and mitigation plans to be developed and fed back into the Transport Agency. A **customer satisfaction survey** will form part of this assessment to assess how the project has performed against the customer satisfaction objective of reducing confusion and improving connectivity.

This monitoring will be the responsibility of the Project Lead.

APPENDIX A: 2015 INDICATIVE PEKA PEKA INTERCHANGE SCHEME



APPENDIX B : ASSESSMENT CRITERIA

APPENDIX C : ENGAGEMENT AND COMMUNICATIONS PLAN

APPENDIX D: LONG LIST OPTIONS

APPENDIX E : ESR SCREENS

APPENDIX F : STORMWATER ANALYSIS

APPENDIX G : LANDUSE ANALYSIS

APPENDIX H : WAIKANAE ECONOMIC STUDY

APPENDIX I: COST ESTIMATES

APPENDIX J : SHORTLISTED OPTION REFINEMENT

APPENDIX K: STAKEHOLDER FEEDBACK

APPENDIX L : SHORLISTED OPTION NOISE ASSESSMENT

APPENDIX M: CONSENTING STRATEGY

APPENDIX N: NOTES FROM WORKSHOP 2

APPENDIX O: ECONOMIC EVALUATION