highways and network operations

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Business Case for Implementation

Detailed Business Case to proceed from Initiation to Implementation

Ara Tūhono: Pūhoi to Wellsford RoNS

Pūhoi to Warkworth Section

April 2015

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Change History and Approval

Approval of the project indicates an understanding of the purpose and content described in this document. By signing this document each individual agrees work should be initiated on this project and the necessary resources should be committed as described herein.

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Glossary of Terms

Abbreviation	Term
A-W	Auckland to Whangarei
AADT	Annual Average Daily Traffic
AC	Auckland Council
AEE	Assessment of Environmental Effects
ARC	Auckland Regional Council
ARGS	Auckland Regional Growth Strategy
ARTA	Auckland Regional Transport Authority
ASCV	Area of Significant Conservation Value
AT	Auckland Transport
BCR	Benefit-Cost Ratio
CBD	Central Business District
CMA	Coastal Marine Area
CMJ	Central Motorway Junction
DfT	Department for Transport
DoC	Department of Conservation
D&C	Design and Construct
EEM	Economic Evaluation Manual
EPA	Environmental Protection Authority
FYRR	First Year Rate of Return
GDP	Gross Domestic Product
GPS	Government Policy Statement
GST	Goods and Services Tax
HCV	Heavy Commercial Vehicle
HNO	Highways and Network Operations
HPA	Historic Places Act

Abbreviation	Term
I&R	Investigation and Reporting
IRS	Investment and Revenue Strategy
ITS	Intelligent Transport Systems
LTMA	Land Transport Management Act
LOS	Level of Service
LV	Light Vehicle
MOU	Memorandum of Understanding
MSQA	Management, Surveillance and Quality Assurance
NCG	Network Plan Coordination Group
NGTR	Northern Gateway Toll Road
NIP	National Infrastructure Plan
NLTF	National Land Transport Fund
NLTP	National Land Transport Programme
NoR	Notice of Requirement
NPC	Net Present Cost
NPV	Net Present Value
NSHS	National State Highway Strategy
NZHPT	New Zealand Historical Places Trust
Transport Agency (or the Agency)	The New Zealand Transport Agency
NZTS	New Zealand Transport Strategy
O&M	Operations and Maintenance
P&I	Planning and Investment
P&Q	Price and Quantity
PBM	Proxy Bid Model
PoPS	Portfolio Procurement Strategy
PPM	Principal Project Manager

Abbreviation	Term
PPP	Public Private Partnership
PSC	Public Sector Comparator
PT	Public Transport
P-W	Pūhoi to Wellsford
P-Wk	Pūhoi to Warkworth
RLTP	Regional Land Transport Programme
RMA	Resource Management Act
RDC	Rodney District Council
RoNS	Road of National Significance
SAR	Scheme Assessment Report
SH(#)	State Highway (number)
SKM	Sinclair Knight Merz
SSRC	Scope and Standards Review Committee
TGP	Transmission Gully Project
TGP	Transmission Gully Public Private Partnership
VAC	Value Assurance Committee (formerly SSRC)
VKT	Vehicle Kilometres Travelled
WACC	Weighted Average Cost of Capital
WDC	Whangarei District Council
WEBs	Wider Economic Benefits
Wk-W	Warkworth to Wellsford
WRR	Western Ring Route
WTP	Willingness-to-Pay

1 Executive Summary

The Ara Tūhono Pūhoi to Wellsford (P-W) Road of National Significance (RoNS) is a major transport project extending north over approximately 40km from the current terminus of the Auckland Northern Motorway. It entails construction of a new offline route with connections to the existing State Highway 1 (SH1).

The National Infrastructure Plan sets out a vision for "A transport sector that supports economic growth by achieving efficient and safe movement of freight and people". In support of this objective the Government has identified seven Roads of National Significance (RoNS), including SH1 between Pūhoi and Wellsford (P-W). These projects represent essential State highways that are linked to New Zealand's economic prosperity and "that require work to reduce congestion, improve safety and support economic growth".

The seven RoNS are prioritised through the Government Policy Statement (GPS) on land transport funding.

The RoNS projects represent a 'lead infrastructure' approach. This means the Government is investing in infrastructure now to encourage future economic growth rather than wait until the strain on the network becomes a handbrake on progress.

The P-W RoNS has a strategic role looking at connecting Auckland and Northland regions and looking to future regional growth as well as improving the safety of the route and making journey times more reliable. The Auckland Plan, the Auckland Council's long-term strategic guide, identifies Warkworth as a 'Satellite town' and highlights the surrounding area for potential 'greenfields' development.

At the outset of the investigation stage of the P-W RoNS, the Transport Agency split the project into two separate sections, being Pūhoi to Warkworth (P-Wk) and Warkworth to Wellsford (Wk-W). The P-Wk section designation and indicative alignment are shown in the figure below.

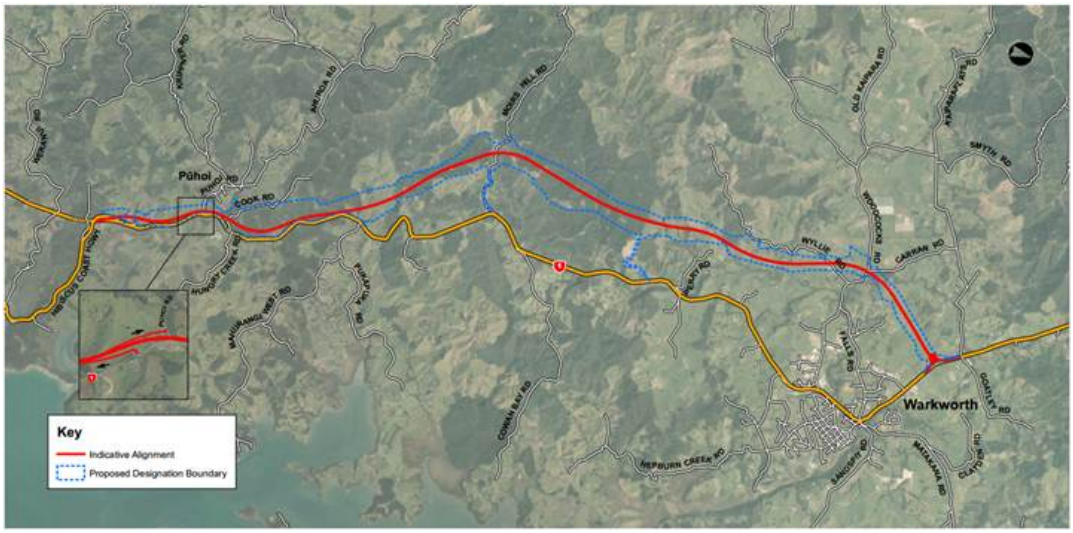


Figure 1-1: Pūhoi-Warkworth section of the Pūhoi to Wellsford Road of National Significance

Issues and opportunities

The major industries in Northland are forestry, tourism and primary production. Each of these industries is heavily reliant on the SH1 corridor to provide access to markets to the south and providing access for tourists from Auckland and beyond. The Northland economy, traditionally reliant on these industries and its transport links, has historically underperformed compared with the rest of New Zealand.

The existing route between P-W carries high traffic and freight volumes between Auckland and Northland and is classified as a High Volume National Strategic State Highway. Freight volumes between the regions are forecast to increase by 70% by 2042[1].

The road transport situation along the corridor is characterised by increasing traffic volumes and congestion, a poor safety record, poor travel time reliability and poor network resilience. In 2008 the SH1/16 Strategy Study identified the SH1 corridor as the preferred route to accommodate future demand and determined that SH1 required a high standard route between Auckland, Wellsford and on to Northland to support better inter-regional links.

In terms of safety, the P-Wk section is ranked 16th worst in New Zealand for Collective Risk. If no significant improvements are made, crash numbers are likely to remain at relatively high levels and to generally grow with increasing traffic volumes.

It is estimated that if traffic increases at current rates and no capacity improvements are made to the route, by 2021 the existing P-Wk section of SH1 will operate with Level of Service “E” and the remaining sections will be close to capacity.

Transport objectives

Given the issues and opportunities noted above, the transport objectives at a programme level are to:

- To enhance inter-regional and national economic growth and productivity.
- To improve movement of people and freight between Auckland and Northland.
- To improve the connectivity between the medium to long-term growth areas in the northern Rodney area (Warkworth and Wellsford).
- To improve the reliability of the transport network through a more robust and safer route between Auckland and Northland.

At the project level the objectives for P-Wk are to:

- Increase long-term corridor capacity, improve route quality and safety, improve freight movement and provide resilience in the wider State highway network.
- Increase travel time consistency and decrease travel times to and from the northern end of the Johnstone’s Hill tunnels and the northern end of Warkworth.
- Alleviate congestion at Warkworth.
- Ensure the development of a future Wk-W section of P-W RoNS is not compromised.

[1] National Freight Demand Survey, Ministry of Transport et al, 2014.

Transport options considered

Mode share options were investigated as part of the Auckland to Whangarei (A-W) Strategic Corridor Study. In terms of freight, the potential for a significant shift of freight to rail is limited due to the capacity of the track, the nature of the products transported and the origins and destinations of the commodity movements. Similarly, coastal shipping is mainly confined to cement and petroleum products from Northport.

The Strategic Corridor Study concluded that while coastal shipping and rail provide important capacity, their ability to accommodate future growth is limited to specific industries. SH1 needs to be able to accommodate the increasing demand for travel between Auckland and Northland.

Description of recommended option

Three different corridor alternatives were investigated including the existing SH1 and SH16 corridors and an inland route that followed the approximate alignment of the existing rail corridor from Kaukapakapa to Wellsford. The existing State Highway corridor was identified as the preferred route as it provides access to Warkworth and the eastern beaches, has the potential to be staged as a number of smaller projects, and would involve a smaller construction cost than an inland route.

Numerous options for the form of the road were developed to meet project objectives and were assessed against a multi criteria evaluation framework based on the objectives of the Land Transport Management Act (LTMA). Implementability and operability were also included as assessment criteria in the evaluation of potential options, and the recommended option has since undergone further assessment against the implementability and operability of the option.

The recommended option for the P-Wk section is for a four lane motorway standard new section of highway to the west of the existing SH1 alignment. The section would end to the north of Warkworth where a connection would be provided back onto the existing SH1.

Economic assessment

The assessment profile for P-Wk is described as “HHL” meaning a high strategic fit, high effectiveness and a low economic efficiency. The project as part of the RoNS programme is assigned a higher priority than would otherwise be afforded to a project with a similar assessment profile.

Consenting

The consenting process for the P-Wk section began in April 2012 and a Board of Inquiry delivered its decision in September 2014, granting designation and consent for the P-Wk project. The designation has been future proofed to allow for a number of possible future alignment options for the Wk-W section.

An innovative approach was taken to the consenting process in order to achieve consent conditions that would support innovation in the project delivery phase. As a result of the limited geotechnical investigation and design work required to gain the consents the cost estimates for the project are uncertain. Further investigation and design work is now underway to reduce this uncertainty.

Consultation

P-Wk has undergone several stages of consultation throughout the history of the Project. The first phase took place from June to August 2010 informing affected parties of the project and gathering information on constraints. The second phase of the consultation took place between November 2010 and January 2011 and focused on the indicative route for P-Wk. Following this consultation, the preferred alignment for P-Wk was communicated to affected and interested parties. Significant additional consultation has been carried out during the consent application process. The Agency has established strong and valued relationships with local Iwi which have formed a consultative group known as Hōkai Nuku.

Recommended procurement option

An assessment of the Agency's traditional, business as usual, procurement options identified a Competitive Alliance delivery model followed by operations and maintenance contracts as best suited from among the Agency's traditional procurement and delivery models. Given the project's characteristics, a PPP was also considered as a feasible procurement model for P-Wk.

A qualitative and quantitative assessment was carried out of the Competitive Alliance and O&M contracts option against a PPP option. On balance, a PPP is considered the preferred model for procuring P-Wk.

Key factors supporting the feasibility of PPP for the P-Wk project are:

- It is suited to the scale of P-Wk.
- Material risks inherent in P-Wk can be adequately defined and allocated appropriately in a PPP contract that provides a fixed price for the Transport Agency.
- The scope for innovation in the project, including due to the wide designation and non-prescriptive consent conditions, suit PPP.
- It is feasible to express and quantify the outcomes so they can be incorporated into a mechanism for measuring the performance.
- It is feasible to bundle the on-going management and maintenance with the construction and financing into a long term (25 year) contract.
- The private sector is expected to have strong interest in the project, as seen on Transmission Gully PPP, including new entry to the New Zealand market of major international PPP firms.

A PPP offers a number of potential benefits as a procurement model:

- It provides a fixed price contract to the Agency with a strong level of risk transfer and powerful inherent delivery incentives on the contractor.
- It is a whole of life model, with strong incentives for the integration and optimisation of design, construction, operation and maintenance over a long period.
- It is an outcomes focussed model that supports the Agency's investing for outcomes approach and can be directly aligned to support the Agency's strategic priorities (such as safety).

In addition to this potential project-specific value a PPP also offers potential strategic benefits to the Agency:

- Due to their scale and complexity PPPs offer the potential to bring new entrant international players to the New Zealand transport sector, potentially providing access to deeper capital markets and international best practice.
- A financed procurement model can provide programme flexibility to enable the earlier delivery of outcomes from other projects within the Agency's programme. In particular, it opens a 'cash window' while the Agency is not making payments during the construction phase that can allow additional benefits to be delivered in the programme. By financing one project the Agency is able to advance another.

The results of the quantitative financial analysis suggest that it would be viable for PPP bidders to overcome their additional financing and other costs and provide the Agency with a value offering that matches, in risk-adjusted cost terms, the traditional procurement approach.

The quantitative analysis has focussed on the [redacted] level of risk. Pricing at the [redacted] level is consistent with the Agency's outturn cost experience over its portfolio of traditional procurement, which is the cost that the Agency faces once variations for risk realised on those contracts are incorporated. Given the fixed price nature of PPP and the strategic benefits that the model offers it is considered appropriate to compare against the upper end of the outturn cost range for traditional procurement.

[redacted]

[redacted]

A set of further value opportunities are also available to a second-generation Transport Agency PPP. Second generation refers to enhancements to the process and elements of the PPP model that may be available based on the learnings and further thinking following the Transmission Gully PPP (TGP) procurement. These opportunities include:

- Improved PPP capability in the Agency and in the (bidding) market following TGP and other New Zealand PPPs.
- Enhancements to the procurement process to reduce cost and better manage risks.
- Increasing the competitive tension in the procurement.
- Strong market interest in a Transport Agency PPP, including from international firms with significant PPP experience.
- Improved financial market conditions, including falling reduced margins observed in recent overseas PPP transactions.

Each of the opportunities presents positive potential value additions over and above the qualitative and quantitative value proposition.

The assessment has taken into account that a PPP is a complex and significant commitment. It has a number of important features that are quite different to the Transport Agency's traditional procurement models. A PPP would involve a very long term contractual relationship with a private sector constructor, operator and, importantly, financiers. This brings a focus to risk allocation and financial and commercial issues that may not be part of or as transparent in the Transport Agency's more traditional procurement models. This added scrutiny and transparency is considered a benefit of the PPP process.

As with traditional procurement, effective contracting is a primary (but not the only) means of mitigating risk under a PPP. The RFP and the evaluation framework would be carefully designed to structure the right incentives for the private partner to assist in mitigating the risks set out above.

Financing also imposes an ongoing repayment commitment on the Agency. This creates a 'strip' of repayments which pre-commit future revenues. Currently, the Agency has set a prudent ceiling on pre-committed future revenues of 10%. On current forecasts and plans, the P-Wk project financed via a PPP would fit within this ceiling.

Tolling has a role to play in managing the impact of the revenue pre-commitments under a PPP. Toll revenues are not expected to fully offset the unitary payment under a P-Wk PPP. However, over the life of the PPP they could be expected to progressively ease the burden on the fund (or other revenue source).

Implementation strategy

A process and timetable have been developed for procuring the P-Wk PPP. This is based on the TGP process incorporating lessons learnt and building on the Agency's wider major procurement expertise. It is designed to provide governance assurance and risk management at the project, Business Unit and Board levels. A governance and management framework has also been developed, taking into account lessons from TGP.

PART A – The Case for the Project

Overview of Part A

This Part A sets out the strategic and economic case for the Pūhoi to Warkworth project. It is arranged into the following sections:

- A brief background to the project.
- A description of the problems, opportunities and constraints related to the transport network in the area.
- A discussion of the outcomes that the project is seeking to achieve, at the strategic, programme and project levels.
- The key stakeholders and a summary of the stakeholder engagement that has been undertaken.
- A description of the alternatives and options that were assessed.
- The recommended option for achieving the outcomes sought.
- A summary of the economic assessment of the project.

2 Background to the Project

The Pūhoi to Wellsford (P-W) project is one of the seven RoNS projects that the Government has tasked the Transport Agency with delivering with a focus on moving people and freight within and between key economic centres more safely and efficiently. The RoNS are 'lead infrastructure' projects; they enable economic growth rather than simply responding to it.

The existing route between P-W carries high traffic and freight volumes from Auckland to Northland; it is classified as a High Volume National Strategic State Highway. It is desired to continue the quality of road of the Northern Gateway Toll Road (NGTR) to cater for this high volume.

Over the past eight years, the project has been developed and its priority assessed to the point where Transport Agency has certainty to proceed with the Pūhoi to Warkworth (P-Wk) section. This development has included numerous studies of routes between Auckland and Whangarei and the determination of a preferred route between P-Wk. The information from these studies has been used to inform this Business Case for Implementation. The consented P2W designation has been future proofed to allow for a number of possible alignment options for Wk-W.

The focus of this Business Case is the P-Wk section, with consideration of the strategic context of the wider P-W RoNS.

This strategic and economic case for the P-Wk project has been developed from the Business Case Statement for the P-W Four Laning Project issued to the Transport Agency on 22 December 2009[2]. It reflects the additional information made available following the investigation undertaken as part of the P-Wk Scheme Assessment.

This section provides a brief background and contextual overview for the project, summarises the work carried out to date and provides an overview of the Transport Agency's governance structure during the project investigation and development phase.

2.1 Background and context

The P-W RoNS is a significant project stretching over approximately 40km. It requires both the construction of a new offline route as well as improvements to the existing State highway. At the outset of the investigation stage of the P-W RoNS, the Transport Agency split the P-W RoNS into two separate projects, being Pūhoi to Warkworth (P-Wk) and Warkworth to Wellsford (Wk-W).

The study area and existing road layout is shown in Figure 2-1 below. The designation indicated on the map was granted following a Board of Inquiry process in September 2014.

[2] As part of the SH1 Johnstone's Hill to Wellsford Improvement Strategy 2009, Sinclair Knight Merz (SKM), NZ Transport Agency contract PA3237.

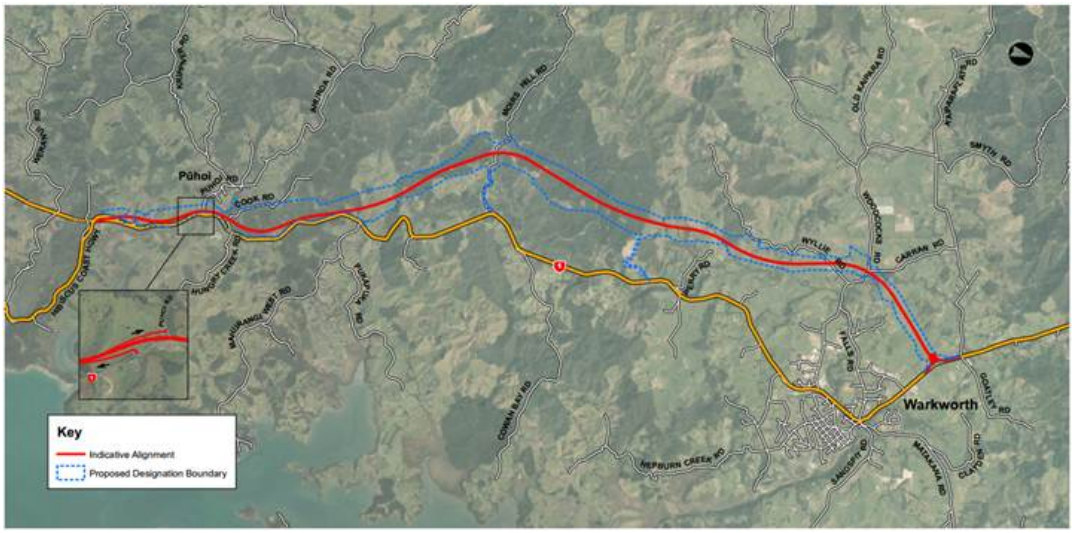


Figure 2-1: P-Wk section of the Pūhoi to Wellsford Road of National Significance

The SH1/16 Strategy Study (discussed below) concluded that it would be desirable to continue the standards adopted for the Northern Gateway Toll Road (NGTR) for the P-W RoNS project. The NGTR was completed in 2009 and provides a more direct and safer route north, extending the Auckland Northern Motorway's previous terminus (Grand Drive) to just south of Pūhoi with two lanes provided in each direction separated by a median barrier. The P-Wk project would continue this quality of road north from Pūhoi.

2.1.1 Strategic and policy context

A number of government and regional policies and strategies incorporate and support the P-Wk project.

The National Infrastructure Plan (NZ Treasury, 2011) sets out a vision for "A transport sector that supports economic growth by achieving efficient and safe movement of freight and people". In support of this objective the Government has identified seven Roads of National Significance (RoNS), including SH1 between Pūhoi and Wellsford (P-W). These projects represent essential State highways that are linked to New Zealand's economic prosperity and "that require work to reduce congestion, improve safety and support economic growth".

A key departure from road planning in the past is that the RoNS projects represent a 'lead infrastructure' approach. This means the Government is investing in infrastructure now to encourage future economic growth rather than wait until the strain on the network becomes a handbrake on progress.

The P-W RoNS has a strategic role looking at connecting Auckland and Northland regions and looking to future regional growth as well as improving the safety of the route and making journey times more reliable (see section 4).

The seven RoNS are prioritised through the Government Policy Statement (GPS) on land transport funding. This policy direction is the basis of the investment priorities outlined in Transport Agency's National Land Transport Plan (NLTP). In particular, the GPS requires the NLTP to help address strategic 'bottlenecks' and allow new economic growth areas to be better connected into the national network.

In March 2012 the Auckland Council[3] (AC) formally adopted the Auckland Plan[4], a strategic plan for the Auckland Region. The Auckland Plan's Directive 13.7, relating to supporting of the long-term needs of the Ports of Auckland and Auckland Airport, describes P-Wk as a key interregional connection[5]: *'this project is nationally important and aims to help revitalise the Northland economy. This project would address road safety issues, reduce journey times for freight, and improve access to Warkworth and the surrounding areas".*

The Auckland Plan identifies Warkworth as a 'Satellite town', continuing the Rodney District Council's growth assumptions, and highlights the surrounding area for potential 'greenfields' development. Plans for future land-use in Warkworth include a significant increase in zoning for industrial and business land, and the success of this will be underpinned by the quality of transport connectivity. Further north, Whangarei is identified as an area suitable for economic growth and a significant increase in commercial and residential development is anticipated.

Development in the Warkworth will be concentrated around land with good transport access (i.e. around a motorway interchange) as opposed to a dispersed land-use pattern as historically has been the case in the Northland and Rodney districts. Denser development would also support higher levels of travel by modes other than private cars, particularly walking and cycling and also local public transport (PT) services.

The Auckland Regional Land Transport Programme (RLTP, 2012-15) also identifies the P-Wk project as a nationally and regionally significant activity.

2.1.2 Transport context

The SH1/16 Strategy Study[6] between Auckland and Wellsford was completed by the Transport Agency in 2008. Set against the background of increasing traffic volumes, poor safety record and the need for better inter regional links, the study determined that SH1 required a high standard route between Auckland and Wellsford. The Transport Agency also classifies the route as a High Volume National Strategic State Highway which means that it has met several criteria relating to the traffic it carries. The criteria include:

- More than 12,000 heavy commercial vehicles (HCV) per day.
- More than 35,000 vehicles per day (part of the route).
- More than 2 million tonnes or more than $3 billion annually in value of freight.
- More than 3 million passengers annually.
- More than 60,000 international travellers on the route annually.

The function of a National Strategic State Highway is primarily to allow safe and efficient movement of traffic. To ensure this function is not impeded, points of access along the route should be restricted to key intersections. Designation of a road corridor as a 'Motorway' or

[3] In November 2010 the local and regional councils in the Auckland region were amalgamated into a single unitary authority, the Auckland Council.
[4] Auckland Council, 2012, Auckland Plan.
[5] Auckland Council, 2012, The Auckland Plan, Chapter 13 Box 13.5.
[6] Transport Agency, 2008, SH1/16 Auckland to Whangarei Strategy Study. Strategy Report, March 2008.

'Expressway' provides an effective way to control the type and frequency of access to the road, reducing the risk of development alongside the State highway which would further impact its movement function.

2.1.3 Economic context

The Northland economy is reliant on an efficient transport network due to the nature of its major industries. To improve its economy, Northland requires better access for the following:

- Tourism – Particularly in the Bay of Islands and the Waitangi Treaty Grounds, Cape Reinga, and Ninety Mile Beach.
- Logging and forestry – forestry products are a renewable and sustainable resource that will become increasingly important in a carbon neutral world economy and hence represent potential for growth in both value and volume.
- Primary production industries – dairying and meat production.

Whangarei is the main urban centre in Northland (population around 77,000 (2006 Census data for the greater Whangarei district) and the location of the country's northern most deep water port, Northport. Of particular importance from an economic perspective is the SH15A connection to Northport at Marsden Point.

Northport is used for:

- Movement of bulk products.
- Importing crude oil for use in the adjacent Marsden Point refinery.
- Export of refined petroleum productions for distribution across New Zealand.
- Export of timber logs for international markets.

SH1 to the north of Auckland is the key transport link with the Northland region and the northern part of the Auckland region. While rail and coastal shipping provide capacity in the corridor, their role in accommodating future growth is limited. It is therefore important that SH1 is able to accommodate the increasing demand for travel between these regions.

SH1 also provides connections to other key areas including Matakana and coastal communities at Leigh, Mangawhai and Waipu. Significant tourist traffic volume uses SH1 to access destinations in the Far North.

2.2 Work Completed to Date

The history of investigation into the study area dates back as far as 2006. The Transport Agency carried out the SH1/16 Strategy Study between 2006 and 2008. The Strategy Study aimed to confirm the function of SH1 and SH16. In 2009, after the completion of the SH1/16 Strategy Study, the Agency undertook consultation on the conclusions of the Strategy Study with a number of key stakeholders including the Auckland Regional Council (ARC) and RDC. Following the publication of the Strategy Study[7] the Transport Agency developed a Business Case Statement[8] to support the early stages of the P-W project.

[7] Transport Agency, 2008, SH1/16 Auckland to Whangarei Strategy Study. Strategy Report, March 2008.
[8] Transport Agency, 2009, Business Case Statement: Pūhoi to Wellsford Four Laning Business Case Statement. 2009.

In early 2009, the Government, through the GPS, announced the first seven RoNS, one of which was P-W. Following this announcement, the Agency undertook the Auckland-Whangarei Strategic Corridor Study[9] identifying the strategic importance of the transport corridor between Auckland and Whangarei.

In 2010, the Transport Agency undertook a Scheme Assessment study for the P-W route, split into the two sections of P-Wk and Wk-W, which was completed in October 2011. The project was split so that the investigation, design and then construction of the full RoNS could be effectively managed. A Scheme Assessment Report (SAR) and Assessment of Environmental Effects (AEE) were prepared for the P-Wk section. The Agency had close involvement with AC and Auckland Transport (AT) during the scheme assessment phase.

Table 2-1 summarises the timeline and key elements of the on-going consideration and development of the project.

Table 2-1: SH1 (P-W) upgrade – key events

Date	Project	Description
December 2006 to March 2008	Strategic Corridor Study: SH1/16 Strategy Study	The Study confirmed the existing SH1 corridor as performing a national function while the SH16 corridor would continue to operate with a regional function. Two corridors were identified to provide future capacity between Auckland and Wellsford. An inland route which follows the existing railway line and a corridor which incorporated the existing SH1 route.
March 2008 to February 2009	Consultation	The Agency undertook consultation on the conclusions of the Strategy Study with a number of key stakeholders.
March 2009	Ministerial Briefing	Following the completion of the Strategy Study, a number of potential alignment options within the preferred corridors were considered in more detail. The outcome of this work was reported to the Minister in March 2009[10].
April to May 2009	Business Case Statement: P-W Four Laning Business Case Statement (Transport Agency 2009d)	Following the announcement that the route was of national significance, a Business Case Statement to support the funding application for the initial stages of the project was developed. This Business Case Statement was prepared prior to the release of Treasury's Better Business Case Guidelines.
June to October 2009	Funding Application for Investigation and Reporting (I&R)	In October 2009, Transport Agency approved funding for the initial stages of the project development, which included investigation through to the completion of the specimen design and planning approval.
July 2009	Strategic Corridor	An overarching study by Transport Agency assessing the

[9] Transport Agency, 2010, Auckland to Whangarei Strategic Corridor Study: Strategic Context Report, July 2010.
[10] Transport Agency, 2008, Action Paper to the Transit New Zealand Board: State Highways 1/16 Auckland to Wellsford Strategic Study, Action Paper N° CS/08/02/6086 Page 16 of 29. ST5-1001. January 2008.

Date	Project	Description
to June 2010	Study: Auckland-Whangarei (A-W) Strategic Assessment	strategic importance of the transport corridor between Auckland and Whangarei was developed. The study included development of the Strategic Context, Network Plan and State Highway Strategy Reports.
March 2010 to August 2011	P-W Scheme Assessment	The Scheme Assessment for P-W began with a Scoping Report (Transport Agency 2010). The Agency subsequently decided to undertake scheme assessments separately for the P-Wk and Wk-W sections. As a result, the first of two separate SARs and AEEs were prepared. The public were consulted on the outcomes of the Scheme Assessment for the P-Wk section. Further development and assessment of the short-listed options has led to the selection of a preferred option for the P-Wk section. Public consultation has been undertaken on this preferred route. The Wk-W section has yet to have a preferred route chosen.
June to August 2010	Consultation	The Transport Agency undertook public consultation on the conclusions of the Network Plan (Transport Agency 2010a).
November 2010 to January 2011	Consultation	The Transport Agency undertook public consultation on the indicative route between P-Wk developed during the scheme assessment process.
April 2012	Confirmation of the preferred alignment for P-Wk	Confirmation of the preferred route by the Transport Agency Board and communication of this to the public and key stakeholders. Endorsement by the Transport Agency Board to seek designation and consents for P-Wk.
April 2012 – Ongoing	Business Case for Implementation: P-W Business Case Statement update	Following the delivery of the P-Wk SAR, a Business Case for Implementation was developed to support the funding application for the project. An assessment of both tangible and intangible benefits of the project was made using the more detailed information available as a result of the SAR assessment of P-Wk.
April 2012 – September 2014	Consenting process	The Transport Agency formed a Planning Alliance (the Further North Alliance) to gain designation and consents for P-Wk. The consenting strategy aimed to achieve maximum flexibility in the consent conditions. As part of this process the Alliance carried out extensive further consultation with stakeholders.
September 2014	Board of Inquiry decision.	The Board of Inquiry delivered its decision to the Environmental Protection Agency granting designation for the P-Wk project with non-prescriptive consent conditions.
September-October 2014	Revision of project cost estimates	Project cost estimates were revised to reflect the consent conditions and reviewed based on updated cost knowledge.

2.3 Governance During the Project Investigation and Development Phase

2.3.1 Organisational Structure for SAR Phase

The organisational chart from the Scheme Assessment phase for the project is shown below.

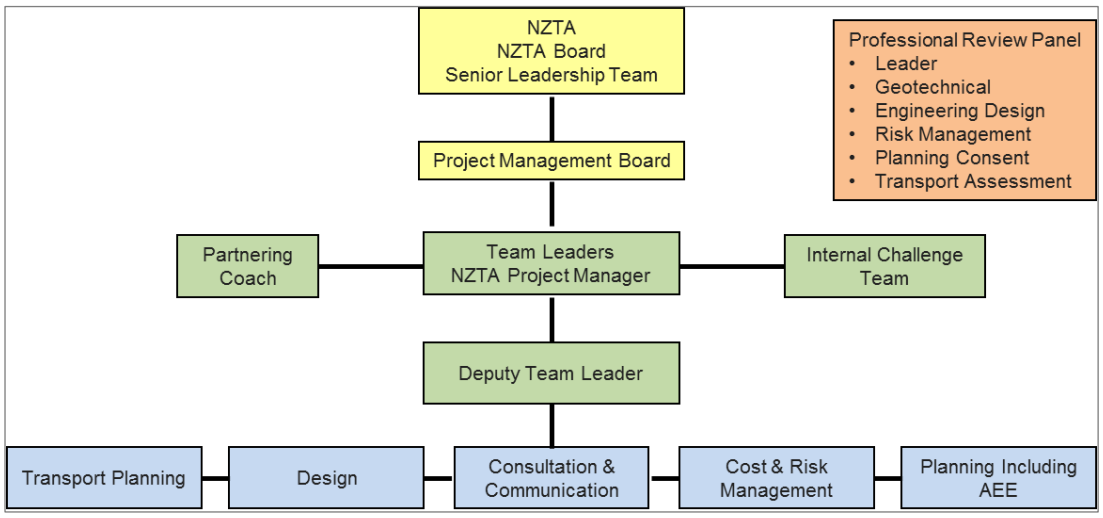


Figure 2-2: Organisational structure from the P-Wk SAR

2.3.2 Transport Agency Board

The Transport Agency Board has overall responsibility for the Agency's projects including P-W RoNS. The Board reports directly to the Minister of Transport and is responsible for:

- Land transport planning.
- Managing the State highway network.
- Regulating access to, and participation in, the land transport network.
- Promotion of land transport safety and sustainability.
- Use its revenue in a manner that seeks value-for-money.
- Ensuring that its revenue and expenditure are accounted for in a transparent manner.

2.3.3 Value Assurance Committee

The Value Assurance Committee (VAC) (within the Highways and Network Operations (HNO) Group) is the most senior decision making team within the HNO group. The VAC contains the National Manager Programme and Business Solutions, the Manager Network Outcomes and various other senior managers and technical specialists. Projects need to be endorsed by the VAC prior to getting presented to the Transport Agency Board.

2.3.4 Project Sponsor

The Project Sponsor is the General Manager, HNO. The Project Sponsor is responsible for:

- Ultimate authority and responsibility for the project.
- Approving changes to scope, schedule, budget and quality.
- Escalating and championing recommendations to the Highways VAC.
- Providing policy guidance to the Principal Project Manager (PPM).
- Endorsing the PPM to confirm that project scope and deliverables are correct.
- Reviewing progress and providing advice on resolution of issues.
- Supporting the PPM.
- Resolving issues beyond the PPM's authority.

3 Problems, Opportunities and Constraints

Historically, the economy of Northland has lagged behind the rest of New Zealand. The main industries, namely tourism, logging, forestry, dairying and meat production, all rely on an efficient transport network to operate. The lack of an efficient transport network and good connections to the major trading and population centres in the Auckland region presents several problems for the Northland region.

As well as a relatively underdeveloped economy, problems in the region also include: a poor road safety record, congestion with high volumes of HCVs mixed with general traffic, poor network resilience and limited ability to provide for increased freight movement. These problems are likely to be exacerbated with the expected increases in traffic and freight volumes in future years.

These problems present opportunities which are supported by the P-Wk project. The policy context and problems with the existing transport network underpin the urgency for the project.

There is limited opportunity to change the mode share of freight movement. The potential for a significant shift of freight to rail is limited due to track capacity constraints and coastal shipping is largely confined to cement and petroleum products.

This section presents:

- An overview of the problems and related opportunities presented by the existing transport network in the area.
- A summary of the urgency for the project.
- A summary of the constraints that limit the solution options in the area.

3.1 Problems and opportunities

The Northland economy lags behind

On a number of economic measures, including average wage, unemployment figures and economic growth, Northland is at a disadvantage compared to other parts of the country. At the 2013 census the Northland region's economy had a GDP per capita of $35,068 compared to the national average of $47,532[11].

The historically poor performing economy in Northland, and in particular the Far North, has resulted in the region being identified as being amongst the most deprived in New Zealand from a socio-economic perspective[12].

Northland's prosperity is currently dependent on tourism, pastoral farming, forestry, building and property development and the region is vulnerable to a downturn in any of these industries. A broader economic base is required to reduce this vulnerability.

[11] Ministry of Business, Innovation and Employment (MBIE), Regional Economic Activity Report, 2014

[12] Atlas of Socioeconomic Deprivation in New Zealand NZDep2006, Ministry of Health. This is a measure of socioeconomic position, which in this context means "the social and economic factors that influence what position(s) individuals and groups hold within the structure of society". Measures can include such things as income, household occupancy and access to a telephone.

Improved transport links present an opportunity to boost economic activity to help redress this imbalance and make better use of the resources, including the labour force, within the region.

Road safety performance is poor

The performance of the existing SH1 between Pūhoi and Wellsford, from a safety perspective, is also an important consideration. This section currently has a poor safety performance. Serious incidents, such as fatal head-on collisions, can result in SH1 being temporarily closed and traffic being required to use extensive detours.

Within the P-W corridor, crashes are concentrated within two sections of SH1, Schedewys Hill and the Dome Valley, south and north of Warkworth respectively. Crash rates in these locations are high in comparison with the national average.

The P-Wk section is ranked 16th worst in New Zealand in terms of Collective Risk[13]. If no significant improvements are made, crash numbers are likely to remain at relatively high levels and to generally grow with increasing traffic volumes.

An opportunity exists to bring about considerably improved safety outcomes on the route.

Increasing congestion within the corridor

The route is primarily a single lane carriageway (one lane in each direction with no separation by a central median) with some passing lanes and is characterised by rolling or steep terrain with some narrow, winding sections. SH1 carries high volumes of freight traffic with an average of 9.7% HCVs along the route between Pūhoi and Whangarei, leading to frequent disruptions to general traffic. Many of the townships along the transport corridor experience congestion during holiday periods.

Existing level of service (LOS)[14] along the route ranges from “C” to “D”, based on demand. During peak holiday periods a LOS approaching “F” is not uncommon.

It is estimated that if traffic increases at current rates and no capacity improvements are made to the route, by 2021 the section of SH1 between P-Wk will operate with LOS “E” and the remaining sections will be close to capacity. By 2051, it is estimated that the entire route will operate at LOS “E” or “F”, with significant delays expected due to flow breakdown resulting in stop start traffic.

A key constraint to economic growth currently is the cost of freight and tourism travel between the Auckland and Northland regions. These costs are exacerbated by congestion on the existing road network north of Pūhoi, particularly at Warkworth and Wellsford, in addition to the safety concerns associated with the winding alignment and lack of passing opportunities on SH1. An opportunity exists to relieve this constraint.

Network resilience issues

SH1 provides a vital lifeline between Auckland and Northland. There are no parallel alternative routes that are developed to a sufficient standard to offer a real alternative choice to the SH1

[13] KiwiRap Risk Maps and Performance Tracking Report (2012). Risk maps display the safety risk of the State highway network in terms of Collective Risk and Personal Risk. The State highway network is divided into links which are given a rating and a national rank. Collective Risk and Personal Risk are based on the historical number of fatal and serious injury crashes per length of road and per vehicle-kilometre travelled on that section of road respectively. Historical crash data used for the 2012 Risk Maps was from 2007 to 2011.

[14] Level of Service: LOS is a quality measure describing the operational conditions of a highway in terms of speed and travel time, freedom to manoeuvre, traffic interruptions and comfort and convenience. LOS A represents the best highway operating conditions and LOS F the worst (stop-start traffic).

corridor. Although short route sections exist to by-pass sections of SH1 including the Brynderwyn Hills both routes are significantly longer and not constructed to a high standard compared to SH1 and they are not considered to represent suitable alternative routes in the short or medium term.

In the ten year period from 2003 to 2012 SH1 between Pūhoi and Warkworth has been closed 21 times for a total of 64 hours due to motor vehicle accidents[15].

Recent events (such as the flooding of SH1 through Dome Valley with a diversion to SH16 over the 2011 Auckland Anniversary weekend) demonstrate the lack of route resilience with the current road and how easily Northland could be isolated for an extended period should SH1 be affected by a natural disaster.

The existing highway passes over terrain which includes numerous examples of ground instability such as at Schedewys Hill and along Windy Ridge. This is due to the historical nature of the alignment, which was originally adopted as it offered the 'path of least resistance' in construction terms. The alignment was selected without any cognisance of the stability of the geology, geometric design or the long-term efficiency of the route.

SH16, which lies 20km to the west of SH1, also provides a route for northbound and southbound traffic, and is promoted as an alternative to SH1 during holiday periods. However, SH16 does not serve communities within the locality of the existing SH1 between P-Wk, most notably the Warkworth township and the Eastern beaches (beach communities located east of Warkworth, including Leigh, Omaha, Sandspit, Snells Beach and Mahurangi East). SH16 is prone to similar instability and flooding issues as SH1, is generally of lower geometric standard than the existing SH1 between Auckland and Wellsford, and over 20km longer.

The opportunity to improve the resilience of the transport links between Auckland and Northland supports the economic outcomes discussed above and serves one of the Transport Agency's medium-term objectives[16].

The State highway corridor is limiting freight movement and accessibility

Freight volumes are forecast to double by 2031, with the vast majority of this increase being carried by road vehicles (Ministry of Transport, et al 2008). While rail and coastal shipping provide some inter-regional capacity, their role in accommodating future growth is limited (see section 3.2).

One of the key issues with the current State highway is the variable and generally low standard of SH1 between Pūhoi and Wellsford. Much of this section of SH1 is a steep and winding road, which inhibits the effective and efficient movement of vehicles, particularly Heavy Commercial Vehicles (HCVs). The slow movement of HCVs, combined with limited passing lanes, can cause long delays between Pūhoi and Wellsford for all users and cumulatively make this journey expensive and frustrating over time.

Travel times and travel time reliability between Northland and potential markets have been identified as an important issue by industry representatives. The constraint that the route quality places on freight is a potential inhibitor of freight-based economic activity in the region, putting the economic growth of Northland's industry at a disadvantage. Furthermore, poor accessibility may affect the attractiveness of the Northland region as a tourist destination.

[15] Data provided by the Auckland Motorway Alliance.
[16] Objective 7: Greater resilience of the State Highway network, Our Strategy for 2013-16, NZ Transport Agency, July 2013.

3.2 Urgency

The problems and opportunities identified above and the policy context provide the impetus for the project.

3.2.1 Forecast Growth

As mentioned, with the continuing forecast growth in traffic in the corridor and without further improvements, congestion on the road network will act as an increasing barrier to the reliable movement of products and people to key markets in Auckland and further south. It may act as a constraint on the expansion or potentially negatively affect the continued existence of some manufacturing and other industries.

Future traffic volume predictions[17] between P-Wk in the Do-Minimum scenario (described in section 8.2) are for growth of 2.8% per year from 2009 to 2026 and then reduced growth to approximately 0.8% per year until 2051. This reduction reflects the impact of growing congestion levels on SH1. Safety issues

3.2.2 Poor safety outcomes

As outlined in Section 0, crash risk within the P-W corridor is above national averages on similar sections of road and several sections have been identified as crash black spots. With the forecast increases in demand on the corridor the crash risk on the existing State highway is forecast to increase, leading to additional and increased cost to the community and economy.

3.2.3 GPS policy direction

The 2012 GPS outlines the Government's priorities in relation to land transport funding. Progress on the RoNS programme is identified as a key task to support economic growth and productivity. The GPS states (paragraph 25):

> *'Continuing to progress the seven RoNS is a critical part of the economic growth and productivity priority and a significant part of the government's National Infrastructure Plan. The RoNS are important to addressing the needs of our key supply chain routes. Investing in these routes will ease the most significant pressure points in the national network, reduce congestion in and around our five largest metropolitan areas, improve road safety and link our major sea and air ports more effectively into the State Highway network.'*

This theme is reinforced in the draft 2015 GPS, which states that (paragraphs 28 and 29):

> *New Zealand is still in the process of addressing some critical constraints on the network particularly, but not exclusively, in the upper North Island.*
>
> *Continued investment is needed to address these constraints through the RoNS programme … and measures to make more of the network accessible to heavier freight vehicles.*

And that (paragraphs 67 and 68):

> *…even better access is needed to markets, employment and areas that contribute to economic growth and productivity. GPS 2015 (draft) will support this through:*

[17] Taken from Pūhoi-Wellsford SATURN Model.

a. Ongoing investment in our State highway network...GPS 2015 (draft) will enable:

- *Completion of the RoNS programme, which is designed to address capacity on our key supply chain routes*

In general, the sooner the RoNS projects can be delivered the sooner their benefits can be realised.

3.3 Constraints on solution options

The major constraints that impact on the available solutions to the problems identified above relate to the limited alternative transport modes, the challenging terrain and ground conditions and the environmental effects of construction in the area. The environmental and social impacts of the proposed project are mitigated in the consent conditions.

Limited opportunity to change mode share of freight

Rail carries around 3.5% of freight by volume between Auckland and Northland[18]. There are typically two return freight trains per weekday on the North Auckland Line between Whangarei and Auckland, one for logs and one for general freight (containers). The potential for a significant shift of freight to rail is limited for the following reasons:

- Existing track capacity is very limited, including tunnels undersized for modern container heights.
- Commodity movement origins and destinations do not fit with existing rail network and require significant inter-modal transfer, which severely impacts the viability of rail from a cost perspective.
- The nature of products transported does not lend itself to rail transport.

The physical constraints on the North Auckland Line have been recognised by KiwiRail, but given the pressures for investment elsewhere in busier parts of the network there are no firm and funded proposals to upgrade the route within KiwiRail's current planning horizon.

Approximately half of the Marsden Point oil refinery's production is distributed using the Wiri pipeline that connects Marsden Point and the Wiri Oil Terminal in Auckland. The remainder is distributed using coastal shipping and a small proportion using road based methods. The pipeline has a potential throughput of approximately 9 million litres per day and currently operates close to capacity.

Coastal shipping contributes to 30% of freight movement by volume[19] and is mainly confined to cement and petroleum products from Northport. Almost all cement products from Northland are moved by ship and nearly all petroleum products not moved by the Wiri pipeline are also transported by ship.

Northport suffers from its remoteness from New Zealand's main markets and producing areas and has had limited success in attracting container services. In considering future options for Northport, the most likely scenario is a continuation of the present position, with the port mainly catering for bulk cargoes and with general cargo commodities to and from the area being transported from Auckland or Tauranga[20]. In this case, the role of SH1 would be to

[18] National Freight Demand Survey, Ministry of Transport et al, 2014.
[19] ibid
[20] Transport Agency, 2010, Auckland to Whangarei Strategic Corridor Study: Strategic Context Report.

support these inter-regional movements, a position which underpins the main analysis of this study.

More detail on alternative freight modes can be found in the A-W Strategic Context Report[21] and in the discussion in section 0.

Environmental impact

The study corridor passes through areas with significant natural resources, including the Pūhoi River Coastal Marine Area (CMA). This area is located within the Waiwera, Wenderholm and Pūhoi CMA and is identified by the Department of Conservation (DoC) as an Area of Significant Conservation Value (ASCV).

The study area is likely to have a number of environmental effects: noise, visual, landscape and amenity effects, ecological effects, effects on the coastal and estuarine environment, freshwater effects, and heritage and social effects generated during both the construction and operation phases.

These constraints have been recognised with appropriate mitigations in the consent conditions granted through the Board of Inquiry decision. More detail on the environmental constraints can be found in the P-Wk AEE[22] and on the EPA website[23].

Social impacts

The project area consists largely of farms, forestry and lifestyle blocks. There are a few dwellings, forestry blocks and areas of relatively intense lifestyle blocks to the west of Warkworth. While the land is sparsely populated, social impacts within the study area represent a significant constraint to the development of options within the study area.

Consideration was given to these impacts during the Board of Inquiry hearing. The final decision and conditions for the designation and consents for the P-Wk section include mitigations and offsets for social impacts.

Physical constraints

The study area contains a number of areas of steep terrain, some of which is experiencing or has experienced significant mass movement. In addition there are some low lying soft soil environments which would require specialised ground improvement works.

Construction in such an environment is difficult and design would need to account for the risk associated with the conditions experienced, often leading to increased levels of cost and complexity.

[21] Transport Agency, 2010, Auckland to Whangarei Strategic Corridor Study: Strategic Context Report.
[22] Transport Agency, 2011, Pūhoi to Warkworth Assessment of Environmental Effects.
[23] http://www.epa.govt.nz/resource-management/Pūhoi/Pages/default.aspx

4 Transport Objectives

The strategic objective of the corridor is to improve accessibility between the Auckland and Northland regions so that economic growth is facilitated and any improvement measures contribute to the strategic fit, economic efficiency and effectiveness of the route.

At a programme level, improvements to the SH1 corridor are subject to a set of objectives focused on enhancing economic growth and productivity, improvement in the movement of people, improving connectivity to key growth areas and improving travel reliability between Auckland and Northland.

The objective of the P-Wk project is to increase long-term corridor capacity, improve route quality and safety, improve freight movement and provide network resilience. Specific objectives for the P-Wk section are to improve travel time consistency and safety on the section and to alleviate congestion at Warkworth.

4.1 Strategic Objectives

The strategic objective of the corridor was developed in the A-W Strategic Corridor Study. The objective is in keeping with the objectives in the Land Transport Management Act (LTMA), the GPS and the NLTP.

The overall objective of the corridor is to identify opportunities to improve accessibility between the Auckland and Northland regions in order to facilitate economic growth through the provision of a package of improvement measures that will contribute to the strategic fit, economic efficiency and effectiveness of the route.

4.2 Programme Objectives

The A-W Strategic Corridor Study established a programme of activities which aim to optimise the network. These activities were assessed using an evaluation framework which included criteria relating to the LTMA objectives. The options were assessed comparatively rather than against a set of predefined targets, i.e. the options which best met the evaluation criteria (as per the Network Plan) relative to the other options were preferred.

The objectives at a programme level are to:

- To enhance inter-regional and national economic growth and productivity.
- To improve movement of people and freight between Auckland and Northland.
- To improve the connectivity between the medium to long-term growth areas in the northern Rodney area (Warkworth and Wellsford).
- To improve the reliability of the transport network through a more robust and safer route between Auckland and Northland.

These four objectives are directly linked to solving the problems and realising the opportunities identified in section 3.1.

4.3 Project Objectives

At the project level the objectives for P-Wk are to:

- Increase long-term corridor capacity, improve route quality and safety (e.g. gradient, alignment, overtaking), improve freight movement and provide resilience in the wider State highway network.
- Increase travel time consistency and decrease travel times to and from the northern end of the Johnstone's Hill tunnels and the northern end of Warkworth.
- Alleviate congestion at Warkworth.
- Ensure the development of a future Wk-W section of P-W RoNS is not compromised.

A comparison of the performance of the recommended option against these project objectives is provided in section 7.4.

5 Stakeholders

P-Wk has undergone several stages of consultation throughout the history of the Project. The first phase took place from June to August 2010 informing affected parties of the project and gathering information on constraints. The second phase of the consultation took place between November 2010 and January 2011 and focused on the indicative route between P-Wk. Following this consultation, the preferred alignment for P-Wk was communicated to affected and interested parties. Significant additional consultation has been carried out during the consent application process.

5.1 Consultation and Communication Strategy

During the period June 2010 to January 2011, Transport Agency undertook public consultation on the indicative alignment for P-Wk that was developed through the scheme assessment process. The consultation strategy planned for the consultation to be undertaken in two phases, with an emphasis on consultation with affected and interested parties. This approach enabled high level issues to be addressed in Phase 1 and Phase 2 before the detail of particular alignments was considered.

Subsequent to the consultation phases, further communication focused on the provision of information on the preferred route to the interested parties. The phased approach enabled matters to be considered in principle first, and for the wider interests to be at the forefront of consideration.

Phase 1 took place from 21 June to 16 August 2010 and had three main purposes:

- To inform affected and interested parties about the project, paying attention to both the affected locality and the wider community of interest.
- To consult potentially directly affected and interested parties on the strategic directions related to the design of the project.
- To seek views and information on possible constraints affecting the viability/desirability of possible routes through the project Area, to engage with the local community, and to assist in route/alignment selection.

The principal focus of the consultation in Phase 1 was to seek feedback related to proposals for interchanges, location of bypasses and the principle of an offline route. Targeted meetings and interviews were held with groups and selected business stakeholders and user groups during Phase 1. In addition to this, a number of meetings with individual property owners were held.

Phase 2 took place from 18 November 2010 to 28 January 2011 and focused on the Indicative Route for P-Wk. This phase was designed to:

- Inform affected and interested parties about the progress of the project, including the development of the Indicative Route.
- Consult with the potentially directly affected, indirectly affected and other interested parties on the specific alignment presented by the Indicative Route, the associated potential effects on individuals, communities, road users and other interest groups and possible remedies and mitigation measures.

Phase 2 included a series of five public information days held at Warkworth and Pūhoi during November 2010 and January 2011.

Following the first two consultation stages (April 2012), the preferred alignment between P-Wk determined by technical investigations was communicated to interested and affected parties. This exercise focused on providing information on the preferred route for the P-Wk section of the RoNS. The preferred alignment was released via the Transport Agency website for public consideration.

In 2013 the Further North Alliance undertook a subsequent and final phase leading up to the Board of Inquiry hearing. Phase 3 included:

- Informing affected and interested parties of the Board of Inquiry process and their rights and potential for involvement in this process.
- Consultation with parties on the specific alignment presented by the Indicative Route, the associated potential effects and possible remedies and mitigation measures, as was done for Phase 2.

Phase three included four open days, held at Pūhoi, Warkworth and Orewa.

5.2 Professional Engagement Process

5.2.1 Emergency, Operation and Maintenance Services

During the scheme assessment, consultation with Emergency Services in the area was undertaken through the Northern Police liaison group. This group provided guidance to the design team on operation issues, emergency facilities and maintenance requirements for the RoNS.

5.2.2 Auckland Council / Auckland Transport

Involvement of AC and AT has been a vital part of the P-Wk project. Ensuring the local road network and land-use is supportive and integrated with the preferred option is a key factor in providing effective and efficient infrastructure. As the P-Wk project moves into the procurement and design phase the Transport Agency will continue to work closely with AT and AC.

The initial scheme assumed no interchange was provided at Pūhoi. The Transport Agency, through the Planning Alliance, have been working closely with AT and AC with regard to access provision at Pūhoi, resulting in allowance being made for South facing connections at this location. The provision of South facing ramps at Pūhoi is part of the consented scheme and this change is included in the Business Case analysis.

5.2.3 Iwi

The Transport Agency entered into a strategic partnership with the five Iwi along the project route. The Iwi formed a partnership called Hokai Nuku to facilitate thier partnership with the Transport Agency. The Further North Alliance and the Transport Agency have worked closely with Hokai Nuku through the consenting process, including Hokai Nuku participation in site investigations and input into cultural aspects and decisions for the project. Hokai Nuku provided the cultural assessment and evidence at the BOI hearing in support of the project.

6 Alternatives and Options Assessment

Identification of the preferred transport solution to connect Auckland and Northland has occurred over a long period of time and has involved numerous studies.

The SH1/16 Strategic Study looked at the roles of SH1 and SH16 in providing strategic transport links to the north. The study developed corridor options to accommodate future demand between Auckland and Wellsford. The study recommended SH1 corridor provides a nationally strategic role, with SH16 serving a regional function.

The A-W Strategic Study looked at the SH1 road corridor in terms of its role within the multimodal transport network between Auckland and Whangarei. The road corridor has been identified as the only viable option to accommodate the forecast increased demand on the A-W corridor. Alternative modes such as rail or coastal shipping networks are unlikely to be economically viable to significantly reduce demand for road based freight transport.

Options were developed for the upgrade of the SH1 corridor to cater for future demands. The study made a number of recommendations in relation to the form and function of the P-W RoNS. Possible connection points were also considered as part of this assessment.

This section summarises the mode alternatives, route alternatives and form-of-road options that were considered. In this context the analysis focussed on the full length of the P-W RoNS in order to provide an integrated network solution. The summary here relates to the P-W RoNS but applies also to the P-Wk section.

6.1 Alternatives Analysed

One of the key objectives identified in the GPS is the need to make better use of existing transport capacity. To ensure that existing capacity is maximised before investment in new infrastructure is undertaken, a key component of A-W Strategic Study was the assessment of the existing and potential future capacity of transport modes. A summary of this assessment is provided in the table below:

Table 6-1: Assessment of alternative modes

Passenger Rail	No plans to upgrade line for passenger services
Rail Freight	There is little scope to transfer significant volumes of additional freight from road to rail. Main commodities using rail (dairy, forestry and cement products rail) are already at capacity. The demand for passenger rail in Auckland also limits the lines capacity to accommodate freight. Limited potential for increased capacity with resources currently available.
Coastal Shipping	Remote location means that double handling are costs high. Road based transport is still required to transport goods to the main markets in Auckland and south. Significant road demand is still required to access Northport. Shipping is confined to cement and petroleum products.
Pipeline	Plans to increase refining production at Marsden Point may put pressure on pipeline capacity. There are plans to increase capacity but no timeframe for this has been given.

Walking and Cycling	Improvements can reduce demand for short town centre car-based trips. Limited potential to reduce SH1 demand due to highly dispersed rural nature of population base.
Public Transport	No existing intra-urban provision. Limited inter-urban provision. Current and likely future levels of demand do not give value-for-money investment. Shuttle services cater for tourist demand.

The A-W Strategic Study investigated existing and potential future transport modes between Auckland and Whangarei. The study[24] indicated that it was not economically viable for either the rail or coastal shipping networks to significantly reduce demand for road based freight transport. The key recommendation of the A-W Strategic Study was that road based transport was the only mode where a significant increase in capacity was possible to accommodate increased demand along the transport corridor between Auckland and Whangarei.

The report indicated that the section of SH1 between P-W is under pressure with high HCV and general traffic demand, particularly during holiday periods. It was recommended that this section of route be improved as a priority to accommodate this demand.

6.2 Recommended Package of State Highway Alternatives

As part of the SH1/16 Strategy Study, four different strategic State Highway alternatives were investigated for the P-W corridor as set out below.

6.2.1 Alternative 1

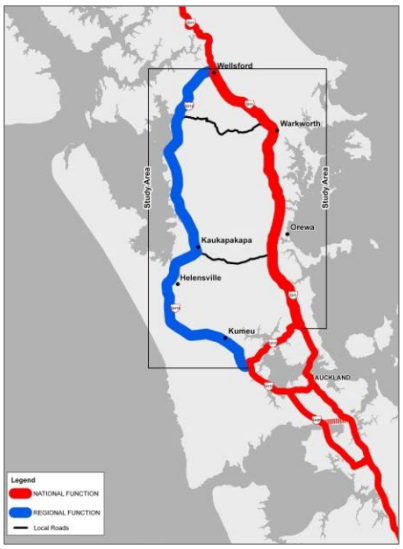
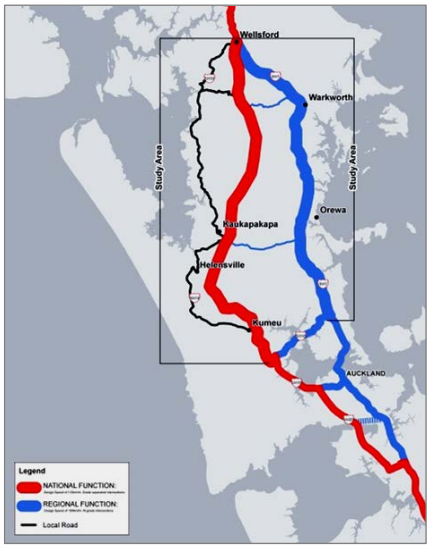


Figure 6-1: Alternative 1

Alternative 1 is consistent with the National State Highway Strategy (NSHS) in that SH1 and SH16 serve national and regional functions respectively.

[24] Transport Agency, 2010, Auckland to Whangarei Strategic Corridor Study: Strategic Context Report.

6.2.2 Alternative 2



Alternative 2 proposed a new inland route, broadly following the existing railway route to avoid physical and environmental constraints as far as possible. This route would serve a national function only and would have very strict access control, to avoid promotion of commuting and inappropriate development. The new route would link into the Auckland Western Ring Route (WRR), and thereby promote a national strategic north to south link avoiding the Auckland central business district CBD (Central Motorway Junction (CMJ)). SH1 would serve a regional function and SH16 north of Brigham Creek Road would no longer be a State Highway.

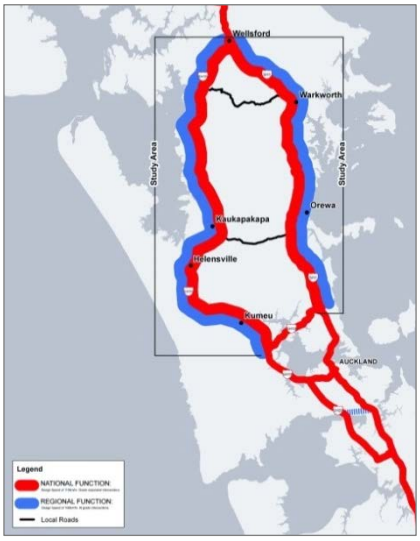
Figure 6-2: Alternative 2

6.2.3 Alternative 3

Alternative 3 would relocate the national function to the SH16 corridor. SH1 would serve a regional function. This concept would be consistent with the notion of separating longer distance travel from routes serving local centres. As with Option 2, SH16 would link into the Auckland WRR, and thereby promote a national strategic north to south link avoiding the Auckland CBD (CMJ).

Figure 6-3: Alternative 3

6.2.4 Alternative 4



In this alternative both existing corridors would be upgraded to combine national and regional functions. Provision of this functionality would require parallel access routes, to comply with standards and appropriate means of access to adjacent land-uses.

Figure 6-4: Alternative 4

An evaluation framework for the project was developed to allow a comparison to be made between the four alternatives. The framework was based on the LTMA criteria, extended as necessary, to include the project objectives and an appreciation of the functional requirements for the future transport network based on the expected travel demands.

The scoring system for the evaluation framework was developed based on assessing and comparing the potential benefits and impacts of each of the alternatives relative to a Do-Minimum scenario.

Careful consideration of transport planning principles and the Transport Agency's[25] own standards and policies led to a number of key decisions being made in this evaluation, summarised below:

- National route functionality would require a high quality route with divided carriageways, grade separated interchanges and no side friction. Motorway standards were assumed. Very limited access would be provided on new routes to discourage use for local trips (typically one interchange per township).
- Upgrading to a regional functionality would provide a good quality route that would typically have at-grade intersections and some degree of side friction.
- Upgrading existing routes would improve accessibility to existing towns and new development areas through provision of new connectivity with reasonable linkages into urban areas (several intersections or continuous access).

[25] Formerly Transit New Zealand at the time the assessment was undertaken.

These decisions were paired with key findings of the study including:

- The proportion of long distance traffic crossing the study area is small and the potential for diversion between SH1/SH16 would be correspondingly little.
- SH16 is a significantly longer route than SH1 and so any diversion of longer distance traffic into Auckland would likely be less than if SH1 was improved.
- The majority of the future development is expected to take place in identified centres in the eastern part of the study area.
- The volume of crashes is a function of the road quality and the volume of traffic. A new segregated inland route would provide a safer road but would attract only limited volumes of traffic. Upgrading SH1 and/or SH16 would result in improvements to the safety characteristics of the roads (but less than for a fully segregated route).
- The environmental amenity of land which would be required is highest for the SH16 corridor, moderate for a central route and lowest for the SH1 corridor.

Table 6-2 shows that exclusive of cost, Alternative 2 (a new inland route serving a national function) was the optimal solution in terms of functionality. However, such a route would have very high construction costs, be difficult to stage and implement as a number of smaller construction projects, not provide direct access to Warkworth and restrict the realisation of the full benefits until completion. Alternative 1, which places the national function on the SH1 corridor, building on current investment and placing the regional function on the SH16 corridor, was therefore determined to be the highest ranked alternative.

Based on the evaluation, Alternative 1 was selected as the recommended functionality for SH1 and SH16. This places the national function within the SH1 corridor and the regional function within the SH16 corridor. Another key advantage to this outcome is that the strategy maintains continuity with previous transport planning and land-use development decisions that have been made for the region. Figure 6-5 summarises the recommended strategy following the assessment carried out in the SH1/16 Strategy Study.

Summary of Initial Option Evaluation				
	Option 1	Option 2	Option 3	Option 4
Routes satisfying highway function				
National	SH1	Inland Route	SH16	SH1/SH16
Regional	SH16	SH1	SH1	SH1/SH16
Local	-	SH16	-	-
	Score	*Score*	*Score*	*Score*
Support for Economic Development	●●	●●◗	●◗	●●
Regional Integration and Agglomeration	●●	●●●	●◗	●
Assists Safety and Personal Security	●◗	●◗	●	●◗
Access and Mobility	●●	●●	●	●◗
Network Resilience	●	●●●	●◗	●◗
Integration	●●◗	●●	●	●◗
Responsiveness	●●	●◗	●●	●●●
Sustainability of Transport Network	●◗	●●	●	●
Environmental Sustainability	●◗	●●	●●	●●
Climate Change	●	●	●	●
Overall Effectiveness (Rank)	**2**	**1**	**4**	**3**
State Highway Functionality				
Costs/Efficiency				
Cost ($Bn 2006 prices))	**4-6**	**5-8**	**7-10**	**5-8**
Overall Assessment (Rank)	**1**	**2**	**3=**	**3=**

Scoring Legend

● Beneficial Impacts
● Adverse Impacts

* More symbols = larger impact

Table 6-2: Assessment of alternatives as part of SH1/16 Strategy Study

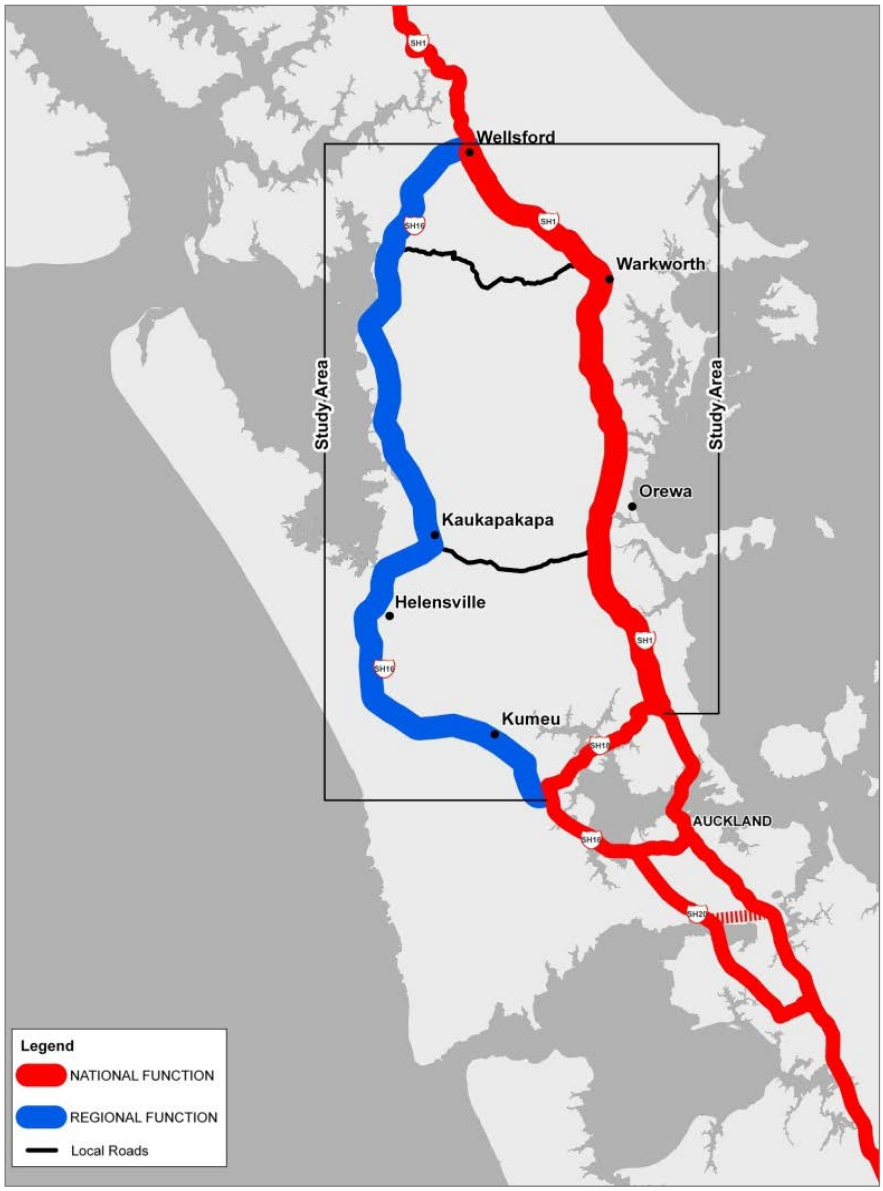


Figure 6-5: SH1/16 Strategy Study recommended corridor strategy

6.3 Options Analysed

The form and function of the P-W RoNS was assessed within the A-W Strategic Corridor Study. Options focused on the SH1 road corridor as this had been selected as the preferred nationally strategic route.

The following options were considered for the form of the RoNS within the selected alternative:

- Do-Minimum (existing SH1 + planned Warkworth improvements)
- Online (within existing road reserve)- upgrade of the existing SH1 to 4 lanes
- 2 lanes offline (P-Wk) + online upgrade (2 lanes) to Wellsford
- 2+1 lane offline (P-Wk) + online upgrade (2+1 lane) to Wellsford

- 4 lane expressway offline (P-Wk) + online upgrade (4 lanes) to Wellsford
- 4 lane motorway offline (P-Wk) + online upgrade (4 lanes) to Wellsford
- Offline, new 2 lane facility between Pūhoi and Wellsford
- Offline, new 2+1 lane facility between Pūhoi and Wellsford
- Offline, new 4 lane expressway facility between Pūhoi and Wellsford
- Offline, new 4 lane motorway facility between Pūhoi and Wellsford.

The summary table in Table 6-3 provides an overview of the evaluation process. Route options were assessed against six criteria based on LTMA objectives and given the same weighting. The scores for each of the measures have been averaged to form a score in the respective criteria using the five-point scale (scores ranging from -2 to +2). The scores from each of the criteria have been used to establish a ranking between options.

Table 6-3: Summary of RoNS route option evaluation

	DoMin	Route Options								
			Offline to Warkworth / Online to Wellsford				Offline to Wellsford			
	1	Upgrade Existing 2	2 lane offline 3	2+1 lane offline 4	4 lane express way 5	4 lane motorway 6	2 lane offline 7	2+1 lane offline 8	4 lane express way 9	4 lane motorway 10
Summary										
Assisting Economic Development	0	+	+	+	+	+	+	++	++	++
Safety and Personal Security	0	+	+	++	++	++	+	++	++	++
Improving Access and Mobility	0	0	+	+	+	+	+	++	++	++
Protecting and Promoting Public Health	0	0	+	+	+	+	++	++	++	++
Environmental Sustainability & Urban Form	0	–	+	+	+	+	+	+	+	+
Value for Money	0	--	0	0	0	0	0	0	0	0
Ranking	9	10	8	4	4	4	4	1	1	1

The summary table indicates that offline options produce considerably more benefits than the "Do-Minimum" or "upgraded existing" options. The high standard offline options (2+1 lane, and 4 lane configurations) achieve greater benefits with regard to assisting economic development and safety and personal security. The offline options which extend to Wellsford score highly in improving access and mobility and protecting and promoting public health.

The ranking exercise established three preferred options as follows:

- 2+1 lane offline to Wellsford.
- 4 lane expressway to Wellsford.
- 4 lane motorway to Wellsford.

For offline options, connection back to the existing road network at key points was an important consideration. Both strategic and local road networks were examined to explore logical connection locations. Options were developed for each major node, bypass opportunity and connection. Each possible interchange position and bypass route was evaluated separately and was compared to the Do-Minimum scenario.

From this assessment, possible connection points were identified at the following locations:

- Pūhoi
- Mahurangi
- Warkworth
- Wellsford

The A-W Strategic Corridor Study recommended that the upgrade of SH1 between P-W be an offline road with the following:

- No connection to SH1 be provided at Pūhoi or Mahurangi.
- A western bypass be provided at Warkworth.
- A connection to SH1 be provided at Warkworth.
- An eastern bypass be provided at Wellsford.
- A connection to SH1 be provided at Wellsford.

The recommended option for the P-Wk section is discussed further in the next section.

7 Recommended Option

A preferred route has been identified and publically communicated for the P-Wk section of the RoNS.

The P-Wk project provides an offline route between the northern extent of the Northern Gateway Toll Road to a connection back to SH1 at the northern end of Warkworth. The option provides a 4 lane motorway in accordance with the RoNS standards.

The recommended option has been selected through a multi criteria assessment with regard to the potential environmental, property and social impact which the option may have. Significant effects have been avoided wherever possible through route choice and the remaining unavoidable impacts have been mitigated through design. Implementability and operability were included as assessment criteria in the evaluation of potential options, and the recommended option has since undergone further assessment against the implementability and operability of the option.

Cost optimisation has been considered for the P-Wk project options. Considerations include adoption of reduced geometric design standards, inclusion of grades up to 10%, reducing the width of pavements and reducing shoulder widths.

7.1 Introduction

Work done to date on the P-Wk section has included the following:

- Scheme Assessment Report (SAR) for the P-Wk Section.
- Assessment of Environmental Effects (AEE) for P-Wk.

The designation and resource consents for P-Wk were obtained following the Board of Inquiry decision in September 2014.

This section outlines the recommended option for the P-Wk section of the P-W RoNS.

7.2 Scope

The P-Wk SAR built upon the A-W Strategic Corridor Study with a Scoping Report produced in September 2010. While the A-W Strategic Corridor Study made clear recommendations for providing an offline route, no distinction was made between the standard of the road (expressway or motorway) or the number of lanes (2+1 lane or four lane alignment).

A Standards Review Report[26] was produced in the early stages of the P-Wk SAR. The report concluded that:

> *"the proposed full interchange locations are limited and so at-grade left in/left out access options to a new route from intermediate local roads would not be practical given the resulting long distances required for some movements. As such, retaining connections to the existing SH1 will be important for any local roads that the alignment of the new highway will cross. Therefore, at a network level, it seems appropriate to adopt a motorway standard and thus achieve full access control along the new route."*

[26] Transport Agency, 2010, Standards Review Report, April 2010.

The Standards Review Report outlined the design principles and standards for the RoNS and these were endorsed by the HNO VAC. They are summarised as:

- The route would be designed to a minimum Level of Service B[27] for year 2026 flows, which results in a four lane highway.
- The route would be designed with controlled access at designated locations and classified as a Motorway.
- Access points along the route would be designed as fully grade separated interchanges.
- The scheme would be developed in accordance with the RoNS standards and guidelines with some minor exceptions to geometric standards.
- The RoNS would connect directly to the end of the existing tolled motorway north of Johnstone's Hill Tunnels. The existing connectivity between the motorway and old highway would be removed.
- An interchange would be provided at Warkworth (South facing interchange ramps have subsequently been added at Pūhoi).
- The RoNS would be offline as per the recommendation of the A-W Strategic corridor study.

In addition to the above principles, other key design assumptions and standards for the P-Wk project were as follows:

- A design speed of 100km/h would be adopted where there are sightline limitations on certain vertical and horizontal curves.
- A reaction time of 2.5 seconds would be used for sight distance calculations.
- Staging options would be considered for the delivery of the project.
- The design would be subject to value for money assessments.

7.3 Pūhoi to Warkworth Preferred Option

The P-Wk preferred option was developed through a route selection process commencing with the generation of a long-list of options followed be assessment and evaluation of these options to obtain a short-list. This is reported in the P-W Scoping Report (Transport Agency 2010). The short-listed options were further developed, assessed and evaluated to obtain a selected option (as discussed in section 6). For the evaluation of the short-listed options and to enable the identification of the selected option, an LTMA-themed framework was developed with reference to the GPS and the project objectives for the P-W RoNS.

The six evaluation framework categories were as follows:

- Assisting Economic Development – through improved strategic connections for freight and tourism between the Auckland and Northland regions.

[27] Level of Service 'B' – In the zone of stable flow where drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is a little less than with Level of Service A (Austroads 2009a).

- Safety and Personal Security – through improved road safety and reduced road crashes.
- Improving Access and Mobility – through improved route security, resilience, reliability and connectivity.
- Protecting and Promoting Public Health – through improved community connectivity and reduced severance.
- Environmental Sustainability – assessment of the key effects on natural and built environments and best use of existing networks and infrastructure.
- Value-for-Money – relating to cost and ability to be tolled.

Following the evaluation of the short-list options, the selected option (as shown in Figure 7-1) included:

- On the section between Pūhoi to the south Schedewys Hill: The alignment through this area was strongly controlled by the geometric alignment from Johnstone's Hill tunnel and other environmental and social constraints.
- Between the south of Schedewys Hill and Perry Road: a western alignment at Perry Road was the highest ranking option and performed best in environmental sustainability, urban form and value for money and equal best in improving access and mobility. The options separation from SH1 provides higher route security and lower constructability risks and avoids direct impact to Pohuehue Scenic Reserve and Wech House. The option also avoids the high risk geotechnical hazards along Windy Ridge and east of SH1.
- A northern interchange location at Warkworth for the Warkworth Bypass was chosen because it reduces traffic past Mahurangi College and Warkworth Primary School, improved connectivity between the RoNS and Matakana / Sandspit, provides greater potential to accommodate staging andprovides greater potential to accommodate additional growth in the Warkworth area.
- Connection to existing SH1 south of Kaipara Flats Road could be incorporated into a future Warkworth Interchange located north of Woodcocks Road, should the Wk-W alignment ultimately selected continue directly north from this location.

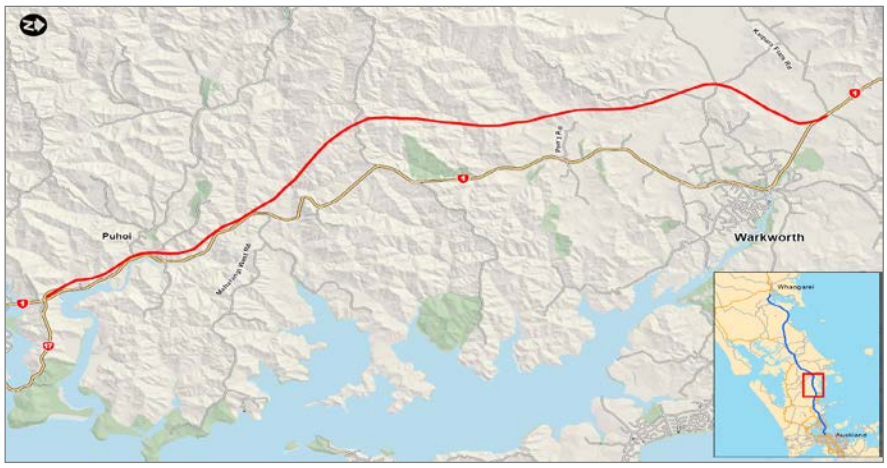


Figure 7-1: P-Wk preferred alignment

7.4 Objectives

Pūhoi to Warkworth Project Objectives (Section 4.3)	Performance against objective
Increase **long-term corridor capacity**, improve **route quality** and **safety** (e.g. gradient, alignment, overtaking), *improve freight movement* and provide **resilience** in the wider State highway network through the addition of a four lane route.	**Corridor Capacity:** The P-Wk RoNS increases the capacity of the corridor through providing an additional route. The increase in capacity is forecast to lead to an increased level of traffic travelling between P-Wk. Transport modelling assessment indicates the total traffic using the SH1/RoNS corridor increases from 30,000 (Do-Minimum case) to 42,000 (P-Wk RoNS) in the 2051 design year as a result of the RoNS project. During the 2026 design year, the Annual Average Daily Traffic (AADT) on the corridor increase from 25,000 to 29,000 as a result of the P-Wk RoNS being constructed. **Route Quality:** The proposed P-Wk RoNS will be designed to full motorway standards and will mark the continuation of the high quality route from the Northern Gateway. The P-Wk RoNS will operate at LOS A[28] in both 2026 and 2051 design years representing free flow driving conditions. **Safety:** The existing State Highway between P-Wk has a poor safety record and is ranked 16th in terms of Collective Risk in New Zealand[29]. The P-Wk RoNS will be designed to modern safety standards with an appropriate design speed resulting in far fewer crashes than the existing State Highway. The improved safety associated with the P-Wk RoNS is anticipated to produce $9.1 million of crash reduction benefits or a reduction of approximately 34 injury accidents in the opening year. **Freight Movement:** Road freight traffic between Northland and Auckland will increase by over 250% over the 25 year period from 2006-07 to 2031. Increases in capacity, reliability, quality and safety provided by the P-Wk project will increase productivity of freight vehicles and improve connectivity between the Auckland and Northland regions. **Resilience:** P-Wk project provides resilience through provision of an offline alternative route to the existing State highway alignment between Pūhoi and Warkworth.
Increase **travel time consistency** and **decrease travel times** to and from the north end of the Johnstone's Hill tunnels and the north end of Warkworth.	**Travel Time Reliability:** The existing State Highway between P-Wk is prone to route resilience issues with regular closures due to incidents. Congestion within Warkworth currently causes reliability issues during congested periods. Forecast congestion on the existing State highway and lack of passing opportunity adds additional uncertainty to travel times in the corridor. The P-Wk RoNS bypasses the Warkworth town centre and provides a high quality route operating at LOS A. **Decrease in Travel Time:** The P-Wk RoNS results in a travel time saving of 17 minutes between the Do-Minimum and the RoNS (between Pūhoi and the SH1/RoNS tie-in north of Warkworth for the forecast 2026 PM Peak).

[28] Level of Service 'A' – A condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent (Austroads 2009a).
[29] KiwiRap Risk Maps and Performance Tracking Report (2012).

<table>
<tr><th>Pūhoi to Warkworth Project Objectives (Section 4.3)</th><th>Performance against objective</th></tr>
<tr><td></td><td>

Table 7-1: Summary of 2026 PM Peak Travel Times (minutes)

<table>
<tr><th>Section</th><th>Do Min</th><th colspan="2">With RoNS</th><th>Difference (Do Min – RoNS)</th></tr>
<tr><th></th><th></th><th>RoNS</th><th>SH1</th><th></th></tr>
<tr><td>P-Wk[30]</td><td>27 min</td><td>10 min</td><td>19 min</td><td>17 min</td></tr>
</table>

*Note: Travel time is average of northbound and southbound directional times.

</td></tr>
<tr><td>**Alleviate congestion** at Warkworth by providing a Warkworth bypass for through traffic.</td><td>**Reduction in congestion:** The reduction in congestion as a result of the P-Wk RoNS is best represented through decrease in the travel time Table 7-1) and LOS experienced on the corridor. The P-Wk RoNS improves the predicted LOS from E on the existing route in 2026 and 2051 to LOS A on the RoNS in both 2026 and 2051.</td></tr>
<tr><td>Ensure the **Wk-W Section** of the P-W Project **is not compromised.**</td><td>Compatibility: The P-Wk RoNS section has been designed in such a way as to support the construction of the Wk-W section. The P-Wk section of the project will likely form the first stage of the RoNS tying into the existing State Highway north of the Warkworth township.</td></tr>
</table>

7.5 Implementability

As assessment of the ability to implement the preferred P-Wk option was carried out as part of the Scheme Assessment. The section between P-Wk can be divided into two possible discrete stages. There is limited opportunity for additional sub-stages along the length of the P-Wk section due to the distance of the preferred route from the existing highway.

7.6 Designations and Resource Consents

Following the Scheme Assessment process, the Pūhoi Planning Alliance submitted and confirmed designations and resource consents through the Environmental Protection Authority (EPA). Designation and consents were granted by Board of Inquiry decision in September 2014.

7.7 Operations Review

An operations review has not been carried out during the scheme assessment process. An operations review is expected to be undertaken during subsequent design development.

7.8 Property Impacts

The property impacts of the preferred P-Wk alignment are largely limited to rural land with selected lifestyle properties affected. The minimisation of property impacts was an important consideration within the option development which influenced route choice.

[30] P-WK section is measured from Grand Drive because there is no interchange at Pūhoi and a common start/end point is required to compare travel times.

Property purchase for the P-Wk section is currently underway.

7.9 Environmental and Social Impacts

Along the length of the project, the route selection process and preliminary design of the proposed alignment has sought to avoid and remedy potential environmental effects. These processes have been informed by a range of technical studies, environmental investigations and community feedback on preliminary concepts and project values.

As a result, most of the sensitive communities and sensitive environmental attributes had already been avoided or remedied. There are only a few locations along the proposed alignment where the balance between community and environmental values versus project objectives, route selection and design criteria, would result in direct effects on properties or sensitive high value environmental attributes that are not able to be avoided.

In such instances, measures are required in the consent conditions to mitigate the potential effects of the alignment. Similarly, the consent conditions require mitigations where adverse social impacts are anticipated.

7.10 Asset Management

The project will involve the construction of a new four lane offline motorway. Under traditional procurement, Transport Agency would own and operate this new piece of infrastructure and would be responsible for its maintenance. Under alternative procurement (PPP), the Agency would own the new infrastructure and the PPP contractor would operate the infrastructure and would be responsible for its O&M. Through the scheme assessment process the existing highway has been assumed to remain under the Transport Agency's control.

Section 0 provides details on the O&M cost estimate for the preferred option.

7.11 Joint Working

Opportunities exist to work with AC and AT in terms of developing the details of the project with complimentary AT/AC initiatives to deliver wider network benefits. Two examples of these are set out in the following sections.

7.11.1 Warkworth Tie In

During the RoNS option development and evaluation process, it was considered important to ensure that the local road network is developed to accommodate the new connections and changing demands arising from the project. This is of particular importance at Warkworth, where significant growth is predicted by 2051.

The former RDC identified the Matakana Link road as a potential future project within the Warkworth Area. Planning and protection of the proposed Matakana Link road was identified in the A-W Network Plan as an optimisation activity for Transport Agency and AT within the study area.

The Matakana Link road and its interaction with the RoNS was also an important consideration throughout the option development and evaluation period. Ultimately, the preferred alignment included a northern tie in to Warkworth which connects to SH1 via an at-grade intersection. The proposed intersection has been designed to direct southbound traffic on SH1 from the Dome towards the proposed motorway rather than through Warkworth. The location of the intersection was developed through coordination with AT and AC to ensure its

location integrated with the possible future link to Matakana and offered good access to the future development area to the west of Warkworth.

7.11.2 Southern Connection

The RoNS will connect to the northern end of the Johnstone's Hill Tunnels. Currently the northern end of the Johnstone's Hill Tunnels provides an interchange between the NGTR and AT's alternative free route via Orewa on the Hibiscus Coast Highway alignment.

During the consent application process it was determined that an interchange at Pūhoi with South facing ramps would be provided as a tie in point between the NGTR / Pūhoi RoNS and the existing State highway alignment.

7.12 Risk Analysis Process

Risk has been actively managed throughout the progression of the P-Wk project from the strategic study phase through to SAR and AEE. Risk has been managed through a combination of qualitative and quantitative assessment approach has been adopted in accordance with the Transport Agency's Risk Management Process Manual. Three risk workshops were held during the P-Wk SAR phase with regular updates to risk reporting (discussed further below).

A set of project risks was developed for the P-Wk section of the RoNS. This changed throughout the course of the investigation as risks were mitigated and new risks emerged. Quantification risks were assessed prior to the development of the scheme estimates and appropriate contingencies were applied to account for the risk.

During the course of the P-Wk scheme assessment, three risk workshops were held. The first workshop (7 May 2010) entailed a comprehensive identification of all known risks and associated risk treatments. This exercise resulted in the establishment of a base risk register for the Investigation and Reporting phase of the P-Wk project. A second workshop was held (20 October 2010) to provide a collective overview of treatment plans and to assess progress in mitigating identified risks and realising opportunities. A third risk workshop was conducted (17 March 2011) prior to completion of the SAR. This workshop reviewed all risks and opportunities and significant risk reports were prepared for the ten highest ranked threats (risks) and the two highest ranked opportunities.

The workshop attendees used their considerable experience in project management, civil engineering design, road construction, geotechnical engineering, environmental compliance, planning and resource management and relevant legislation to identify all potential risks and the development of individual risk treatment plans.

During the progression of the scheme assessment and finalisation of the preferred alignment, informal reviews of the risk register were undertaken on a weekly basis with a formal review being carried out on a monthly basis. Both the informal and formal reviews involved updating of the risk register and risk treatment plan to reflect changes as the P-Wk project progressed during the scheme assessment phase.

The key project risks are summarised in Table 7-2.

The risk analysis discussed here is different from the risk analysis undertaken for the purpose of quantifying transferred risks for the quantitative analysis of a PPP procurement (see section 10). However, the processes are complimentary and examined similar risks.

7.12.1 Key Project Risks

An assessment of project risk was performed as part of the 2010 A-W strategic study. The project risks which were identified at this stage of the project are identified below:

Table 7-2: Project rsks

Hazard	Causes	Consequences	Current Controls / Plans	Risk Analysis			
				CAT	Most Likely Risk		
					C	L	Risk
New GPS requires significantly reduced priority for road based schemes	Change in government policy	Significant. RoNS would not proceed.		Del	90	2	180
Funding reallocated to other projects (e.g. WRR)	WRR costs significantly higher than anticipated	Significant. RoNS could be delayed indefinitely.		Del	90	3	270
Project costs exceed benefits. Preferred option exceed budget and BCR	Cost analysis does not adequately address all issues. Benefits not effectively communicated.	Low political support and reluctance to fund project. BCR does not justify project commencement	Undertake rigorous strategic justification, taking cognisance of wider economic benefits. Effective communication of benefits versus costs throughout project development.	Cost	90	5	450
Local community disadvantaged / negatively impacted.	Consultation does not capture all issues affecting community.	Local needs are not met.	Early and effective consultation and communications. Early integration of issues into option selection.	Env	40	4	160
Anticipated traffic volumes might be lower than would otherwise justify a four lane upgrade.	Land-use growth forecasts not sufficient to generate enough traffic.	Inadequate justification results in delays to project commencement or reduced scope / cancellation.	Validate traffic data at outset. Use of established methods. Assess commercial growth initiatives, regional development etc.	Del	80	5	400

Hazard	Causes	Consequences	Current Controls / Plans	Risk Analysis			
				CAT	Most Likely Risk		
					C	L	Risk
Regional growth strategies may change under new Auckland council structure	New Auckland council structure may have strong non-road influence.	RoNS commencement is delayed	Transport Agency to keep in close contact with Auckland Council.	Del	30	2	60

CAT: Category (Cost, ENV-Environmental or DEV-Delivery)

C: Consequence (as a percentage with 0% as a low consequence and 100% as a high consequence)

L: Likelihood (1 = unlikely and 5=highly likely)

Risk: sum of Consequence and Likelihood (0=low risk, 500=high risk)

Many of the risks identified at the strategic study level are still current. Additional information has become available with the SAR process, and steps have been put in place to manage the risks identified at this early stage.

In addition, a formal review was undertaken on a monthly basis to coincide with the Transport Agency's overall risk reporting for the P-W project. This formal review involved reviewing of the top ten threats and identifying the top two opportunities. It was considered appropriate to provide for an input into the Transport Agency's overall risk register for the P-W RoNS project and to provide for greater detail around these risks and respective treatment plans (which covers all project phases, including the lead-up to and aspects subsequent to the scheme assessment phase).

These risks are the same as detailed in the risk register, with the only difference being that they have been expanded upon to provide more detail around the risk and the respective treatment plan due to the significance of these risks.

Throughout the development of the SAR for the P-Wk project, the prioritisation of the top ten risk threats has changed. At the conclusion of the scheme assessment phase for P-Wk and completion of this SAR, the top ten risk threats were those listed in Table 11-2:

Table 7-3: P-Wk top ten risks (threats)

Risk Number	Risk (Threat) Description
1.01	Funding – Funds for project not forthcoming due to other projects having higher priorities.
1.04	Benefits – Anticipated traffic volumes might be lower than would otherwise justify a four-lane upgrade.
1.06	Regional growth strategies may change under new council structure.
1.16	Funding – Overly conservative cost estimate causes an unnecessary change in direction / failure of project to proceed as originally intended.
2.37	Consenting – lack of robust documentation for EPA process may result in additional costs and delay the commencement of physical works. (no longer a risk following the outcome of the consenting process)
3.13	Political – EPA process imposes onerous demands on information and/or consent conditions. (no longer a risk following the outcome of the consenting process)
4.02	Design Issues – Geotechnical investigations to date unable to provide certainty regarding geotechnical challenges.
4.06	Buildability – Conditions may be more difficult than expected, resulting in increased construction costs.
4.08	Funding – Costs exceed available budgets.
4.20	Design Issues – Adverse effect to decision pertaining to Pūhoi interchange.

7.12.2 Risk Quantification

A quantitative risk analysis was undertaken at a Quantitative Risk Workshop on 27 January 2011. The objective of the quantitative risk analysis for the stages was to determine the:

- Expected estimate.
- 95th percentile estimate.

The risk process was broken into two components: the uncertainty associated with the quantity and rate of items included in the schedule and discrete risks identified by the project team.

7.12.2.1 Quantity and Rate Risk

Based on discussions and consensus in the risk workshop, utilising the team's experience and knowledge of the project design and construction risk profile, each section of the estimate (e.g. earthworks, drainage) was rated with a confidence limit for the variation in the costs.

Risk simulations were run using @RISK software based on this register for each stage.

7.12.2.2 Discrete Risks

A discrete risk analysis was undertaken using the following procedure:

- A collated register of construction risks was developed from information supplied by various team members.
- This discrete risk register was then quantified in the risk workshop based on the team's knowledge and experience.
- Each item was then rated for both consequence (in terms of dollars) and likelihood (in terms of a percentage probability).
- Risk simulations were run using @RISK software based on this register for each of the five stages.

This risk simulation analysis resulted in contingency cost estimates for the SAR: The cost estimate and risk analysis work has since been updated as part of the commercial procurement analysis, discussed further in section 11.

8 Economic Analysis

This section outlines the economic analysis for P-Wk. The assessment profile for P-Wk is described as "HHL" meaning a high strategic fit, high effectiveness and a low economic efficiency. The project as part of the RoNS programme is assigned a higher priority than would otherwise be afforded to a project with a similar assessment profile.

P-Wk is assumed to begin construction at the start of the 2017 calendar year with a six year construction timeframe. The scheme creates a present value of [redacted] million in conventional benefits over the typical 40 year evaluation period. WEBs have been assessed for P-Wk and are expected to contribute [redacted] million in benefits over the evaluation period.

The BCR of the P-Wk section of the RoNS is 0.92 when considering only conventional benefits. The BCR changes to 1.02 with the inclusion of WEBs.

The economic analysis presented in this section is for the Pūhoi to Warkworth section of the RoNS. The economic assessment for P-Wk has evolved over time as the level of information has become increasingly more detailed. The assessment of the project has been carried out using the Transport Agency IRS guidelines. The Economic assessment has been carried out following the guidelines set out in the EEM and advice provided by Transport Agency.

8.1 Assessment Profile

The P-Wk project was assessed using the latest Transport Agency Investment and Revenue Strategy (IRS)[31] guidelines. An assessment profile of the P-Wk project is 'HHL' having been determined using the Transport Agency's funding allocation process as detailed below:

Strategic Fit Assessment Criteria: High

When assessed against the "Strategic Fit" criteria, P-Wk clearly meets the 'high strategic fit' criteria:

- The route is part of one of the RoNS and will improve access in and out of the major urban area of Auckland.
- The route provides additional capacity on a key freight route typically carrying more than 1,000 HCVs per day and will have a significant contribution to economic growth and productivity.
- The route provides access to the major tourism area of Northland, which had a total of 5.5 million tourist visits in 2009, which is the latest year for which data is available. It carried approximately 8.7 million tourists in 2009 (including outbound movements by Northland residents).

[31] Transport Agency, 2012. Investment and Revenue Strategy (2012-2015). Although the IRS has been replaced with the Investment Assessment Framework (IAF) for the 2015-18 NLTP, the IRS is used in the analysis here.

Effectiveness Assessment Criteria: High

When considered against the "Effectiveness" assessment criteria, the P-Wk section will provide long-term, integrated and enduring solutions. The project will provide enhanced network resilience and reduced risk of disruption compared to the existing situation. Currently SH1 is the only realistic option for the majority of the traffic on the route and for the movements between Northland and the areas further south in New Zealand.

Economic Efficiency Assessment Criteria: Low

The BCR for P-Wk is outlined below in Section 8.3. The BCR is less than two, qualifying the project with low economic efficiency.

Summary

The assessment profile for the P-Wk section of the P-W RoNS is defined as "HHL". The IRS for 2012-2015 places increased emphasis on delivering GPS impacts and a national perspective to integrated networks. Greater attention is placed on the effectiveness assessment; demonstrating that network impacts and network integration have been taken into account in providing long-term solutions. The interaction between the effectiveness and economic efficiency assessment factors will provide a more balanced view of integration. An investment with a "HHL" profile is given a priority of 3 out of 11 possible levels.

National programs such as the RoNS program are considered a higher priority than standalone projects. The RoNS are 'lead infrastructure' projects; they enable economic growth rather than simply responding to it.

8.2 Do-Minimum

The economic evaluation requires that a Do-Minimum scheme is determined as a basis for the comparison of project options. Scheme benefits and costs are then calculated as the marginal difference between the Do-Minimum and the scheme.

The Do-Minimum option was developed as part of the Scheme assessment and was used in the traffic modelling for the economic assessment. The Do-Minimum represents a realistic future scenario for the wider network in the 2026 and 2041 future years. The Do-Minimum network assumes that the existing SH1 alignment and configuration remains with the exception of the following future network changes:

- Speed limit reductions and traffic calming measures on SH17 in Orewa have been represented by urban speed flow curves and lower maximum speeds on SH17.
- Signalised intersections were already coded in the base year model at the Whangaparoa Road, East Coast Road, Red Beach Road, Centreway Road and Florence Avenue intersections, as described in the Pūhoi to Wellsford Strategic Assessment SATURN model report.
- Grand Drive – a link between Grand Drive and the Hibiscus Coast Highway (SH17) was added, as well as a four way intersection on SH17 and a three way intersection on Grand Drive to provide access to the proposed development at Silverdale North.

- Warkworth road network changes have been made consistent with the Transport Agency/RDC designation procedures completed 2007 – 2009, in support of the proposed road network described in the Warkworth Area Structure Plan and the 2006 memorandum of understanding (MOU) between Transport Agency and RDC and comprising:
    - upgrade of the SH1/Woodcocks Road and SH1/Whittaker Road intersections
    - upgrade to the SH1/Hill Street intersection
    - upgrade to SH1/Hudson Street and SH1/McKinney Road intersections
    - addition of the Warkworth Western Collector Road (two lane, sub-arterial road) from McKinney Road to Hudson Road
    - SH16 and SH18
    - SH16 Brigham Creek Extension included
    - SH18 Hobsonville Deviation included
    - SH1 – an additional auxiliary lane northbound has been included between Constellation Drive and Greville Road.

Projects within the P-Wk section of SH1 are limited to several intersection upgrades in and around Warkworth as per the MOU agreed between RDC and the Transport Agency in 2006. Since this work is either completed or under construction the costs and benefits will be common to the Do-Minimum scenario and all options and hence have been left out of the economic assessment.

The exception to this relates to the Hill Street works. During the Board of Inquiry hearing process the Transport Agency presented evidence confirmed that, since the construction of P2W was forecast to begin shortly, the assumed Hill Street intersection upgrades were seen as unnecessary and are unlikely to be undertaken.

Since the hearing the Transport Agency has undertaken minor upgrades at the Hill Street intersection which do improve the performance of the Hill Street intersection. These works are not as significant as those assumed in the Do minimum and, whilst providing some operational improvements, these improvements do not match the extent of the improvements assumed in the Do Minimum network.

Given timing constraints, the scaling back of the Hill Street works has not been reflected into the economics presented here. The effect of this is that the Do Minimum (which does assume the upgrade is in place) reflects the Hill Street intersection operating better than will actually be the case. As a result, the performance of the network is overstated in the Do Minimum and the overall benefits of the P-Wk project are understated economically. This lends a degree of conservatism to the results of the economic analysis.

Table 8-1: P-Wk Do-minimum wider network adjustments

Transport Link	Change made in Do Minimum network analysis
Grand Drive – SH1 to SH17	Free Flow Speed 50 kph
SH17: SH1 – to Puriri Avenue	Free Flow Speed 45 kph, 1,200 vph capacity
Grand Drive to SH17	Silverdale North access
SH1 – Hill Street intersection	Increase capacity and upgrade to five leg signal controlled intersection
SH1 – Hudson Street intersection	Signalise and increase capacity
SH1 – McKinney Rd intersection	Signalise and increase capacity
Warkworth Western Collector Road	Align as per Warkworth Structure Plan
SH1 – Woodcocks Road intersection	Signalise and increase capacity
SH1 – Whittaker Road intersection	Increase capacity for this previously signalised intersection
SH16 – Brigham Creek Extension	New Link
SH18 – Hobsonville Deviation	New Link
SH1 – Constellation Drive to Greville Road	Additional auxiliary lane (northbound)

No other improvements currently in the NLTP[32] have been included in the Do-Minimum.

[32] Transport Agency, 2009, National Land Transport Programme, 2009-2012.

8.3 Economic Summary of Recommended Option

An economic evaluation has been carried out on the P-Wk section of the RoNS. The assessment assumes an evaluation period of 40 years with a discount rate of 6%, as per Transport Agency direction[33].

A summary of the economic assessment is provided in the table below. A conservative adjustment has been made to account for the benefit understatement resulting from the Do-Minimum assumptions mentioned above. The cost estimates are preliminary and will be revised in mid-2015 when improved cost information becomes available. The base capital costs are shown in Appendix A. [redacted]

Table 8-2: P-Wk economic evaluation summary

Timing	
Earliest Implementation Start Date	2017
Expected Duration of Implementation	72 Months
Economic Efficiency	**P-Wk**
Time Zero	1 July 2014
Base date for Costs and Benefits	1 July 2014
Present Value of Total Project Cost of Do-Minimum	$0
Present Value net Total Project Cost of Recommended Option	[redacted]
Present Value net Benefit of Recommended Option (Exc. WEBS)	[redacted]
Present Value net Benefit of Recommended Option (Inc. WEBS)	[redacted]
Benefit Cost Ratio	
BCR (Exc. WEBS)	1.02
BCR (Inc. WEBS)	1.11
First Year Rate of Return (FYRR)	0.02

[33] Transport Agency, 2013, Update of the RoNS Project Summary Sheets, 19 June 2013.

Costs	P-Wk (NPV)
TOTAL CONSTRUCTION COST	[redacted]
Property	[redacted]
Procurement /Implementation costs	[redacted]
TOTAL IMPLEMENTATION COST	[redacted]
Maintenance, Renewal and Operating	[redacted]
TOTAL PROJECT COSTS (NPV)	[redacted]
Benefits	**P-Wk (NPV)**
Travel Time Savings	[redacted]
Vehicle Operating Cost Savings	[redacted]
Accident Cost Savings	[redacted]
Vehicle Emissions Reductions	[redacted]
Journey Time Reliability	[redacted]
Noise	[redacted]
Congestion Related Relief	[redacted]
Agglomeration Benefits	[redacted]
Walking and Cycling (EEM v2)	
Travel Behaviour Change (EEM v2)	
Total Net Benefits (NPV)	[redacted]

Walking and cycling benefits and travel behaviour change benefits have not been considered as part of the assessment of P-Wk. Given the strategic nature of the route and limited urban areas in the study area, these are considered to be inappropriate in this circumstance.

The economic costs summarised in Table 8-2 above were calculated using the construction, property and NZTA own costs from the Project Base Estimate provided in Appendix A. These Appendix A costs were also the basis of the PSC calculations presented in Section 10.

8.4 Wider Economic Benefits

As part of the P-Wk scheme assessment WEBs have been examined in more detail. This section discusses the updated methodology used to define the WEBs likely to be generated by the project.

Traditional benefit cost analysis aims to assess the direct economic, social and environmental impacts of an initiative. In a transport context, such as the P-Wk project, this typically includes capital and O&M costs, travel time, vehicle operating costs, safety impacts and environmental externalities (such as greenhouse gases and air pollution).

Increasingly, there is greater acknowledgement that traditional benefit cost analysis does not adequately take into account the indirect impact that an investment in transport infrastructure is likely to have on the wider economy. As such, the WEBs that may be derived from P-Wk can be estimated to capture the impacts that may not be captured due to imperfect competition. Additionally, changes in the operations of transport networks may have implications for employment and productivity within an economy.

The application of the WEBs framework in New Zealand has relied heavily on the UK Department for Transport (DfT) guidelines. Moreover, the Transport Agency EEM[34] specifically outlines guidelines for measuring agglomeration benefits. This assessment of the WEBs uses the Transport Agency EEM to sum the following four impacts over the project lifecycle:

- **WEB1 Agglomeration Impacts**– improvements in transport can increase the accessibility of an area to a larger number of firms and works. This generates an increase in 'effective density' which is likely to result in positive agglomeration economies. WEB1 values the increase in productivity to all existing CBD or cluster jobs[35] resulting from the increase in employment density arising from a transport improvement.
- **WEB2 Increased Competition** – estimates any potential increase in production or output in the goods or service markets that use transport as a result of reduced transport costs.
- **WEB3 Output Change in Imperfectly Competitive Markets (Imperfect Competition)** – measures the efficiency benefits to firms from reduced transport costs, where those benefits are not passed on to customers due to lack of competition.
- **WEB4 Increased Labour Supply** – estimates the additional tax revenue arising from increased supply of new workers, existing employees working longer hours and workers relocating to more productive jobs as a result of improvements of time savings from a transport project.

Each of the WEBs components have been estimated for the project and calculated for the 40 year project period (i.e. 2013 to 2052). Table 8-3 summarises the WEBs associated with provision of P-Wk.

Table 8-3: Summary of WEBs

WEB	P-Wk ($m NPV)
WEB1 Agglomeration[36]	Included in conventional benefits
WEB2Increased Competition	[redacted]
WEB3 Imperfect Competition	[redacted]
WEB4 Labour Supply Impacts	[redacted]
TOTAL WEB	[redacted]

[34]The EEM methodology addresses agglomeration impacts only.
[35]Cluster Jobs: A group of similar places of employment or jobs close together.
[36]Guidance from Transport Agency based on future changes to the EEM guidance.

8.5 Sensitivity Analysis

In some instances, it might be appropriate to consider effects of various discount rates and/or evaluation periods on the economic viability of the project. Discount rates are usually based on current financial interest rates. Transport Agency have provided guidance for the RoNS programme outlining a discount rate of 6% and an evaluation period of 40 years.

When picking a discount rate, the source of the funding for the project must be taken into account. The current EEM recommends sensitivity tests should be done varying the discount rate used to assess the benefits and costs. Discount rates of 6% (standard value as recommended by the Transport Agency), 4% and 8% have been tested.

Table 8-4: Discount rate sensitivity testing

BCR for discount rate sensitivies			
	4%	**6%**	**8%**
P-Wk (Excluding WEB's)	1.42	1.02	0.75
P-Wk (Including WEB's)	1.52	1.11	0.81

The EEM recommends sensitivity testing based around the timeframe in which a project is delivered. This has not been carried out due to the fact that construction has been assumed in the shortest possible timeframe for construction. It is not considered appropriate to test any further scenarios whereby construction completion is brought forward.

As mentioned above, the assumptions in the analysis related to the Hill Street intersection works are conservative and the benefits of P-Wk are likely to have been understated (with a resulting understatement of the BCR).

PART B – Commercial Analysis

Overview of Part B

This Part B sets out the commercial case for the preferred delivery model for the procurement of P-Wk. It is arranged into the following sections:

- A procurement options analysis summarising the qualitative assessment of the preferred delivery model from among the Agency's traditional procurement options and the qualitative assessment of the appropriateness of the PPP model for P-Wk.
- A summary of the assumptions used in the quantitative financial analysis of the PPP option, with a focus on the development of the Public Sector Comparator.
- The results of the quantitative assessment of the P-Wk PPP option.
- A summary of the commercial analysis and the recommended procurement option for P-Wk, with an assessment of the further value opportunities, strategic considerations, risks and potential mitigations related to a PPP.

9 Procurement Options Analysis

The early analysis undertaken during the Scheme Assessment was based on the D&C delivery model under a traditional procurement approach. Subsequent work undertaken to look at the best approach using traditional delivery models, updated to reflect the nature of the consent conditions and the risk characteristics of the project, identified the Competitive Alliance model as the preferred traditional procurement option for construction. The D&C model is not appropriate to the scale and ground condition risk characteristics of the project.

The Competitive Alliance model with subsequent operation and maintenance contracts are used in this Business Case for Implementation as the traditional procurement comparison to the PPP delivery option.

The qualitative assessment suggests that PPP is also a viable procurement option for P-Wk. The project exhibits characteristics of scale, complexity, scope for innovation, definable and measurable outcome requirements, and relatively stable risk profile over a long-term operating period that suit PPP procurement. Market sounding suggests that there would be strong bidder interest in a P-Wk PPP.

9.1 Introduction

The HNO Group's Portfolio Procurement Strategy (PoPS) includes a range of procurement delivery models that are each suited to projects of different characteristics. This 'toolbox' enables the Agency to select the right model for the particular job.

The Agency has also added a new model to its toolbox through the TGP process. Public Private Partnerships (PPPs) are a form of advanced procurement along with Alliances and large Design and Construct (D&C) contracts. PPPs introduce a whole-of-life focus and financing disciplines to the Agency's procurement toolkit.

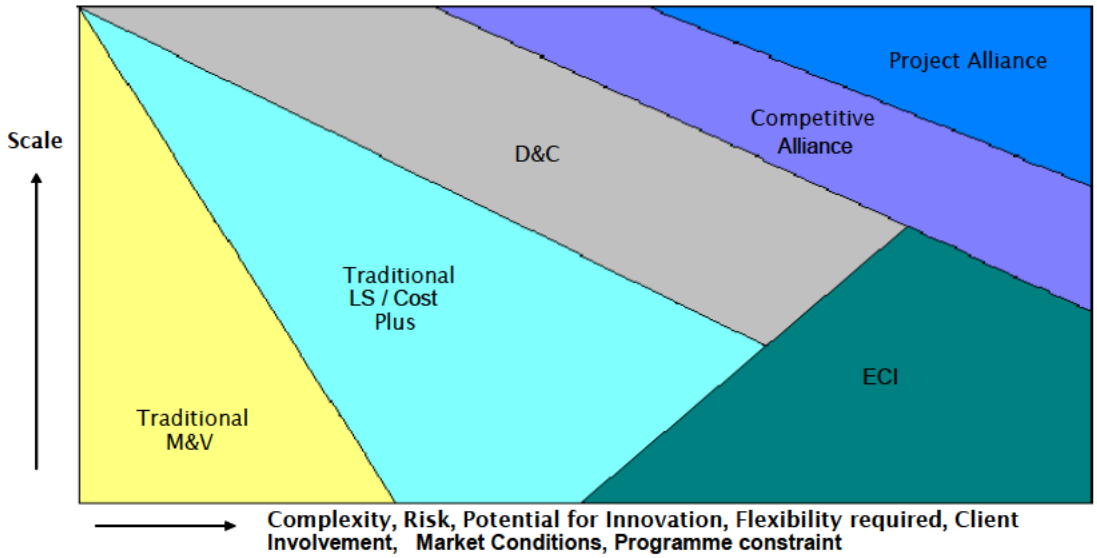
This section 9 contains a qualitative analysis of procurement options. This is followed in sections 10 and 11 with a quantitative analysis of a PPP procurement for P-Wk.

This section presents:

- The selection of the traditional procurement option;
- Background descriptions of the Competitive Alliance and PPP models;
- A discussion of PPP as a procurement option for P-Wk;
- An introduction to the Lessons Learnt from the TGP procurement process.

9.2 Assessment of Traditional Procurement Options

An assessment of the Agency's traditional (ie, non-PPP) procurement options was carried out. The assessment assessed each of the traditional delivery model options used by the Transport Agency against the key inherent project characteristics. Each delivery model is recognised as having its own strengths and weaknesses, and these were matched, with empirical evidence used, to select the one most appropriate to this project. The following diagram illustrates how the different traditional procurement options are suited to different project characteristics.



The delivery model selection matrix (traditional procurement options) developed for P-Wk is provided in Appendix D.

Of the traditional procurement and delivery models only the D&C and Alliance models were considered viable options for the design and construction of a major project such as P-Wk. A Competitive Alliance was the preferred option for P-Wk for the following reasons:

- **Scale:** The project is of a significant scale by Transport Agency and New Zealand roading project standards. To date the Transport Agency has only used Alliances and the TG PPP for projects in this estimated cost range. Whilst a D&C delivery model is feasible for a project of this scale, it is untested and can place too great an emphasis on capital cost minimisation at the risk of compromising the best whole-of-life outcome. A D&C delivery model would need work to ensure the conditions of contract are sufficiently robust for a project of this scale, and in particular to guard against the risk of contract variations leading to higher outturn cost.

- **Scope of Innovation and Efficiency:** The consenting approach to the P-Wk project, with minimal conditions imposed through the Board of Inquiry, readily provides for an open and robust assessment of design options. A Competitive Alliance allows for these options to be well tested in the procurement process, as well as continued efficiencies to be identified through the delivery phase, with the benefits from this shared under the Alliance commercial model. Similarly the difficult allocation of risk from the challenging geotechnical conditions can be handled by an Alliance under the shared risk approach. Whilst in general terms a D&C approach allocates geotechnical risk to the Contractor, this model exposes the Agency to contract claims for unforeseen site conditions. Furthermore, to get the most value from the flexible consent conditions it is preferable to avoid pre-specifying in detail the requirements of the project in the Principal's Requirements (PRs), as would need to be done in a D&C procurement. Additionally, if the PRs were not clearly defined up front there would be a risk of client-initiated scope changes post contract award if the Agency was not happy with the design as tendered.

- **Flexibility:** A Competitive Alliance allows some flexibility for construction activities to be planned around the availability of property, providing some mitigation against the risk of delay if a compulsory acquisition process was required.

- **Stakeholder and Environment Interests:** A number of good stakeholder relationships have been built up by the P-Wk Planning Alliance team to date, and there are a number of environmental sensitivities along the route. An Alliance delivery model readily provides for these characteristics to be incorporated into the commercial agreement, and allows the Transport Agency the ability to influence good stakeholder and environmental outcomes through delivery. By comparison this can also be achieved through a D&C delivery model, but requires a high level of contract specification to ensure the contractor exhibits the right behaviours on stakeholder and environmental issues, which introduces some inflexibility in delivery and potentially undermines the innovation and efficiency benefits available to the project.

- **Risk sharing:** The Competitive Alliance delivery model allows for good value for money testing of a range of design solutions while also limiting the market's exposure to risk in a way that ensures they are motivated to mitigate them while not exposing the Agency to added risk price premiums. While total actual risk in the project remains unchanged by the delivery model, under a Competitive Alliance the Agency may avoid additional pricing for risk that the market finds difficult to accurately assess due to uncertainty.

On balance a Competitive Alliance is considered the best of the traditional delivery model options for the design and construction of P-Wk:

- It is suitable for a large-scale project;
- It allows exploration of design options and innovation;
- It provides flexibility to manage uncertainty;
- It provides a well-aligned framework to manage and deliver on stakeholder and environmental interests.

Competitive Alliance serves as the best comparator for assessing a PPP, and has been used in developing a PSC for the project. The operating phase comparators are a series of consecutive operating and maintenance contracts, which would typically be retendered on a 7-10 year basis.

9.3 Description of the Alliance delivery model

Several of the features of the Alliance model are stated in the discussion of its suitability to P-Wk above. However, it is also useful to provide a description of the commercial model as background for the reader.

Under the Competitive Alliance model, consortia of design and construction providers would compete for the contract to deliver the road. The consortia would each offer a Total Outturn Cost (TOC) as part of their bids along with their quality offering. The Transport Agency would select a consortium based on both its TOC and quality offering, with the selection criteria balancing price and quality. The Agency would then enter TOC negotiations with the selected consortium. Once the TOC is agreed the consortium and the Agency would form an Alliance in which the Agency is an active partner working in collaboration with the consortium members.

In keeping with the partnering approach, any savings against the TOC ('gains') are shared between the Agency and the other partners, as are any cost overruns ('pain'). The pain/gain share model combined with a collaborative working approach is designed to incentivise a trusting and innovation culture.

The Transport Agency's experience is that this makes the model well suited to large and complex projects, particularly where there is a lot of risk or potential for change at the outset.

Recent examples of where the Agency has used the Competitive Alliance model are:

- The Newmarket Viaduct replacement project in Auckland, which had significant engineering and traffic management risk related to the deconstruction of the old viaduct and construction of the new viaduct while maintaining live traffic running on one of the busiest and most strategically vital sections of the New Zealand road network, which runs above the busy inner-city suburb of Newmarket;

- The Waterview Connection project, which involves building two 2.4km tunnels as part of the Western Ring Route motorway project in Auckland. This is the largest road tunnelling project ever undertaken in New Zealand and represents the first of its kind for New Zealand, with attendant risks and benefits of a collaborative approach.

For the avoidance of confusion, although commercially there is a clear distinction between the D&C procurement and contracting model and the Competitive Alliance model, an Alliance for a transport project as discussed in this business case would entail design and construction activities.

9.4 Description of a PPP delivery model

It is also useful to provide a brief background description of the main defining elements of the PPP delivery model.

A PPP for P-Wk would have the following high-level features:

- It would involve an entity contracting with the Transport Agency to **design, construct, finance, operate and maintain** P-Wk. All of these activities would be bundled into and governed by a single contract. The entity (the 'contractor') would be a Special Purpose Vehicle formed for the project by a group of investors (equity sponsors). This investor group would have responsibility for sourcing and managing debt financing and for sub-contracting and managing the full suite of required design, construction, operations and maintenance services.

- The term of the contract would be for the construction period plus a long operating period, likely to be 25 years to match the lifecycle of the road. This enables a **whole-of-life focus** that appropriately considers the interactions and trade-offs between the construction and O&M phases.

- Construction, operating and financing risk would be transferred from the Transport Agency to the contractor where it makes commercial and financial sense to do so. The starting premise would be that **risk is allocated to the party best placed to manage it**. In a PPP context this typically means a greater allocation of risk to the contractor compared to traditional delivery models. It is important to note that a PPP seeks best risk transfer, not necessarily maximum risk transfer.

- The specific risk allocation and detailed contractual framework allow for **a fixed price contract** for delivery of the outcomes.

- The Transport Agency would specify its requirements for a P-Wk PPP in terms of the outcomes it wants to achieve from the road, not in terms of inputs or outputs. This **outcomes-focus** would provide the contractor with flexibility and opportunity to innovate and make value-for-money choices and trade-offs without being overly constrained in the way it must construct, operate and maintain the road. The PPP outcomes approach is well aligned with the Agency's investment outcomes approach.

- Specifying requirements in terms of outcomes also provides a basis for **a performance based mechanism** for determining payments to be made to the contractor. A single periodic payment (e.g. quarterly) would be made to the contractor over the operating term of the PPP contract (i.e. the payments only commence once the asset is commissioned and operating). This payment would incorporate repayment of the financing of the asset and operating costs. This allows a portion of capital and operating payments to be at risk, linked to actual operational performance, throughout the term of the contract.

- The introduction of financing means the **timing of funding under a PPP contract is significantly different** to that of a traditional procurement approach (a competitive alliance followed by a series of O&M contracts).

At the core of the PPP's contractual incentive structure is the performance regime which would be designed on the principle that the Transport Agency would only pay for service delivered. Service delivered would be judged against a range of standards and outcome-focussed performance measures. These standards would be related to the Transport Agency's outcomes for P-Wk, such as the availability of the road for safe and timely customer journeys[37]. The payment would be reduced (abated) where the services delivered are below the required performance standards. This incentivises the contractor to deliver services in accordance with the Transport Agency's desired outcomes. P-Wk would have the benefit of the performance regime from TGP having already been tested and socialised with the market and a final position successfully reached and taken to contractual and financial close. This precedent, appropriately modified to suit the outcomes sought for P-Wk, would be used as the basis for the P-Wk performance regime.

The whole-of-life focus is driven by the performance standards and incentives built into the performance regime. Although the performance regime is (for the most part) applied during the operating period its effects are felt throughout the whole life of the PPP, starting from the bidding and design phase. The design and construction will have to take into account their impact on the operation of the road and the ability to satisfy the performance regime over the operating period. The PPP project sponsors and financiers will scrutinise the design, construction and operation plans for the road to ensure that these are optimised to work together to manage and mitigate financial exposure to the performance standards. In this way the performance regime sits at the heart of the whole-of-life delivery of the Agency's desired investment outcomes under a PPP.

Figure 9-1 gives an illustrative example of the differences in the project cash flows for the Transport Agency between procurement under the traditional procurement approach (represented by the PSC) and a PPP (represented by the PBM).

[37] Under this 'availability regime' the Contractor takes only limited demand or revenue risk, related to the volume of road usage. At the other end of the demand risk spectrum are full toll revenue models. While P-Wk may be tolled it is unlikely to be viable as a fully cost-recovering toll road.

[redacted]

In simple terms, the main difference is that under traditional procurement most of the payments are made 'up-front' during the construction period with only relatively small ongoing payments for operations and maintenance costs, whereas under a PPP the payments are spread over time and only start once the road is open to customers.

Because the PPP payments stretch into the future their actual value, considering the time value of money, declines over time. To illustrate this, the following figure shows the same cash flows but presented in their indicative present values.

[redacted]

9.5 PPP as a Procurement Option for P-Wk

A qualitative assessment was undertaken of the appropriateness of P-Wk as a candidate for PPP procurement. The analysis found that the following features of P-Wk are consistent with the attributes for a PPP project and that P-Wk could be a viable candidate for delivery via a PPP model:

- **P-Wk is of significant scale.** The project has a base construction and operation cost (without including escalation, risk and financing) of more than [redacted]. This is a large project in the NZ PPP market, being at least twice the size in spend terms of the two most recent non-roading PPPs. The project is expected to be attractive to a range of potential private sector participants and it will absorb the relatively high transaction costs of a PPP transaction. Market sounding suggests that a PPP approach is likely to increase the range of private sector participants interested in the project and active in New Zealand, as was experienced on TGP, including a significant amount of international interest.

- Material **risks inherent in P-Wk can be adequately defined and allocated appropriately** between the Transport Agency and the private sector contractor (e.g. ground conditions, once further geotechnical investigations have been carried out). P-Wk would benefit from the testing of the risk identification and allocation process that has taken place as part of the negotiation of the TGP Project Agreement, for example in relation to insurance and safety and travel time performance. A high-level risk allocation is provided in Appendix G.

- There is **scope for innovation**, particularly given features such as a large earthmoving component, deep terrain and challenging geotechnical conditions, as well as opportunity to reduce the construction timeframe and minimise structures taking advantage of the flexibility provided by the wide designation and non-prescriptive consent conditions. The consents for P-Wk are designed to provide maximum flexibility for innovation. For example, the designation is on average around 350 metres wide providing significant scope for alignment optimisation, the consent conditions do not specify the nature of the majority of the structures, there is no Condition One constraint (this is the need to be “In general accordance with” a set of pre-defined plans), etc. This scope for innovation plays well to the strengths of a PPP, particularly the focus in a PPP on ensuring innovative ideas appropriately consider their impact throughout the project lifecycle.

- It is **feasible to express and quantify the outcomes** the Transport Agency requires from P-Wk so they can be incorporated into a mechanism for measuring the performance of the private sector contractor and setting the amounts it is paid for delivering the services. TGP has demonstrated and achieved market acceptance of the outcomes focussed approach, with KPIs set against the Transport Agency’s required outcomes and associated financial abatements for non-performance. P-Wk would be able to leverage this precedent and build on it to suit the outcomes sought for P-Wk

- It is **feasible to bundle the on-going management and maintenance with the construction and financing** into a long term (25 year) contract. This is also specific to a road of this type and follows from the TGP precedent.

On the basis of this qualitative procurement options analysis above, a quantitative financial analysis of the viability of a PPP procurement for P-Wk has been carried out. Sections 10 and 11 of this Business Case for Implementation present the assumptions and results of that analysis. A summary of the commercial value for money proposition is then presented in section 12.

9.6 Lessons Learnt from the TGP Procurement

Following the successful completion of the TGP procurement the Transport Agency commissioned KPMG to carry out a lessons learnt review and to prepare a lessons learnt report. The purpose of this exercise was to gather perspectives from a wide range of participants in the process, both public and private sector, and to help inform and improve future PPP processes.

The lessons learnt report has been shared with stakeholders internally and with key participants externally (including NZ Treasury, Ministry of Transport and market participants). The lessons are incorporated into much of the analysis in this Business Case. Section 12.4 provides a summary and further detail.

10 Developing the Public Sector Comparator

The quantitative financial assessment of the project has involved developing a Public Sector Comparator (PSC) to calculate the whole-of-life cost of the project if the Transport Agency were to design, construct, finance, operate and maintain the project over a 25 year operations period using traditional procurement (Competitive Alliance and O&M contracts). The PSC includes a risk adjustment to allow for those risks that are likely to be transferred to the private sector partner under a PPP contract.

The PSC provides the benchmark against which the anticipated PPP cost must be measured. It also provides a basis for establishing the affordability envelope for the project. It is presented as a Net Present Cost to enable the comparison.

[redacted]

10.1 Purpose of this Section

The risk-adjusted whole-of-life cost of P-Wk using traditional procurement is presented as the Public Sector Comparator (PSC). The purpose of the PSC is to provide a comparator for the estimated cost of the project under a PPP procurement model (which is presented as the Proxy Bid Model (PBM), discussed in section 11). This comparison is used to examine whether a private sector PPP bid could be expected, through construction and operating cost efficiencies and different risk management practices, to equal or better the risk-adjusted whole-of-life cost to the Agency of traditional procurement.

The calculation of the PSC uses a different methodology to the traditional Transport Agency scheme estimate. For example, the PSC includes allowances for inflation and is a net present cost (NPC) number, whereas the Transport Agency scheme estimate is a real number (excludes inflation and discounting). The PSC is not directly comparable to the scheme estimate. A reconciliation of the PSC and the Transport Agency scheme estimate is included in Appendix F along with an explanation of the differences.

This section presents:

- A brief background to the consenting strategy for P-Wk and the implications of this for the cost estimation process;
- An overview of the PSC, including its purpose, benefits and practical application;
- A summary of the build-up of the PSC, including the capital expenditure and O&M assumptions and the transferred risk analysis;
- A summary of the discount rate used in the analysis.

The results of the financial analysis and the PBM comparison are then presented in section 11.

10.2 Background to the P-Wk consenting strategy

The Transport Agency began the consenting process for P-Wk in April 2012. The Agency created a Planning Alliance, known as the Further North Alliance (FNA), made up of three professional services firms and the Agency, to manage the process. The Alliance's objectives were to achieve consents that could support best outcomes for the project and to provide value for money for the Agency in the consenting process. Consents were successfully achieved in September 2014 following a Board of Inquiry process.

The consenting strategy aimed to achieve consent conditions that would enable the highest level of flexibility for design and construction of the motorway so as to support innovation and value for money in delivery. Furthermore, the strategy identified that detailed geotechnical analysis and specimen design was not a requirement for achieving consents.

The Alliance successfully attained a set of consent conditions that enable a degree of flexibility not seen on a New Zealand roading project in recent times. This flexibility both enables and encourages innovation in the delivery of the project outcomes, including by allowing broad scope for alignment optimisation, freedom of structural solutions, and reduced constraints to earthworks activities. Furthermore, the consents are written with an outcomes focus rather than specifying inputs or outputs. This was a deliberate aim of the Agency's consenting team to align the consents with an outcomes-focussed procurement and to prepare in case the road was procured as a PPP.

The designation and consenting situation for P-Wk is significantly different to that on the Transmission Gully PPP project. TGP faced a narrow designation and challenging consent conditions, particularly in relation to erosion and sediment control and open-area restrictions during earth works. TGP was not consented with PPP in mind. However, TGP also had a well-developed specimen design.

[redacted]

[38] Estimates of the cost of a full specimen design are in the order of [redacted] and would take 4-6 months to complete.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

10.3 Definition and purpose of the PSC

The PSC is an estimate of the risk adjusted cost of P-Wk if it were to be designed, built, financed and operated by Transport Agency using traditional procurement methods. It has been developed taking into account:

- The outcomes required from the project;
- The risks that would be retained by the Transport Agency under traditional procurement but which would be transferred to the private sector under a PPP.

In this case the PSC represents the risk-adjusted assessment of the cost of procuring P-Wk via a Competitive Alliance (for construction) and subsequent operation and maintenance contracts.

The PSC has been used as a basis for the development of the PBM, which represents the cost to the Transport Agency of P-Wk if it were procured through a PPP (see section 11).

The purpose of the PSC is to provide a benchmark for the quantitative financial assessment of the likely value-for-money of a PPP. The value-for-money test is whether a PPP procurement is likely to be delivered at the same or less cost as the comparator procurement model. This test is assessed through a comparison of the PBM against the PSC.

The PSC does not include the risks that would be retained by the Agency, as these are the same in either the comparator or PPP procurement models and so do not need to be considered in the comparison. The PSC also does not include other Agency costs common to all procurement models such as property purchase costs. The additional management costs of a PPP are included in the PBM.

If a decision is taken to procure P-Wk through a PPP, the PSC will be used as an input to determining the "affordability threshold". The affordability threshold would be disclosed to respondents to the P-Wk RFP as the amount the Agency is prepared to pay for delivery of P-Wk via a PPP.

10.4 PSC as a range

A critical part of the PSC process is the assessment and valuation of project risk. Because a PPP is a fixed price contract there is a particular focus on risk assessment and valuation. The Transport Agency's PoPS requires a risk assessment for all projects and reporting against a distribution of expected risk outcomes. The approach taken for PPP assessment is consistent with this PoPS requirement.

[redacted]

10.5 Build-up of the PSC

The P-Wk PSC is summarised in the following table:

Table 10-1: PSC summary [redacted]

	$m (NPC)	$m (nominal)
Operating costs	[redacted]	[redacted]
Construction costs	[redacted]	[redacted]
Raw PSC	[redacted]	[redacted]
Transferred risk and pricing uncertainties [redacted]	[redacted]	[redacted]
Total PSC	[redacted]	[redacted]

The PSC is comprised of three components:

- The "raw PSC" based on the "Reference Project".

  The Reference Project provides a baseline costing assuming P-Wk is built and operated by the Transport Agency using a Competitive Alliance followed by a series of O&M contracts. This includes all capital costs (the base estimate) and operating costs associated with designing, building, maintaining and operating P-Wk over the same period as the assumed term of the PPP and to performance standards consistent with the outcomes under a PPP and excludes risk events and contingency. The timing of cash flows included in the PSC calculation reflects when the cash flows are incurred by the Transport Agency (under traditional procurement the bulk of payments are made up-front during the construction period, with relatively small ongoing payments for operation and maintenance costs during the operating life of the project).

- Pricing and quantity (P&Q) uncertainties

  A probability distribution around the base estimate is produced to recognise that the prices and quantities used for the base estimate are subject to uncertainty. This replaces the contingency component of the scheme estimate.

- Transferred risk

  One of the important features of a PPP is the transfer of certain risks to the contractor. Risks that the contractor would have to manage would include such things as completing the building of P-Wk within the cost estimate, achieving the required operational quality requirements etc. The value of transferred risks is included in the PSC to allow a like-with-like comparison with the PBM. Retained risk is the same under both scenarios so does not need to be considered in the analysis.

These three components are each discussed in more detail below. [redacted]

The following figure summarises the components of the PSC.

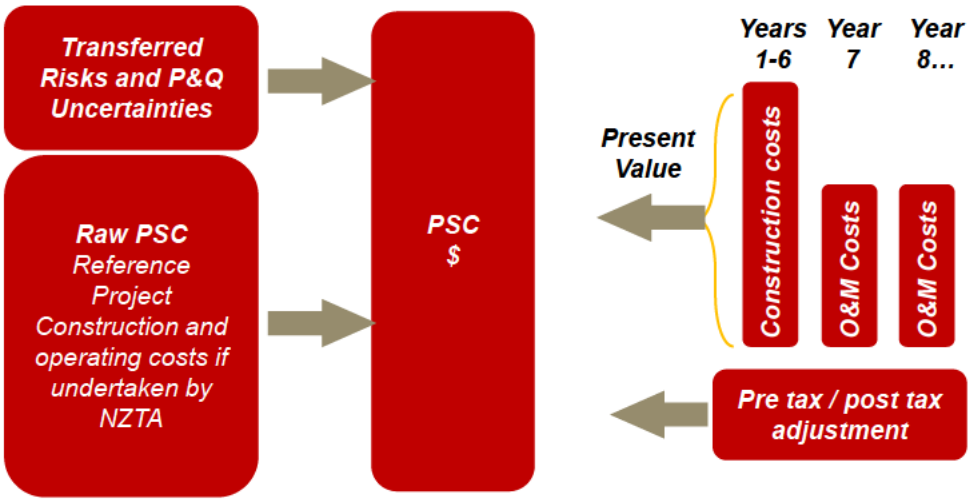


Figure10-1: PSC components

The following lessons were learnt from the TGP process regarding the construction phase component of the raw PSC:

- The PSC must reflect the design requirements that bidders would be required to meet. These include minimum requirements such as the RoNS standards, with design speed dispensations allowed on selected horizontal and vertical curves where appropriate.

- [redacted] As mentioned above, currently for P-Wk there is a low level of available geotechnical data and this uncertainty is reflected in the current PSC range and a strategy is in place to reduce this uncertainty.

- The particularly onerous consent conditions on TGP, especially the In General Accordance condition and open earth restrictions, imposed cost that may not have been fully priced into the PSC. The lessons learnt in relation to the In General Accordance condition were incorporated into the consenting strategy for P-Wk. As a result, there is no In General Accordance condition in the P-Wk consents and the open earth restrictions are significantly less burdensome. This TGP issue does not apply to the PSC for P-Wk.

These issues have either been mitigated for P-Wk or a strategy is in place to manage them within the PSC and RFP processes.

10.5.1 Raw PSC: Construction phase assumptions

The construction phase component of the PSC assumes traditional procurement using a Competitive Alliance under which the Alliance would carry out the design and construction activities to deliver the road.

The PSC development has considered whether any difference needs to be allowed in the build-up for an Alliance-based PSC as compared to a D&C contract-based PSC[39]. This has focussed on the treatment of risk in an Alliance and considering the competitive process under which both D&C and Alliance procurements are bid. Given this competitive tension, allowing that the TOC bid would be risk-adjusted in any case similarly to a competitive D&C bid [redacted] the overall risk-adjusted outturn cost to the Agency is expected to be the same as it would be for a D&C contract. On this basis, no particular change is needed to the PSC build-up for an Alliance model.

For the avoidance of doubt, **any reference to D&C in the discussion that follows is to the design and construct activities delivered under a Competitive Alliance** and not to a D&C contract.

The design and associated construction costs for P-Wk are based on the most recent scheme estimate and programme for the project completed in mid-2014 and have been updated to reflect the consent conditions.

The scheme estimate was prepared in accordance with Transport Agency's Cost Estimating Manual (SM014). The cost estimate reflects the RoNS standards with some design speed dispensations applied (see section 7.2).

The changes in cost resulting from the consent conditions were assessed in a workshop in October 2014 to inform the subsequent cost revision. This process involved the cost estimators in a conditions review workshop with the planning Alliance. Further advice and materials were provided by the Alliance's planning experts.

The main changes resulting from the consent conditions that have cost implications are:

- The addition of an interchange with south-facing ramps at Pūhoi;
- Additional landscape and urban design requirements;
- Additional traffic management requirements in and around Warkworth (e.g. Hill Street);
- Conditions to protect against the spread or introduction of Kauri dieback;
- Additional requirements for monitoring by Iwi;
- Additional dust mitigation measures for neighbouring house owners.

The remaining consent conditions had relatively minor cost impacts which are included in aggregate in the revised cost estimate. The net change to the base cost estimate for the final consent conditions was approximately [redacted]

The table below summarises the key features of the construction phase assumptions used in the PSC:

[39] The PSC for TGP was based on a D&C contracting model.

Table 10-2: Construction phase assumptions in the raw PSC (excl. risks and uncertainties)

Category	Value
Construction start (Financial Close)	[redacted]
Construction completion	[redacted]
Construction duration	[redacted]
Total construction cost included in the PSC (excl land purchases and contingency, real as at Q2 2014)	[redacted]
Escalation on construction cost	[redacted]
Total escalated construction cost	[redacted]

The total escalated construction cost excludes risk events and contingencies associated with cost and quantity estimates. Risk events and contingencies have been excluded from the base project estimate as the risk allowance (incorporating transferred risk and P&Q uncertainties) is added as a separate, specific adjustment to the PSC (see section 10.5.3).

Appendix A contains a breakdown of the total construction costs ([redacted] million) by individual cost category. Appendix F provides a reconciliation of the total construction costs to the project base estimate included in the PSC.

The construction cost estimate was prepared by Bond Construction Management Ltd. SKM[40] (in its role as a participant in the Further North Alliance) undertook a peer review of certain technical aspects of the estimate.

Although there is no detailed design for P-Wk, the construction cost estimate was developed on a bottom up basis based on the project requirements and design standards. Detailed assessments were made of quantities/volumes for individual inputs. For example, detailed estimates were made of the volume of earth/fill to be moved throughout the length of the road and over the term of the construction period, based on the quantities modelling carried out for the assessment of the indicative alignment; the number of bridges, their form and dimensions were determined allowing deck areas, pile depths and other cost drivers to be quantified; the amount of asphalt required for the pavement was estimated etc.

The schedule of quantities was developed using the Scheme Assessment Report and the scope of works in the analysis and modelling submitted to the BOI during the consenting process as guidance for design parameters. The specifications were guided by the RoNS standards.

A schedule of rates and prices for individual construction inputs was prepared. This was based on current market information on input costs and benchmarked to pricing in recent Transport Agency contracts. The prices were applied on an input by input basis to facilitate the bottom up costing.

Point estimates were produced for the individual input quantities and prices/rates to enable the development of a single construction cost number. However, the point estimates were subject to varying levels of certainty (or uncertainty). Bond Construction Management Limited produced uncertainty ranges for each of the individual quantities and prices/rates. These were generally expressed as "plus and minus" confidence ranges around the point estimates (for example the uncertainty range for fill being expressed as plus or minus [redacted] around the point estimate volume).

[40] Now Jacobs.

The uncertainty ranges were used as an input to developing the construction cost risk and uncertainty range, as presented in **Error! Reference source not found.**.

10.5.2 Raw PSC: Operation phase assumptions

A base Operations and Maintenance (O&M) cost estimate has been developed for P-Wk. These costs are for a 25 year operations period and include lifecycle maintenance costs. The O&M costs are subject to similar degrees of uncertainty as the construction costs but the effect of O&M uncertainty on the PSC is significantly smaller due to the discounting effect over long time period across which the O&M costs are incurred.

The base O&M cost estimate was developed from a bottom-up assessment of the expected cost of providing O&M to the indicative design of the P-Wk section. The O&M comparator is that the Agency contracts for O&M services for P-Wk as part of the Auckland Motorway Alliance (AMA) contract. The AMA provides services up to the Northern end of the existing motorway at Pūhoi. The addition of P-Wk would simply expand the existing network North from Pūhoi by 18.5km and the range of the AMA's coverage would expand accordingly. This means that the AMA's activities are the correct business as usual comparator to be used in the PSC.

The negotiations for the renewal of the AMA contract have been ongoing recently and this has enabled the PSC to be based on the most up to date cost information available. The O&M estimate for P-Wk has been benchmarked against the historical costs of the AMA services and against the cost information discussed during the recent negotiations.

The TGP process revealed useful and relevant information about the way the PPP bidders priced the O&M services. [redacted] There are three likely reasons for this difference between the Agency's comparator costs and observed costs in PPP bids:

- **Whole-of-life factors** reflected in trade-offs between D&C and O&M costs to optimise the present value of costs. Specifically, the Agency's technical assessment of the TGP bids suggests that PPP bidders shifted cost from the D&C component to the O&M component.
- **Inefficiencies in operating a small, stand-alone network.** An O&M contract for a relatively small length of road will not enjoy the scale economies that the Transport Agency can achieve across its network via large-area contracts such as the AMA or the Agency's regional Network Outcomes Contracts.
- **A higher performance standard** under the TGP PPP than was assessed in the PSC. The TGP bid O&M costs will have reflected a "market view" of the cost of achieving the Transport Agency's required outcomes from the road at the required levels of service.

The first two bullet points above are specific to a PPP and not to the Agency's comparator model. These two elements are not relevant to and are not included in the PSC estimate. They are included in the PBM (see section 11.3).

The third bullet above is important for the PSC. That is, the PSC should incorporate costs that that the Transport Agency would need to incur to deliver the same outcomes and levels of service that it would require from the private sector if the road was to be delivered as a PPP.

As with any new addition to the network, the Agency will need to decide on the level of service (ie, quality) that it expects on P-Wk. This level of service should be commensurate with the value of the road to users, which implicitly reflects the cost to users if the road is unavailable or

the quality of service drops. These pre-specified service outcomes would be required through the performance regime in a PPP.

In principle, the Agency would consider the following in setting a level of service on P-Wk:

- Consistency with the service provided on neighbouring roads, in this case the adjoining NGTR immediately to the South (the section of road to the north of P-Wk is not currently of motorway standard and is not a relevant comparator).
- Other elements of user value that might be specific to the P-Wk section, for example if there were particularly important interchanges or interactions with local roads or if there were specific high-value user patterns (such as peak periods particular to local travel movements) that needed to be safeguarded by a dedicated service offering.
- Safety outcomes that the Agency desires toward implementing the Safe System approach.

There are unlikely to be any specific elements of the P-Wk section that require a dedicated service level that is very different from the NGTR section. P-Wk is relatively simple operationally (for example, it does not have a mid-section interchange) and travel pattern characteristics are likely to be shared with NGTR.

On the assumption that the O&M outcomes currently provided on NGTR are appropriate to the characteristics of that road, and given that P-Wk would share those characteristics, it is reasonable to use a consistent level of O&M outcomes as per NGTR for the PSC cost estimate for P-Wk. This is the approach that has been taken.

An availability-based P-Wk PPP would likely require night working to minimise interruption to users due to maintenance activities. However, as night working is standard for the AMA no additional cost (to the extent that night work does impose added cost) needs to be included in the PSC and no adjustment has been made for this.

The build-up of the operating and lifecycle maintenance costs is illustrated in the following figure. The large periodic costs for lifecycle maintenance are pavement rehabilitations and renewals.

[redacted]

[redacted]

10.5.3 Risk Transfer

Constructing and operating P-Wk will involve a range of risks such as unforeseen ground conditions, delays, cost overruns and so on. These risks are not captured in the construction or operating costs for the base estimate in the PSC. These risks may or may not crystallise into actual costs.

Under PPP procurement the risks will be allocated between the Transport Agency and the private sector contractor depending on which party is best able to effectively manage the potential for the risk to occur and best able to mitigate the cost if it does occur. This requires an optimal rather than maximum transfer of risk.

Neither the Transport Agency nor the private sector contractor will be best placed to manage all of the risks. However, all things being equal, the intent under a PPP is to pass as much responsibility as possible to the private sector contractor to manage construction and operation of P-Wk.

A greater level of project risk would be retained by the Transport Agency under traditional procurement than under PPP. The price certainty offered by a PPP is one of the benefits of the model. However, transferring risk to the private sector contractor will come at a cost. The price the contractor will charge to deliver P-Wk will include some allowance for the risks it is required to manage. The risk quantification exercise is an attempt to identify and quantify the material project risks.

The transferred risks are added to the PBM and also the PSC for comparative purposes. Retained risk is the same under both scenarios so does not need to be considered in the analysis.

Where a risk is classified as a “Transferred Risk”, the contractor should be given a substantial degree of flexibility to determine the best method of controlling the costs associated with that risk. This creates an incentive for the contractor to manage the risk in the overall interests of P-Wk, while delivering value-for-money to the Transport Agency. An efficient allocation of risks will allow the Transport Agency to obtain greatest value-for-money by harnessing the respective skills of all parties. If too much risk or the wrong risks are transferred to the contractor, the Transport Agency may pay more than if they were retained, as the private sector may require a risk premium over and above the estimated cost of Transport Agency retaining the risk.

Appendix G contains an outline of the allocation of risks between the Transport Agency and the PPP contractor that would typically be incorporated into the PPP project agreement. This is based on the TGP risk allocation with change to reflect lessons learnt from the TGP process.

10.5.3.1 Transferred Risk and P&Q Uncertainty Quantification

The PSC and PBM were adjusted to incorporate transferred risk and P&Q uncertainty. Each transferred risk and price and quantity uncertainty was modelled as a distribution, reflecting that each has a range of possible outcomes. The individual risks and uncertainties were modelled together to produce a single distribution around the point estimates for the D&C costs and the operating costs. This enables the PSC and the PBM to be expressed as probability distributions reflecting that the existence of risks and forecasting uncertainty.

Careful consideration was given to ensure that all relevant risks were covered under either the uncertainties matrix or the risk matrix and that there was no double-counting of risks between the two matrices.

A detailed analysis of risks for the project was undertaken. This involved the development of a P-Wk specific PSC transferred risk register. The development of the register was based on input from both engineering (technical) and commercial/financial disciplines. The register was developed in a workshop where:

- Transferred risks were identified;
- The nature of each risk and the potential implications for the project if it were to crystallise were described;
- The probability of occurrence was assessed;
- The financial implication to the project if the risk occurred was quantified. Three levels of impact were assessed: low, medium and high;
- The basis for the financial quantification was described. For example, some costs were related to construction costs or a component of construction costs, some were related to preliminary and general costs (for example a risk causing delay was assumed to result in increased preliminary and general costs).

The risk register resulting from the workshop process was subject to review by the participants and others to confirm its completeness and the reasonableness of the probabilities and financial implications.

The risk register was re-examined and updated through a refinement process in March, May and November 2014. The March update involved a full workshop review. The May and November processes were desktop reviews.

The uncertainty ranges associated with the construction volumes and prices described earlier in this section and the probability of each transferred risk occurring together with their financial impact have been used as inputs into a risk model that simulates potential outcomes. Appendix E contains a description of the risks that were considered and then quantified for inclusion in the PSC.

As discussed in section 10.2.2, the uncertainties and risks will be revisited mid-2015 once the geotechnical investigations are complete. At that time the PSC estimate will be updated to reflect the improved understanding of the project costs and risks.

The table below summarises the overall results of the risk assessment process (including P&Q uncertainties). The table provides a total estimated risk cost (including construction and operating phases) for the [redacted] percentile observation. Pricing at the [redacted] is consistent with the Agency's outturn cost experience over its portfolio of traditional procurement, which is the cost that the Agency faces once variations for risk realised on those contracts are incorporated. The [redacted] is the upper end of the traditional outturn cost range and is considered the appropriate comparison given the fixed price nature of PPP and the strategic benefits that the PPP procurement offers.

Table 10-3: Transferred risk and uncertainty [redacted]

	$m (NPC)	$m (nominal)
Transferred construction risk and P&Q uncertainties	[redacted]	[redacted]
Transferred operating risk	[redacted]	[redacted]
Total transferred risk and P&Q uncertainties	[redacted]	[redacted]

The range of transferred construction cost risk and uncertainty (NPC) is shown in the figure below. The range is relatively wide, illustrating the degree of uncertainty at this stage in the process.

[redacted]

10.5.4 Reconciliation of the PSC to the Scheme Estimate

A reconciliation between the scheme estimate and the PSC is provided in Appendix F. In general, the difference between the scheme estimate and the PSC is a result of the calculation methods used for the PSC, the inclusion of operating costs adjustments and escalation which are not included in the scheme estimate.

10.6 Discount Rates

The cash flows in both the PSC and the PBM are discounted to a present value for the purpose of comparing one to the other. The discount rate previously specified by the Treasury (and used in the TGP PSC) for calculating the present values (net present costs or NPCs) of both the PSC and PBM was 8%.

Discount rates reflect the cost of capital. As such, interest rates are an important input to calculating discount rates. The 8% discount rate specified by the Treasury was not, historically, updated regularly for changes in interest rates. This caused an anomaly when comparing the PSC to the PBM at different points in time as interest rates, and thereby the underlying cost of capital, are continually changing.

The challenge caused by applying a static discount rate with market interest rates in the PPP financing structure that, by definition, are constantly changing was one of the lessons from the TGP process. Additionally, if the discount rate used in the bidding process does not reflect the bidders' cost of capital then this difference can create distortions that drive potentially perverse bidding behaviours.

During TGP the Agency worked closely with Treasury to update the approach to the discount rate to more appropriately reflect the cost of capital. The approach that has been used for this

Business Case for Implementation, and endorsed by the Treasury[41], is to use a discount rate (a weighted average cost of capital) that varies with changes in interest rates. This moderates the impact of changes in interest rates on the net present cost of the PBM.

The updated approach to determining the discount rate now also better reflects the cost of capital required by the PPP market, based on observations across all NZ PPP deals to date (which have in turn been benchmarked and confirmed against the PPP market in Australia and elsewhere internationally).

The parameters used in the build-up of the discount rate for the analysis in section 11 are shown in Table 10-4 below.

Table 10-4: P-Wk discount rate build-up

Risk free rate	Rf	[redacted]
Investor and corporate tax rate	Ti/Tc	[redacted]
Post tax market risk premium	PtMRP	[redacted]
Asset beta general	Ba	[redacted]
Equity beta	Be	[redacted]
Debt as percentage of total funding	D	[redacted]
Cost of debt	Rd	[redacted]
Cost of capital (discount rate)	**WACC**	[redacted]

[41] The Treasury is releasing new guidance on the development of PSCs that includes an approach to determining discount rates consistent with the approach used for this Business Case. Refer to www.treasury.govt.nz/ppp.

11 Financial Analysis Results

The construction and O&M cost inputs in the PSC are used as a basis for developing a Proxy Bid Model (PBM) to estimate the comparator cost of bids for the project as a PPP. This is effectively the Public Sector Comparator (PSC) with the addition of private sector debt and equity finance costs restructured into a PPP long-term payment structure.

The purpose of this quantitative analysis is to test whether it is likely that the gap between the PSC and PBM is bridgeable by PPP bidders through savings in construction and risk costs. These savings would need to be from efficiency or innovation during the design and construction process or brought about by the additional rigour and due diligence present under PPP procurement.

At a [redacted] level for risk and uncertainties, there is a [redacted] difference between the PSC and the PBM. This gap is likely to be fairly stable in the face of revised cost estimates to deal with the geotechnical and design uncertainty.

On the basis of the quantitative financial analysis presented here it appears to be viable that bidders for a PPP for P-Wk could overcome the gap to the PSC and that, in terms of the financial test, a PPP procurement is a viable option for P-Wk.

11.1 Purpose of this Section

Having developed the PSC using the assumptions and risk analysis outlined in the previous section the quantitative financial analysis now involves a comparison of the PSC against an assessment of a likely structure and cost of a PPP.

This section presents:

- A summary of the PSC results;
- A description of how the PPP comparator (the PBM) is built-up including an overview of the tax adjustment applied to the PBM;
- A summary of the PBM results and a comparison of the PBM against the PSC;
- A discussion of potential revenue streams from the project, with a focus on tolling;
- A discussion of the Transport Agency's funding requirement for a PPP;
- An overview of the accounting treatment of a PPP for the Transport Agency.

11.2 PSC Summary Results

The PSC results are presented as cost distributions in order to illustrate the inherent risk ranges. Two of these probability distributions are shown: one giving the results in NPC terms (Figure 11-1) and the other showing the total of the nominal costs over the life (construction + operations period) of the analysis (Figure 11-2). The NPC[43] is the present value of the costs as

[redacted]

The present value of forecast costs.

at 1 July 2016[44]. The nominal costs are the total undiscounted and escalated[45]) costs over the analysis period.

[redacted]

[44] The discount date of 1 July 2016 has been used as it is the anticipated date for financial close (project start).
[45] All costs have been inflated at [redacted] per annum.

A breakdown of the PSC at the [redacted] level for transferred risks and P&Q uncertainties is presented in the following table:

Table 11-1: PSC summary at the [redacted] level

	$m (NPC)	$m (nominal)
Operating costs	[redacted]	[redacted]
Construction costs	[redacted]	[redacted]
Raw PSC	[redacted]	[redacted]
Transferred risk and pricing uncertainties [redacted]	[redacted]	[redacted]
Total PSC	[redacted]	[redacted]

11.3 Build-up of the PBM

The PBM provides an indication of the possible cost of P-Wk if it were to be delivered through a PPP. The role of the PBM is to assist in assessing the viability of a PPP by comparing a simulated PPP cost against the comparator cost of the Agency's traditional procurement option, represented by the PSC.

The PBM is built-up and calculated by adding the following to the PSC:

- **Financing costs**. The financing costs used in the PBM are based on current market costs and financing structures and costs observed from recent New Zealand and Australian market transactions, taking into account the structures observed in the TGP bids;
- **PPP management costs** that the private contractor would incur in managing its operations and its obligations under the PPP contract;
- A cost adjustment to reflect **higher O&M costs** for a PPP contractor.

The PBM is based on the construction and O&M costs from the PSC. Private sector financing parameters are added to the model and tax is calculated. The model is solved to generate a sufficient level of Unitary Payment annually to cover operating and maintenance costs, taxation, debt servicing and provide equity returns to shareholders while maintaining banking covenants.

The O&M costs included in the PBM were increased relative to the PSC to include additional costs that a PPP operator is likely to incur in providing O&M services to a small part of the network but which the public sector would not face due to its O&M scale efficiencies. An uplift of [redacted] was applied to reflect this efficiency disadvantage, which for P-Wk is expected to relate primarily to extra costs of traffic management services and landscaping.

The PBM does not make any assumptions about or include any allowance for potential efficiency gains that might be achieved by the private sector in their PPP bids. The potential for efficiency gains and testing of their impact on the present value of the PBM is necessarily a qualitative assessment and is discussed in section 11.5.

The cost of capital assumptions are based on recently observed market rates and financing costs. The actual financing costs in a PPP transaction would depend on a range of factors at the time of transacting.

11.3.1 Interest rate risk management assumptions

The TGP includes an innovation in the financial risk management for the PPP. Prior to the TGP, government agencies entering PPPs were exposed to changes in base interest rates over the term of the PPP Project Agreement as the PPP contractor refinanced its debt. In TGP this risk is moderated through a long term interest rate swap [redacted]

Under the TGP PPP:

- The PPP contractor will provide interest rate swaps to fix base interest rates for the duration of the construction period and for approximately one year into the operating term of the PPP[46].
- An interest rate swap is used to fix the base interest rates for the Transport Agency from the end of the PPP contractor's swap until the time when the PPP contractor's debt will be repaid.

The PBM has been modelled in such a way as to reflect the end cost to the Transport Agency with the long term swap arrangement in place. The base interest rates used in the PBM build-up are based on a recently observed market interest rate curve and commercial swap pricing assumptions.

11.3.2 Financing inputs

Table 11-2 below summarises the key financing inputs used in the PBM modelling. The financing assumptions have, where ever possible, been based on financing parameters for recent PPPs closed or being transacted in New Zealand.

Table 11-2: PBM financing inputs

Parameter	P-Wk PBM	TGP (for comparison)
Debt gearing, tenor and sizing and equity		
Gearing - senior debt % (max)	[redacted]	[redacted]
Initial term (years)	[redacted]	[redacted]
Senior debt tenor (years)	[redacted]	[redacted]
Minimum annual debt service cover ratio (DSCR)	[redacted]	[redacted]
Target blended equity return (post SPV tax)	[redacted]	[redacted]
Margins & fees:		
Interest margin (construction period, excl swap margin)	[redacted]	[redacted]
Interest margin (operations period, excl swap margin)	[redacted]	[redacted]
Refi fees	[redacted]	[redacted]
Arrangement fees	[redacted]	[redacted]
Commitment fees	[redacted]	[redacted]
Swap rates and margins		
Base interest swap rate #1 at Financial Close (excl swap margin)	[redacted]	[redacted]

[46] The margins on the base interest rates are fixed in the PPP bids.

The interest margins in Table 11-2 (in bold) have been selected from a range of recently observed margins from NZ PPP transactions. [redacted]

[redacted]

- While the current market conditions are very favourable, it is not certain that they would still be as favourable at the points in the P-Wk procurement process (proposal submission and financial close) when the various financing parameters would be set. This suggests a degree of prudence is appropriate.

Some sensitivity analysis on the construction and financing inputs is provided in section 11.5.

Table 11-2 also shows the comparative financial parameters for TGP (extracted from the TGP financial close model). This demonstrates that the P-Wk financial parameters are generally more favourable than the financing achieved for TGP. This reflects a change in market conditions since TGP was procured. The change is due to a number of factors but, in short, banks and other debt providers now have increased liquidity – more cash that they are looking to invest – and fewer investment opportunities. This is advantageous for P-Wk as it means the potential for lower interest margins and more accommodating debt terms.

11.3.3 Post tax/Pre tax Adjustment

One further adjustment has been made to account for the different tax status underlying the PSC and PBM calculations. The PBM reflects that private sector respondents for the PPP contract for P-Wk will be tax payers whereas the PSC does not include any tax cash flows. The tax adjustment assists in ensuring like-for-like assessment between the PSC and private sector PPP proposals by "neutralising" the tax difference.

The unitary charge in the PBM has been calculated to provide the PPP contractor with sufficient cash to:

- Pay interest at pre-tax rates;
- Pay any tax incurred by the SPV;
- Make distributions to equity providers that will allow them to pay any tax they incur on those distributions and provide them with their required post-tax return.

Consequently, the unitary charge will be sufficient to pay all tax on the returns on the capital (debt and equity) provided to finance the construction of the P-Wk asset and any other investment needed during the contract term, and provide the debt and equity investors with their required post-tax rates of return. On the other hand, the PSC cash flows do not include any explicit tax outflow for returns on the capital provided to finance the construction of P-Wk assets. This difference in tax status is one of the reasons why the PSC cash flows are different (lower) than the cash flows that drive the unitary charge calculation in the PBM.

The impact of the difference in tax status has been neutralised to enable a fair comparison between the PSC and the PBM (and the price of private sector proposals). This could be achieved by calculating the present value of the PSC and the unitary charge using a pre-tax discount rate, reflecting that the PSC cash flows and the unitary charge are, in effect, pre-tax cash flows.

However, the discount rate used to calculate the present value of the unitary charge and the PSC cash flows is specified, in the first instance, as a post-tax weighted average cost of capital (WACC). WACC is specified on a post-tax basis because, among other reasons, some of its key parameters can only observed on a post-tax basis. Furthermore, it is not appropriate to simply gross-up the post-tax discount rate using the corporate tax rate (28%) as forecast cash tax in each year is unlikely to be 28% of the pre-tax cash flows (because of timing and permanent tax differences) and the forecast period is finite.

Therefore, the following process needs has been followed to correctly estimate and adjust for the present value of the tax adjustment:

1. Calculate the present value of the PSC cash flows using the post-tax discount rate (post tax WACC);
2. Calculate the tax payable on SPV pre financing earnings (cash flows available to the providers of debt and equity) in the PBM;
3. Calculate the present value of the tax payable (calculated in 2) using the post-tax discount rate;
4. Adding the present value of the tax payable (calculated in 3) to the present value of the PSC cash flows (calculated in 1).

11.4 PBM summary results

Probability distributions have been produced for the PBM using the assumptions outlined above. The probability distributions of the present value and nominal costs of the PBM are presented in *Figure 11-5* and *Figure 11-6*.

[redacted]

11.5 Comparison of PSC and PBM

The difference between the PBM and the PSC is primarily a function of costs that the private sector will incur that the public sector will not. These include bidding costs, costs of managing the PPP contract and that the private sector construction costs will include capitalised interest but the public sector costs will not[47]. The O&M costs in the PBM are higher than the PSC O&M costs, reflecting that the private sector will incur costs in managing and discharging its obligations under the PPP Project Agreement that the Transport Agency will not incur under traditional procurement.

The question in the PSC / PBM comparison is not whether the absolute level of cost is acceptable – this is the separate funding question addressed via the economic assessment (see section 8) – but rather whether it is likely that the gap between the PSC and PBM can be bridged by PPP bidders. The bidders would be required to bridge this gap through construction and operating cost efficiencies and more efficient management of risk.

As discussed (see section 10.2), the cost estimates underlying this analysis results are subject to uncertainty and are expected to change (decrease). The results below must be viewed with this in mind.

The absolute level of the gap is important, as it represents the size of the cost efficiencies that PPP bidders would have to find. However, within the scope of likely cost decrease (once the uncertainty has been reduced) the relative gap between PSC and PBM is likely to be fairly stable. In other words, if the PSC curve was to shift to the left to reflect a reduction in the base cost estimate (as is expected), the PBM curve, which is developed using the same base cost, would also shift to the left and the gap between the curves would remain around the same.

The key point in this is that, although there is uncertainty in the underlying costs, the analysis from these costs is sufficient to give a good sense of whether the project is likely to be financially viable for PPP bidders. This assessment of financial viability is not expected to be materially affected by the refinement of the underlying base cost estimates.

The following figure shows the PSC distribution and the PBM distribution overlaid together (both are NPC).

[47] Although the funds provided to the PayGo model are not 'free', as there is an opportunity cost to the users who provide those funds just as there is to a customer who deposits funds into a bank, a notional cost of funds is not included in the PSC.

[redacted]

A selection of costs from these curves is given in the table below. These confirm that for a given risk level (the P-level) the gap between the PSC and PBM is fairly stable. Furthermore, the gap is relatively small compared with the overall project cost. The nominal equivalents are also given for completeness.

Table 11-3: PSC and PBM comparison at selected P-levels (current cost estimates)

P level	PSC	PBM	Difference	PSC	PBM	Difference
%	NPC $m	NPC $m	NPC $m	Nominal $m	Nominal $m	Nominal $m
[redacted]						

The preceding table shows the gap between the PSC and PBM, in absolute dollar terms, is relatively insensitive along the probability distribution. On the basis of this quantitative financial analysis it appears to be viable that bidders for a PPP for P-Wk could overcome the gap to the PSC and that, in terms of the financial test, a PPP procurement is a viable option for P-Wk.

The results in Table 11-3 are an estimate of the cash costs that may be incurred under a PPP contract. The actual costs will be different from those observed for a number of reasons, including different cost of capital and capital structures utilised by the contractor and different base interest rates.

Changes to the cost of a P-Wk PPP could also occur because of changes in base interest rates between the date bids are received for the PPP and financial close. The approach being used to specifying the discount rate will considerably reduce the impact on the net present cost of

changes in interest rates. However, changes in rates during the post-bid period will change the level and profile of the Unitary Payment.

Table 11-4 shows the sensitivity of the gap to changes in the construction costs and financing inputs at the [redacted] point on the probability distribution.

Table 11-4: PSC and PBM comparison for changes in construction costs (early-stage cost estimates)

Description	PSC	PBM	Difference	PSC	PBM	Difference
		NPC $m			Nominal $m	
[redacted]						

Note: The margins in the table are selected to show the full range underlying the margins in Table 11-2. The margins are exclusive of swap margins.

The sensitivity analysis shows that the PSC-PBM gap remains stable. The larger impacts are on the nominal values. The nominal values are impacted most by changes in the construction costs and are relatively insensitive to change in interest rate margins. This highlights the importance of the competitive procurement process in reducing construction costs and also the importance of the geotechnical programme currently underway.

As noted earlier (section 10.6), the approach to specifying the discount rate has changed since the TGP PSC and PBM were calculated. Also, a long term interest rate hedge was not available at that time (section 11.3.1) and the approach to accounting for tax in NZ PPP projects has been revised (section 11.3.3). Consequently, the gap between the PSC and the PBM for the TGP was of a different magnitude (larger), reflecting a different methodology and different set of financial inputs. If the approach now being used to specify the discount rate and the financing and tax assumptions were to be applied to calculate the TGP PSC and PBM, the difference for that project would be more aligned with the difference presented above for P-Wk.

11.6 Potential Project Revenues

11.6.1 Tolling

The P-Wk has been identified as a potential toll road as part of the Transport Agency's national tolling strategy. The southern end of P-Wk continues on from the existing Northern Gateway Toll Road (NGTR).

It is useful to consider how much tolling might be able to contribute to the Unitary Payment for a P-Wk PPP.

An initial toll revenue forecasting exercise has been carried out based on the forecast traffic volumes and light and heavy vehicle mix, and using the conservative price assumption that the same pricing is applied from NGTR. [redacted] The conservative price assumption was used to produce a lower-end forecast.

This analysis suggested a conservative tolling revenue forecast in the first year of operations (2022), net of collection costs and diversion (but excluding the costs of the tolling gantry equipment), of around $10M, growing to $17M in 2030 and $28M in the last year of the P-Wk PPP concession. The total nominal tolling revenue over the PPP period was forecast at $440m. The potential tolling revenue profile based on this analysis is presented in the figure below:

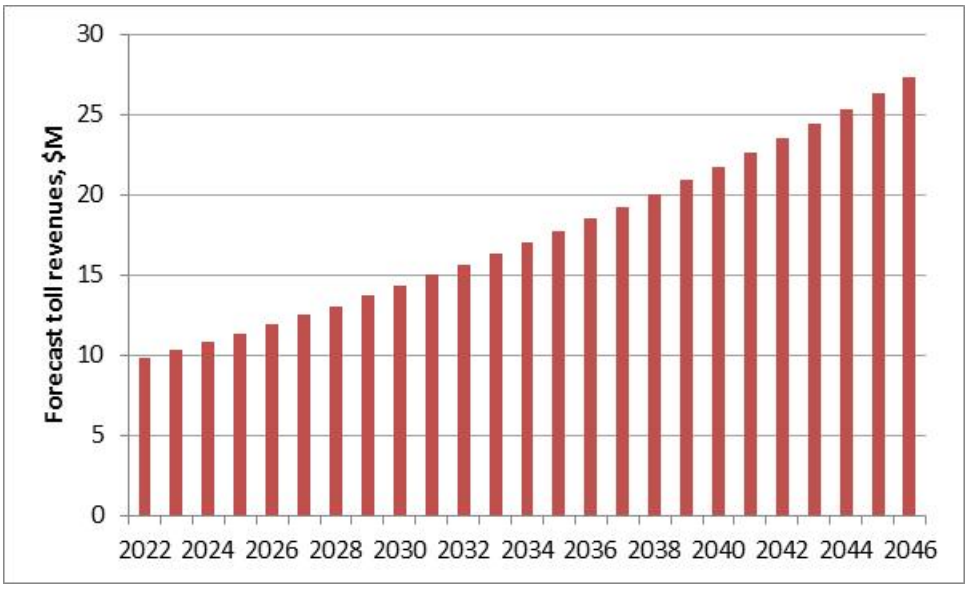


Figure11-8: Annual potential tolling net revenue

Although tolling is not a viable revenue source to cover the cost of P-Wk by itself it is potentially a very useful way of meeting the O&M costs associated with the road. Each expansion of the Agency's State Highway network creates an additional ongoing O&M cost. This cost expansion is not necessarily matched by an increase in revenue to the NLTF (in fact, NLTF may decline due to the higher efficiency of travel on the new road). Tolling does provide a revenue source to match the cost of the road and so presents an opportunity to provide a road that is self-sustaining in terms of its own O&M costs.

This analysis suggests that toll revenues could comfortably cover the O&M lifecycle costs for P-Wk and significantly exceed the O&M costs in years outside of lifecycle works. The surplus in these years could be put toward the Unitary Payments.

For illustrative purposes the forecast toll revenues are shown against the PSC O&M costs (at the [redacted] level) in the figure below.

[redacted]

Further work will be needed on the tolling revenue forecast including formal consultation, a willingness-to-pay (WTP) survey, detailed toll modelling work around variable or optimising revenue tariffs, limiting diversion, leakage and toll infrastructure needs if the decision is made to undertake tolling on P-Wk.

Under a PPP, the contractor would not be required to take any significant demand risk for tolling. A PPP would have no contractual reliance on tolling and the contract would include necessary provisions to protect the Transport Agency's ability to toll the road if it chose to do so. Under the current national tolling strategy, the Transport Agency would likely retain responsibility for the tolling operations and for collection of the tolling revenue irrespective of the method of procurement.

Under legislation the Transport Agency is able to recommend to the Minister of Transport at any time up until the opening of a new road that that road should be tolled. This gives a 6-7 year period for the necessary consultation and further analysis to be carried out on the tolling proposition for P-Wk. This timeframe and the contractual relation between PPP and tolling would allow the work to prepare for tolling to take place in parallel with but separately from the construction of P-Wk. This is the approach being taken on TGP, which is also a candidate for tolling under the national strategy.

11.6.2 Other Potential Project Revenues

Project revenues outside of tolling are limited.

No third party contributions are currently envisaged as part of P-Wk. The opportunity for development contributions will be limited as the proposed motorway has no direct access and limited opportunity for non-State highway connections.

A potential commercial opportunity exists for a service centre to be constructed as part of the project given its length, although this is not included within the project scope and is not signalled as being necessary in terms of the applicable draft corridor management plan.

Other commercial opportunities could emerge in the future. Again, no allowance has been included in the financial modelling to recognise these opportunities. However, the development

of the contract for the P-Wk PPP would need to consider how to provide incentives for development of opportunities in the future within appropriate constraints.

11.7 NLTF Funding Requirement

This section presents the estimated annual cash costs to Transport Agency of procuring the project through a PPP. These costs are compared to the annual cash costs of traditional procurement.

Revenue received from tolling is not discussed in the section as the financial impact of tolling is the same under PPP and traditional procurement as Transport Agency will undertake any tolling activities itself. However, as discussed in the previous section, tolling revenues can potentially make an important contribution to the long term funding of the project.

11.7.1 Costs of the project to Transport Agency

The cash costs of the project to Transport Agency under PPP procurement will consist of:

- Payments made to the contractor (the Unitary Payment) over the term of the contract. The Unitary Payment would be calculated by bidders to be sufficient to cover the PPP contractor's operating costs and capital (debt and equity) repayment/servicing costs.
- Costs that Transport Agency will incur itself in relation to the PPP contract, in addition to the Unitary Payment.

11.7.1.1 The Unitary Payment

The Unitary Payment is likely to include a component that will be subject to indexation to allow for inflationary cost increases over time. For the purposes of this Business Case for Implementation, the inflation allowance has been applied to a proportion of the Unitary Payment to reflect that the costs that the Contractor will incur in providing operating services will be subject to inflation. Costs relating to debt and equity repayment and servicing are assumed not subject to inflation and are not indexed.

An allowance for lifecycle maintenance costs, primarily consisting of resurfacing and pavement rehabilitation has been included in the cash flows when this cost is expected to occur. This causes payment spikes on an approximately [redacted] year cycle.

The annual Unitary Payment has been estimated for P-Wk using the PBM assuming bidders are asked to offer a fixed price equivalent to the [redacted] risk level in the PSC. This is presented in the following figure, which shows the Unitary Payment starting from the 2022/23 year when the road is assumed to be available under the PPP.

[redacted]

The Unitary Payments shown above are in nominal terms. They are not adjusted for the time value of money and so do not reflect the fact that a similar payment made in the distant future (for example, in 2030 or 2047) has a different (lower) value to a payment made in the near future or today. This time value is captured in the NPC. However, the nominal cash flows are important for considering the Agency's future cash flow management and the commitments on the Agency's revenue lines.

Figure 11-10 demonstrates that the majority of the cash costs relate to meeting debt repayments and servicing the financing over the operations period. Return on equity payments remain fairly constant until the end of the concession, when the equity is withdrawn. This structure is typically required as a protection by banks and also works in the Agency's favour as the equity holders remain exposed to project risk throughout the concession.

Interest costs reduce over time as the principal repayments reduce the outstanding debt balance. Related to this, the debt repayments increase over time as interest payments fall (this is a typical 'table mortgage' structure). The initial spike in debt repayments reflects the impact of working capital and the establishment of reserve accounts[48], which occur in the first year of operations.

The payments have been structured to be relatively flat over time, to assist with cash flow management. The actual structure is likely to vary slightly depending on bidders' financial structuring. The Agency, as procurer, would also have the option to influence the structure if it wished to do so.

[48] The debt funders will require the contractor to establish reserve accounts to, among other thing, reserve cash for debt servicing.

11.7.1.2 P-Wk payment commitment on NLTF revenue

The Transport Agency Board has set 10% of NLTF revenue as a ceiling level for long-term liability commitments on the NLTF. The P-Wk payments reported above would not breach this ceiling level when added to existing long term liability commitments (for example, the TG PPP payments).

11.7.1.3 Costs incurred by Transport Agency

Preliminary estimates suggest that Transport Agency could spend approximately [redacted] million in total of additional costs in relation to project management, estimators, commercial, financial and legal advisers under PPP procurement. This amount is additional to the cost of traditional procurement and is likely to be incurred during the periods prior to financial close and so is not part of the Unitary Payment shown above.

Other costs, such as property purchase, geotechnical investigations and technical advice, which are related to the project but not specific to the PPP, are also not part of the Unitary Payment and are not shown. Property costs are expected to be approximately [redacted]

11.8 Accounting Treatment

International Public Sector Accounting Standard (IPSAS) 32 Service Concession Arrangements: Grantor prescribes the accounting for service concession arrangements by public sector entities. The guidance in this standard is directly relevant to the accounting for PPP arrangements under the Treasury's PPP Standard Contract.

The accounting treatment of a PPP contract has two distinct phases, being Construction and Operations.

During the Construction phase, as the contractor is building the asset, Transport Agency will recognise both a Service Concession Asset (split between the road and fixtures and fittings) and a financial liability on a work-in-progress basis.

During the operating phase:

- The service concession asset will be accounted for in accordance with Transport Agency's depreciation and revaluation policies.
- Transport Agency will need to separate the unitary payment made to the Contractor into its component parts. There will be at least three components:
    - cost of service (charge to the income statement);
    - finance cost (charge to the income statement);
    - financial liability (reduction in the financial liability).

The implications for Transport Agency of the accounting guidance are demonstrated in the following table.

Table 11-5: Summary of accounting treatment Implications

Balance Sheet	***Assets*** Land (retained on balance sheet) Roading and related assets ***Liabilities*** Financial liability (written down during the service concession period)
Income Statement	***Income*** Nil ***Expenditure*** Cost of service provision by the contractor (recognised as the services are provided) Depreciation of service concession assets Loss on disposal of service concession assets (being fit-out periodically replaced by the contractor over the service concession period) Finance costs
Cash Flow Statement	***Operating Outflows*** That part of the unitary payment that relates to the services delivered**.** ***Investing Outflows*** That part of the unitary payment that relates to the lifecycle maintenance expenditure. ***Financing Outflows*** That part of the unitary payment that relates to the finance costs and the reduction in the financial liability**.**

Any indemnity provided by the Crown in favour of the NZ Transport Agency in relation to the Pūhoi to Warkworth project will result in a contingent liability for accounting purposes.

However, the indemnity is unlikely to be disclosed in the Financial Statements of the Government given the probability of occurrence is remote. The reporting obligations imposed under the corresponding Reimbursement and Management Agreement entered between the NZ Transport Agency and the Crown will ensure that the NZ Transport Agency will provide early notification of any potential call on the indemnity.

12 Commercial Value for Money Proposition

The Commercial Case has considered a qualitative and quantitative assessment of the preferred traditional procurement model (Competitive Alliance and O&M contracts) and a PPP.

The quantitative financial analysis suggests that it would be financially achievable for PPP bidders to match or beat the cost to the Agency of delivery via traditional models. The qualitative analysis notes a number of benefits from PPP, both at the project-specific level and at the strategic level for the Agency. A number of risks have been identified with a PPP and mitigations suggested.

On balance, a PPP is considered a preferred model for procuring P-Wk.

12.1 Introduction

The purpose of this section is to bring together the commercial analysis in the previous three sections and to assess the overall commercial value for money proposition of the two selected procurement models.

This section presents:

- A summary of the key points of the qualitative VFM assessment and a comparison of PPP against the traditional procurement option.
- A summary of the key points of the quantitative VFM assessment.
- An assessment of enhanced value for money opportunities available to the Agency's next PPP procurement.
- A discussion of the strategic value of a PPP.
- An assessment of the risks and mitigations associated with the PPP option.

This section concludes the commercial analysis with a recommended option for the procurement of the P-Wk project.

12.2 Qualitative Value for Money Assessment

An assessment of the Agency's traditional, business as usual, procurement options (see section 9.2) identified a Competitive Alliance delivery model as best suited from among the Agency's traditional (i.e., non-PPP) delivery models for the construction delivery of P-Wk given the scale and risk characteristics of the project. The ongoing operations and maintenance under traditional procurement would be delivered through regional O&M (Network Outcomes) contracts re-tendered at 7-10 year intervals.

The assessment also found (see section 9.5) that PPP could also be considered as a feasible whole of life procurement model for P-Wk.

In summary, a Competitive Alliance has the following benefits as a procurement model for the construction delivery of P-Wk:

- It is suitable for a large-scale project.
- It allows exploration of design options and innovation.
- It provides flexibility to manage uncertainty.
- It provides a well-aligned framework to manage and deliver on stakeholder and environmental interests.

In summary, the potential benefits of PPP procurement include:

- It provides a fixed price contract to the Agency covering both construction and operation.
- It achieves a strong level of risk transfer (including for cost and time overrun).
- It places powerful inherent delivery incentives on the contractor.
- It is a whole of life model, with strong incentives for the integration and optimisation of design, construction, operation and maintenance over a long period.
- It is an outcomes focussed model that supports the Agency's investing for outcomes approach and can be directly aligned to support the Agency's strategic priorities (such as safety).
- The whole of life and outcomes focus encourage delivery innovation.
- Due to the broader scope of a PPP it has the potential to attract major new entrants to the New Zealand construction and project delivery market.
- Payment only begins when delivery of the outcomes begins, creating a cash window for the Agency.

The PPP and traditional procurement options are compared against a range of procurement characteristics in the table below.

Table 12-1: Comparison of PPP vs traditional procurement models for P-Wk

Characteristic	PPP	Traditional procurement (CA+O&M contracts)	Notes
Suited to P-Wk project scale	✓	✓	
Provides construction price certainty	✓	✓×	Some cost variation potential remains in the Alliance model.
Provides operations period price certainty	✓	×	Traditional procurement faces re-pricing risk at each contract renewal.
Whole-of-life integration	✓	×	
Enables innovation	✓	✓×	Innovation opportunity is not as wide in traditional procurement due to lack of whole of life integration.
Strong performance incentives	✓	✓×	Traditional procurement not as wide due to absence of whole of life.
Outcomes focus	✓	✓×	Although CA can be structured with an outcomes focus, traditional is weaker due to absence of whole of life.
Enables flexibility to deal with change post contract signing	×	✓	Changes are possible under PPP but harder and potentially costly to make.
Lends itself to protection of the Agency's reputation	✓×	✓	PPP relies more on contractual specification to protect reputation.
Can encourage new entrants to NZ market for the P-Wk project	✓	×	The complexity and duration of PPP is attractive to international participants.
Enables the cash window	✓	×	The cash window enables some project benefits to start earlier. In a cost sense it is neutral to the Transport Agency over time (see 12.6.2).

Note: ✓ indicates that the model performs well on the characteristic; × indicates that the model does not perform well on the characteristic; ✓× indicates that the specific model can deliver on the characteristic but the performance of the model is relatively weaker than the performance of the other model (as described in the notes column).

PPP is considered to offer benefits that are not available to traditional procurement alternatives, particularly in relation to whole-of-life outcomes, and is the preferred procurement model on this qualitative basis.

PPP also introduces a number of risks that must also be considered. These are considered in section 12.7.

12.3 Quantitative Value for Money Assessment

Financial analysis has been undertaken to compare the cost of the Transport Agency constructing, financing and operating P-Wk itself (the public sector comparator (PSC)), using a traditional Competitive Alliance procurement approach, to the cost if it were designed, constructed, financed and operated by the private sector (the proxy bid model (PBM)). The quantitative test is whether the private sector is likely to be able to equal or achieve a lower price than the PSC by providing construction, risk management and operating costs savings within a whole of life, risk adjusted package. The results of the analysis are given in Section 11.

The financial analysis found the difference between the PBM and PSC to be [redacted] in NPC terms. This result suggest that it should be viable for PPP bidders to overcome their additional financing and other costs and provide the Agency with a value offering that matches, in cost terms, the traditional procurement approach.

The procurement of TGP has demonstrated that bidders can generate the level of cost efficiency needed to bridge the gap between the PSC and the PBM. TGP is a project of a scale and challenging geotechnical issues not dissimilar to P-Wk and so its successful procurement provides an added degree of comfort that PPP bidders should be able to produce the required efficiencies for P-Wk.

The costs used in the financial analysis remain subject to uncertainty due to the lack of geotechnical information and the absence of a specimen design. The approach to managing this has been to carry out conservative estimates of the base cost and price and quantity uncertainties.

This means that a cost stress-test is inherently built into the financial analysis. At these conservative (ie, high) cost estimate levels the financial analysis still shows that the PPP can be viable and the economics (section 8) remain acceptable. The Agency's expectation is that, as geotechnical information and additional design becomes available, the cost estimate will come down. This mitigates funding decision risk associated with the current uncertainty in the cost estimates.

12.4 Incorporating Lessons Learnt from TGP

The Transport Agency has learnt a great deal from its first PPP procurement. The lessons learnt exercise completed on TGP (section 9.6) provides an appropriate starting point for the Agency in preparing for a second generation roading PPP.

The main areas of focus and key findings and recommendations of the lessons learnt review were:

- **Project governance and resourcing** – lessons focussed on the need for clearer delegations, wider involvement of internal stakeholders within the Agency, and continuing to build resources and institutional knowledge of PPPs. These lessons are reflected in the governance discussion in section 14 and Agency capability in section 12.5.1.

- **Efficiency of the process** – lessons focussed on the desire to shorten the negotiation period and to improve the certainty of bid positions. The programme in section 13.1 reflects the timing lessons. The lessons learnt review made a number of suggestions for how certainty of bid positions could be improved. These would be explored in the preparation of a P-Wk PPP procurement.

- **Risk allocation** – the TGP process revealed a number of important points regarding the willingness and ability of the private sector to accept particular risk allocations. In particular, Transport Agency credit risk, insurance and natural disaster risk and some elements of the performance risk. These are discussed in section 12.5.3. A P-Wk PPP would be designed with these lessons firmly in mind. P-Wk does have the benefit over TGP of being in a low seismic risk zone, which considerably simplifies the insurances requirements for the project.

- **Optimising Transport Agency funding** – the lessons learnt review considered the appropriateness of the project's capital structure, including the option of the Transport

Agency making a capital contribution to the project. A number of options have been explored with Treasury but will not be adopted for this project and are not discussed further in this Business Case for Implementation.

- **PSC, AT and the discount rate** – feedback from the market was that they value certainty (stability) in the AT as it is a key parameter throughout their bid preparation. There was recognition and acceptance that the AT might be changed during the process for observable external changes, such as new geotechnical information (discussed in section 10.2.3) or interest rate changes (discussed with the discount rate in section 10.6). A change was made to the AT for other reasons during the TGP process. It is important that this is not repeated in a future transport PPP. The costing exercises to establish the PSC have been carried out with this in mind.

- **Funding markets and competition** – the market was of the view that there was sufficient debt and equity liquidity to support bids and that the financial markets are continuing to improve in the Agency's favour (discussed in section 12.4). The lessons learnt review suggested that the Agency might explore options to further strengthen competitive tension in the debt sourcing process. This has also been discussed with Treasury.

Where appropriate some of the lessons are already being incorporated into evolving and improving the implementation of PPP for transport and are woven into this Business Case for Implementation. Other lessons from TGP would be incorporated during the development and design of the RFP and wider procurement processes.

12.5 Enhanced Value Opportunities Available to a PPP

The previous sub-sections have discussed that there is a qualitative and quantitative case for a PPP value for money proposition. The PPP procurement model brings qualitative benefits and it is likely that the quantitative financial case stands up at a level of risk adjustment that is comparable to and consistent with outcomes at the portfolio level of the Agency's large procurements.

The Agency is a procurement leader in New Zealand and seeks continuous improvement in each of its procurement and delivery activities. This sub-section presents a set of further value opportunities that are available to a second-generation Transport Agency PPP. Second generation refers to enhancements to the process that may be available based on the learnings and further thinking following the TGP procurement process.

Each of the opportunities set out below presents positive potential value additions over and above the qualitative and quantitative value position outlined above. These are all upside opportunities to further the value for money offered by the PPP.

12.5.1 Improved PPP capability in the Agency and in the market

The capacity and understanding of PPP among potential bidders has been significantly increased as a result of the TGP process and with the broader development of the PPP market in New Zealand. This should result in stronger consortia and improved value packages in future roading PPP bids.

Likewise, the Agency's capacity and understanding of PPPs has been developed through TGP. There are three key elements to developing this further:

- Having a team of Agency and advisory staff with the right capacity, knowledge and experience to deliver further improvements in PPP delivery.
- Having in place an appropriate internal governance structure to guide decision making through a PPP procurement process and to ensure the necessary level of transparency and assurance is received.
- Incorporating lessons learnt from the TGP process and further thinking developed during and since TGP.

The Agency has in place a strategy to build and expand internal PPP capacity. Because it introduces financing to the procurement toolkit a PPP is a cross-Agency endeavour, involving staff from Finance and Planning & Investment as well as Highways and Network Operations. The TGP process drew on and involved skills from across the Agency. The PPP capacity building strategy will see a continuation of this into a future PPP.

At an advisor level, the Agency competes with the bidding market for expertise. In anticipation of this, the Agency has in place plans to retain the suite of its preferred advisors should the decision be to procure P-Wk as a PPP. The advisor strategy for P-Wk is to continue and build on the Planning Alliance (which the Agency is a part of) that was successfully used to achieve the designation and consents. This represents an innovation in the delivery of procurement process outcomes and demonstrates the Agency's commitment to continuous improvement and best in class procurement practices.

Through the TGP process the Agency has an improved understanding of the governance requirements and reporting timeline for a PPP. The PPP capacity building strategy includes enhancements to the governance structure, including necessary interactions with the procurement Alliance. The planned governance arrangements for P-Wk are presented in section 14.

The Transport Agency has the benefit of the precedent set by the TGP as well as the Treasury's Standard Form Contract and the "testing" it has had on the other NZ PPP deals signed to date and the (two) PPPs currently being procured.

12.5.2 Enhancing the Procurement Process

There are a number of lessons from the TGP procurement process that would be factored into the P-Wk procurement process. These include the following.

12.5.2.1 Managing consenting risk

Consenting risk, in its various forms is a major issue for roading projects under any procurement method. However, the TGP process has identified that, although consenting risk may be allocated to the private sector, where the private sector does not come well prepared to manage this risk it creates a significant issue for the Transport Agency.

Three mitigation approaches would be applied for P-Wk. Firstly, the intent, with the benefit of the TGP experience, would be to remove as much consenting uncertainty prior to issuing the RFP to bidders. Secondly, the designation for the P-Wk route is relatively wide. This provides bidders with the flexibility to achieve an optimal design without the need to encroach on land that is outside the designation. Thirdly, following from the first issue, the RFP would be very explicit and clear about what will be required from bidders when completing the design component of their bids and the process they have to undertake to ensure that consenting

issues are dealt with efficiently and do not become a major issue either in the run up to contractual close or during the construction phase.

The procurement strategy for P-Wk would acknowledge the risk to the bidding process created by the limited design information. However, as discussed earlier, this risk is considered low and manageable.

12.5.2.2 Reducing procurement costs

The next Transport Agency PPP would benefit from being the second-of-a-kind and being able to build on the foundation already laid by TGP. This should assist in reducing the costs of the procurement.

There are now established market expectations and understanding of the TGP PA positions and this should help reduce the number of PA points to be negotiated.

The PPP Project Agreement (PA) for P-Wk will have the benefit of using the TGP PA as a reference point and base to work from[49]. That PA was based on the Treasury's Standard Form PPP Contract[50] and adapted and modified for TGP specific (i.e., transport sector) matters. Likewise, the TGP performance regime would form the basis of the P-Wk performance regime.

The approach to dealing with and clarifying derogations to the draft P-Wk PA would be revisited for P-Wk. This would aim to improve the efficiency of the process to reach contractual close with the preferred bidder for P-Wk.

12.5.3 Improved risk allocation

The TGP process has provided the Transport Agency with valuable feedback on the approach or position it took on some important commercial elements and risk positions of the contractual relationship with the PPP contractor incorporated at the outset. These include, for example, coverage of perceived Transport Agency credit risk, the position on insurance, and the position on the travel time performance requirement.

Market feedback indicates that these were significant commercial risk issues for the bidding consortia and consumed a lot of time both during bid preparation and in negotiation. These risk positions would be reconsidered and restated from the start for P-Wk to reflect the improved understanding of the appropriate allocation of risk. This would avoid the time costs associated with these points.

The presence of some sort of credit support from the Crown to cover the Transport Agency's payment obligations is likely to be a condition precedent to financiers providing funds to the project. This reflects the legal position of the Agency in relation to the Crown. While the Transport Agency's view is that some form of Crown credit support is likely to be required, this would remain subject to Ministerial approval. This position would be indicated in the EOI for a P-Wk PPP.

Under the TGP agreement the Transport Agency provides self-insurance for seismic risks. An element of self-insurance may be required for P-Wk but there will be an opportunity to design a different regime to TGP that includes sharing of risk between the Transport Agency and the P-Wk contractor.

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[49] The TGP PA and Schedules are publicly available fromhttp://www.nzta.govt.nz/projects/transmission-gully/ppp.html
[50] http://www.infrastructure.govt.nz/publications/draftpppstandardcontract

There are some elements of the TGP performance regime that would be changed in the P-Wk performance regime. Also, there are other elements of the TGP performance regime negotiated with the preferred bidder that would need to be reconsidered and probably modified for inclusion in the P-Wk performance regime. There would also be P-Wk specific characteristics that would need to be accounted for. Similarly, there are elements of the TGP PA that have resulted from negotiations with the TGP preferred bidder or are specific to TGP that would not be replicated in a P-Wk PA. [redacted]

12.5.4 Increasing competitive tension in the procurement

Three areas could be further investigated to further enhance the competitive tension in the PPP process, so as to drive additional value-for-money:

- Retaining the option to take three rather than two bidders through the RFP stage. For a project with the characteristics of P-Wk procured as a PPP there may be net efficiency gains from the added bidder (taking into account the additional cost of having a third bidder and the ability of the overall market to support three bids). It would only be worthwhile taking a third through if there were three sufficiently high quality bidders identified at the EOI stage.

- Improving the certainty of submitted bid positions and shortening the negotiation period, for example by ensuring the response requirements are clearly understood and by retaining competitive pressure through the preferred bidder confirmation process.

- Enhancing the approach to procuring the financing so as to increase competitive pressure on financing costs, particularly the debt margins. Availability PPPs are highly financially leveraged with debt. Small reductions in the margins charged by debt providers can have material value for money benefits.

It is not the intention to describe here the pros and cons of three vs. two or the details of how margins might be reduced. Both offer potential value opportunities that could be explored during the procurement of a PPP. It is intended that the EOI will allow for the Agency to take *up to three* bidders through to the RFP stage.

12.5.5 Strong market interest in a Transport Agency PPP

A formal market sounding was undertaken for P-Wk during April 2015. This has revealed a strong interest in a Transport Agency PPP across each of the major segments of the bidder market (being debt and equity providers and major sub-contractors), including from large international PPP market participants.

This reinforces the view on the market's appetite for projects of this nature that had been developed through engagement with the market on the TGP procurement and from ongoing informal discussions.

The TGP procurement process demonstrated a strong interest in PPPs in New Zealand. Market feedback on the Transport Agency's approach through the TGP procurement process has generally been positive and recent discussions with the market suggest it has had a positive impact on the interest in delivering P-Wk as a PPP.

12.5.6 Improved financial market conditions favour the Agency

Observed debt margins on recent large infrastructure PPPs in Europe and Australia indicate that debt margins are falling. There is always uncertainty around the level of debt costs in the future. However, the indications are that a PPP procured on the timeframes for P-Wk would benefit from improved liquidity and competition among debt providers.

Market sounding discussions have been held recently with major New Zealand banks and consortia financial advisors. These market participants have emphasised that there is currently a high level of liquidity among banks and other debt providers. This is putting downward pressure on bank pricing and facilitating a relaxation in debt terms. Also, two PPPs are currently in the procurement process and the debt prices and terms secured for these transactions are generally at levels more favourable than achieved for TGP, reflecting a change in market conditions.

The probable entry of several large specialist European PPP firms into the New Zealand transport PPP market could also assist in providing further access to further liquidity and competition. Market sounding discussions with these firms and their financial advisors indicates that, in anticipation of these firms' entry into New Zealand, their European relationship banks have begun considering their capacity to provide New Zealand dollar debt funding.

[redacted]

12.6 Strategic Value of PPP

In addition to the potential project-specific value a PPP also offers potential strategic benefits to the Agency.

12.6.1 Increased market competition and access to innovation

Due to their scale and complexity PPPs offer the potential to bring new entrant international players to the New Zealand transport sector. As mentioned above, informal and formal market contact indicates that major international firms are actively preparing for a future Transport Agency PPP.

This would bring increased competition for the design, construction, delivery and operation of major projects in the transport sector. This is an important advance for a market of New Zealand's small scale, where there is a risk that a small number of firms come to dominate.

In the case of PPP, the breadth of services provided means that international players can potentially improve access to and competition for finance. PPP specialists also bring a depth of experience and expertise in PPP transactions and operations, potentially increasing the sophistication and maturity of the offerings available to the Agency.

International players can also bring direct and ongoing access to current best practice and innovation from other markets. Through the competitive process this can have spill-over benefits to the local supplier market, as all boats are forced to rise with the tide.

12.6.2 The PPP cash window

A financed procurement model can provide programme flexibility to enable the earlier delivery of outcomes from other projects within the Agency's programme. In particular, it opens a 'cash window' while the Agency is not making payments during the construction phase that can allow additional benefits to be delivered in the programme.

The demand for transport infrastructure is high and expected to remain so, particularly in Auckland and the wider upper North Island and in the Christchurch area. Ranged against this are the revenue and spending constraints inherent in the Transport Agency's funding. Financing is purely a tool for shifting revenue (and risk) through time and between parties. It does not remove a revenue constraint but it can be used to alleviate a current spending constraint for repayment from future revenue.

The strategic value of a PPP at the wider Agency level is additional to the enhanced delivery efficiency that is the core driver of PPP at the specific project level. Because payment does not begin until the road is opened and delivery of project outcomes to customers has successfully started, a PPP creates a cash window for the Agency. In the case of P-Wk this window is likely to be between five and six years and could equate to [redacted], allowing for cost escalation over the period. This would enable another very large project or a package of smaller projects to be delivered earlier than would otherwise be possible. As a result, the economic benefits of these projects would start to be enjoyed sooner, and the overall benefits from these projects would have been increased through the alleviation of a timing constraint on their funding.

The cash window is illustrated in Figure 12-1 below. The window is the period in the bottom charts (which represent cash flows in a PPP) where there are no payments made up until operations start. By contrast, cash flows in the top charts (traditional procurement) occur almost entirely during this period.

[redacted]

It is important to note that this opportunity is a one-off for each financing. Once a project is financed it must be repaid from future revenue. Although a cash window is opened in the near term there is in effect a partial closing of a window for each year of repayment so that over time

there is an equivalent cost position for the Agency. However, the timing of the benefits position for users is the focus here: the near term window is worth more than the repayment commitment in the later term because customers are able to get value sooner (through delivery of economic benefits) from earlier project delivery.

The subtlety in this relates to the cost of financing compared with the 'returns', or benefits received by New Zealand, from the added projects. Where the return is greater than the cost of financing it is appropriate to use the financing to, in effect, enable the earlier investment. This highlights the importance of selecting the right project(s) to fill the cash window.

12.7 Procurement Risks

There will be a number of procurement risks that the Transport Agency would bear under a PPP procurement that it would not face under a traditional procurement. Likewise, there are some risks in traditional procurement that are either not faced or would be more transparent and explicit under PPP.

The value proposition analysis above needs to be weighed against the risks inherent in the procurement options and the available mitigations to these. For both traditional procurement and PPP, effective contracting is a primary (but not the only) means of mitigating risk.

The key procurement risks for the Transport Agency using PPP and traditional procurement for P-Wk are summarised below along with potential mitigations.

Several risks are likely to be common to both the Competitive Alliance and PPP procurement models. Some of these common risks (for example, inflation risk) have not been included in the discussion here.

- **Procurement risks (both PPP and traditional procurement):**
    - The Transport Agency is fully familiar with procurement **probity risks**. These risks are present for both PPP and traditional procurement. However, the complexity of a PPP project means the bidding costs will be considerably more than under traditional procurement. This serves to emphasise the need for a well managed procurement process and a high standard of probity to minimise the risk of process challenge. The Transport Agency achieved this during the TGP procurement process.

      There is always a risk of there being **insufficient, serious interest in bidding**. This risk would be faced with traditional procurement, but is heightened with a PPP procurement because of the number of parties needed in a consortium and the cost and complexity in the bidding process. The private sector is expected to have strong interest in the project, as seen on TGP, including new entry to the New Zealand market of major international PPP firms. This interest has been confirmed through formal market sounding. The response from market sounding suggests that there would be strong market interest in a P2W PPP.
    - There are risks with PPP associated with **new players in the New Zealand market**, specifically international contractors and international banks which may raise previously unseen issues during the process.
- **Process risks (both PPP and traditional procurement).** Two important process risks relate to the consenting process and the land acquisition process. The consenting process and potential risk mitigations have been discussed above. Land acquisition risk is primarily a timing risk due to potential mismatch between the timeframes in the

compulsory acquisition process and the procurement timetable if the project was brought forward. Land acquisition risk would be present for a Competitive Alliance also, although that model allows for it to be more easily managed within the contract and the risk would likely be lessened by the later procurement under a Competitive Alliance.

If the project is procured within the proposed timeframes of PPP procurement, the best mitigation to the land acquisition risk is an early start to the acquisition process.

- **Price risks (both PPP and traditional procurement):**

  [redacted]

  - Under PPP, bidders may not be able to meet the delivery requirements inside the Transport Agency's affordability threshold or else the affordability threshold may be set too high with the associated value for money risk to the Agency. This is a particular challenge related to the affordability threshold approach applied in the roading context. Mitigations to this on the bid side include ensuring that the requirements are clearly specified and well understood by the bidders. On the cost side a mitigation would be to refine the cost estimate and to apply pressure through the competitive process.

  - Cost overrun risk is present in a Competitive Alliance although it is shared with the Agency. It is possible that the bidders for a Competitive Alliance will incorporate an allowance for price overrun risk into their tendered Total Outturn Cost (ie, the tendered price). As a result, the actual outturn cost for the Agency (made up of the allowance for price risk and the Agency's share of any realised risk) may be similar under a Competitive Alliance as for other procurement methods.

  - Traditional operation and maintenance contracts are procured on a rolling 7-10 year basis. This exposes the Agency to price uncertainty at the time of retender. This price uncertainty is not present in PPP.

- **Financing risks (specific to PPP):**

  - Base interest rates would be set at financial close (soon after signing of the PPP contract) for the term of the contract. There is a risk that interest rates will move against the Agency in the period between funding approval and financial close.

  - PPP contractors (and their financiers) have, for previous PPPs, been unwilling to bear the risks of changes in base interest rates beyond the short to medium term (five to seven years). This remains the case, although it may change in the future. The long term interest rate risk management arrangements for TGP mean that the Transport Agency will not have to bear the risk of changes in interest rates beyond this period. The Agency understands that more recent NZ PPPs have explored the market's capacity to deliver longer-term interest rate coverage, and this could be explored further for P-Wk.

- **Reputational risk for the Agency (more of a risk for PPP).** The degree of flexibility allowed in the consent conditions for P-Wk is a direct result of the resource management reputation that the Agency has built up. Additionally, the Agency has built very strong relationships with Iwi in the P-Wk area. A PPP introduces a third party into a long-term

relationship with the Agency and its stakeholders. An important element of the RFP and contract design for P-Wk would be to incorporate the Agency's expectations in terms of managing stakeholders and minimising the effects on the environment into the overarching project objectives to ensure the PPP contractors interests are aligned with those of the Agency and its stakeholders.

While this risk is present under Competitive Alliance it is mitigated by the Agency being a member of the Alliance.

- **Contract management risk (more of a risk for PPP).** A PPP is a major undertaking based on a highly complex contract. In order to receive the PPP outcomes that are contracted for the Agency will need systems and capability in place to manage the contract over a long period of time. The PPP contract is different to other contracts that the Agency manages, and these differences must be understood in order to realise the benefits of the contract. The Agency's capacity to manage PPPs will benefit from having a portfolio of PPPs, as this will provide a sufficient base on which capability can be built and sustained. The efficiency of managing these contracts will also increase over a portfolio rather than a single contract.

- **Renegotiation risk (more of a risk for PPP).** The contract must be able stand the test of time over a long period (likely to be the construction period plus 25 years) and provide protection to the Transport Agency for range of eventualities, not all of which can be foreseen now. The best mitigations of this risk are careful project selection to match the characteristics of PPP and a contract that is as thorough as possible and that includes an agreed approach for dealing with change. Road projects such as P-Wk are suited to PPP because the required outcomes are relatively stable over time and the likelihood of the need for unforeseen change is reduced. The TGP contract incorporates a Change Mechanism for managing unforeseen change, which both parties agree to at the time of contracting.

- **Whole of life performance risk (traditional procurement).** The quality and consistency of performance outcomes on a whole of life basis is less certain under traditional procurement where the design and construct phase is contracted separately from several separate operations and maintenance contracts.

These risks are summarised in the table below.

Table 12-2: Risk comparison for PPP vs traditional procurement models

Risk exposure for the Transport Agency	PPP	Traditional procurement (CA+O&M contracts)	Notes
Probity risk	×	✓×	The inclusion of private sector financiers and more complex contractual obligations means that probity issues are more prominent in a PPP process.
Risk of insufficient bidder interest	×	✓×	The greater complexity of a PPP process and the risk transferred to the private sector increases the risk of parties choosing not to participate.
Risk of contracting with new players in the NZ market	×	✓	
Consenting risk	✓	×	
Land acquisition risk	×	✓×	Likely to be lower risk for CA given additional time before tender.
Cost overrun risk in construction	✓	✓×	Higher risk under CA; Transport Agency will share in cost overruns if they occur
Cost overrun risk in O&M	✓	×	
Interest rate risk during bid phase	×	✓	
Reputational risk	×	✓×	Relates to degree of risk transfer and length of contract in a PPP. Lessened for CA due to direct Agency involvement
Contract management risk	×	✓	
Contract renegotiation risk	×	✓	
Whole of life performance risk	✓	×	

Note: × indicates that the Transport Agency is exposed to the particular risk; ✓ indicates that the Transport Agency is not exposed to the particular risk; ✓× indicates that the Transport Agency is exposed to the risk but the risk exposure under the model is relatively lower or higher than the exposure under the other model (as described in the notes column).

The table suggests that PPP carries more risk for the Transport Agency than traditional procurement, although many of the risks are common to traditional procurement but with a lower exposure. There are natural connections between the risks in Table 12-2 and the benefits set out in Table 12-1 (for example, a benefit in some cases is the avoidance of a particular risk). It is also appropriate to consider the risks, adjusted for their expected mitigations as discussed above, against the benefits. It is considered that the benefits of PPP procurement outweigh the risks and that this benefit-risk proposition is on balance better than for traditional procurement.

Among the PPP-specific risks, the major risks are considered to be land acquisition and reputational risk. Reputational risk can most effectively be mitigated through contractual incentives. Land acquisition risk can be mitigated through a multi-pronged strategy utilising direct negotiation in the first instance backed up by the compulsory acquisition process. If compulsory acquisition is required this may manifest as a timing risk for the procurement, necessitating careful management and attention to timeframes, although remedies are available within the PPP contracting structure to mitigate this risk.

The remaining risks for PPP are considered manageable or mitigations are in place.

A PPP would involve a very long term contractual relationship with a private sector constructor, operator and, importantly, financiers. This brings a focus to risk allocation and financial and commercial issues that are not part of or as transparent in the Transport Agency's more traditional procurement models. This added scrutiny and transparency is also considered a benefit of the PPP process.

12.8 Recommended Commercial Option for Procuring P-Wk

On the basis of the analysis above, a PPP is a viable procurement option for P-Wk. PPP is the preferred approach, over the alternative procurement option, because it is able to provide:

- Qualitatively, a better ability to deliver the NZ Transport Agency's desired outcomes on a whole of life basis than is available through a traditional procurement approach.
- Quantitatively, cost savings or cost equivalency compared to traditional procurement and cost certainty for the Agency once the contract for delivery has been entered into.
- A range of strategic benefits to the Agency.

This assessment has taken into account that a PPP is a complex and significant commitment. It has a number of important features and risks that are different to the Transport Agency's traditional procurement models.

The PPP RFP and the evaluation framework would be carefully designed to structure the right incentives for the private partner to assist in mitigating the risks in a PPP procurement.

A process would be put in place to provide governance assurance and risk management at the project, Business Unit and Board levels. This process is outlined in the following Part C: Readiness and Assurance.

PART C - Readiness and Assurance

Overview of Part C

This Part C sets out the management case for proceeding to the next stage (procurement as a PPP) for the P-Wk project. It describes the processes and assurance that will be put in place to ensure transparency and due process within the Transport Agency governance structure and for the Agency's Board. It is arranged into the following sections:

- Procurement process and key decision hold points, showing the intended timeframes for the procurement and the intended report-backs to the Board.
- Implementation strategy, setting out the strategy for taking the procurement to market.
- Governance and management, setting out the project management and governance structure through the procurement phase.
- Assurance, setting out various acceptance and control processes.
- Lessons learnt and post project monitoring, setting out the approach to reviewing the process and ensuring lessons are transferred to future procurements.

13 Implementation Strategy

A process and timetable have been developed for procuring the P-Wk PPP. This is based on the TGP process incorporating lessons learnt and building on the Agency's wider major procurement expertise. Stakeholder management and probity plans will also be developed as key supporting elements in the implementation.

This section sets out:

- The proposed procurement process and timetable, including the key hold points and timings for report back to the Transport Agency Board.
- An overview of each of the key stages in the procurement process.
- A summary of the key stakeholders and the requirement for a stakeholder management plan.
- A summary of the probity plan.

13.1 Proposed Procurement Process and Timetable

The project has been split into a number of stages, the first being the completion of this Business Case for Implementation and approval by the Transport Agency Board to proceed to procure P-Wk through a PPP.

If approval to proceed is granted, the key procurement milestones will be:

- Preparation and issue to the market of a request for expressions of interest. This will formally determine the extent of market interest in delivering P-Wk through a PPP and enable the Transport Agency to short list interested respondents that have the financial capacity, technical capability and resources required to deliver the project.
- Preparation of and issue to shortlisted respondents of the Request for Proposal (RFP) document. This will include a draft Project Agreement.
- Submission of comprehensive proposals by the short-listed Respondents after an interactive procurement process.
- Detailed evaluation of respondents' proposals, including a clarification process as required.
- Selection of a Preferred Bidder and invitation to enter into negotiations with the Transport Agency with the objective of finalising the Project Agreement.
- Development of a negotiating brief to support and guide robust discussion with the Preferred Bidder with the objective of securing the best possible deal for the Transport Agency.
- Finalisation of the Project Agreement that will give effect to the deal negotiated with the Preferred Bidder and meet the overall objectives of the project.
- Contractual close – signing of the Project Agreement by the Transport Agency and the preferred bidder.
- Financial Close – irrevocable commitment of the financing for the project and setting of the interest rates to apply the debt financing for the project.

The project team will report back to the Agency's Board at key stages in this process. This will be to ensure the Board is informed of the progress and outcomes at each stage and to request approvals to proceed to the next stage, including approvals to take the RFP to market, to enter into negotiations with the Preferred Bidder, and to execute the contract.

A lesson learnt from the TGP process relates to the importance of allowing sufficient time to fully develop and prepare the model and process. The timings have been chosen to:

- Ensure that sufficient time is allowed to incorporate the lessons learnt from TGP and to develop, test and finalise specific elements of the model and process where improvements and enhancements may be available. This activity will occur during the RFP development phase.
- Enable advisors to be secured and work to begin.
- Allow sufficient time prior to shortlisting and RFP release for the geotechnical investigations and additional design work to be carried out to support the review of the PSC, report back to the Board, and request for approval to borrow from Cabinet.
- Allow sufficient time for the RFP bidding and interactive procurement stage, with the aim of ensuring bidders submit well developed and committed proposals.
- Coordinate the RFP stage so as to avoid doubling up with the timing of other major Transport Agency procurements, in particular the Hamilton Bypass tender (programmed for February – June 2015), and thereby mitigating the risk of over-stretching the bidding market.

[redacted]

The overall length of the procurement is comparable to the time taken for the TGP process, but with some changes to the timing and length of particular stages including a shortened negotiation period.

Enabling to borrow up to the PSC limit would be sought from Cabinet in May. This would allow the formal procurement process to begin. Cabinet would confirm that the Agency can borrow prior to Contractual and Financial Close.

The approximate dates for these milestones and the hold points for reporting back to the Transport Agency Board are summarised in Table 13-1.

Table 13-1: PPP procurement and board reporting milestones

PPP Procurement Milestone	Approximate Date
Transport Agency Board approval of the Business Case for Implementation	**December 2014**
Cabinet enabling Agency to borrow up to PSC limit	**May 2015**
PSC review based on new geotech and additional design	May/June 2015
Expression of Interest (EOI) to market	May 2015
Close of EOI	June 2015
EOI evaluation	July 2015
Report back to Transport Agency Board – Approval to announce shortlist and issue RFP	**July 2015**
Announce shortlisted consortia	July 2015
Request for Proposal (RFP) to market	August 2015
Close of RFP	March 2016
Evaluation and clarification process	April/June 2016
Report back to Transport Agency Board – Approval to appoint Preferred Bidder and enter negotiations	**July 2016**
Preferred Bidder announced	July 2016
Negotiation with Preferred Bidder	July-October 2016
Report back to Transport Agency Board – Approval to execute the contract and reach Financial Close	**October 2016**
Cabinet confirmation of Agency's approval to borrow	**October 2016**
Contract Award and Financial Close	October 2016

The Transport Agency's on-going partnership with Treasury will continue during the procurement process. The Transport Agency recognises and acknowledges the interests that the Treasury has in a Transport Agency project that is procured via PPP. This interest relates primarily to the Treasury's programme view across all PPPs in New Zealand and its stewardship of the Standard Form Agreement. The Treasury will be involved in matters that potentially relate to or have implications for the PPP programme and precedents.

13.2 Key Procurement Stages

The process that will be undertaken to select and negotiate with a Preferred Bidder is outlined below.

13.2.1 Procurement Process

The procurement process will, in broad terms involve the following components:

- Advertising in international PPP-specific media to ensure market sounding discussions capture the views of all potential respondents, and all potential respondents are provided an equal opportunity to participate in the procurement process (this has been completed).
- An Expression of Interest process designed to allow the Transport Agency to evaluate bidders and develop a shortlist of consortia that will be invited to submit proposals in response to a Request for Proposals.
- A Request for Proposal (RFP) process leading to the submission of comprehensive proposals. The approach taken in the TGP procurement (and other PPPs completed to date) is to use the proposals to identify one Preferred Bidder.
- A negotiation phase with the Preferred Bidder with the objective of securing a signed contract.

13.2.2 Procurement Strategy: Objectives and Outcomes

The objective of the procurement process will be to select a Contractor that has the optimal attributes and resources to deliver long term value for money for the Transport Agency through effective and efficient design, construction, financing, maintenance and operation of P-Wk PPP.

To achieve this outcome, the procurement process will:

- Adhere to probity principles and be above challenge. This process will be fair, transparent, lawful and undertaken with integrity.
- Adhere to the protocols for recommendations and approvals required at key decision points in the process.
- Maintain an effective level of competitive tension to facilitate an outcome for the Transport Agency that will deliver best value for money.

Critical to achieving the desired outcome will be ensuring that the Respondents are very clear about the Transport Agency's requirements for the project, particularly regarding its requirements for safety and customer focussed outcomes. The procurement process will include a high level of interaction between the Project Team and the Respondents. This will be designed to:

- Ensure the Respondents have a comprehensive appreciation of the project objectives and how they should frame their proposals. This will assist in ensuring that the proposal evaluation process can be focussed.
- Minimise the extent of clarification of proposals needed during the evaluation process.

Feedback from the bidders following TGP indicates that the private sector side found the interactive tender process valuable and well run.

13.2.3 Market Sounding

The market sounding is the critical indicator of the likely successful delivery of the project on a basis acceptable to both the Transport Agency and the private sector. It is important to have an understanding of the market's appetite for the project and its perceptions of key issues before the procurement process formally commences.

The Transport Agency has conducted market soundings with potential debt, equity and contractor participants throughout April 2015.

In order to establish the "market", advertising was placed to elicit any additional seriously interested bidding companies or consortia that were not already known to the Agency. In this context the "market" includes various private sector participants: operators, construction contractors, debt and equity providers. Responses to the advertising contributed to the basis for inviting parties to participate in market sounding.

The market sounding was also used to communicate the Transport Agency's key objectives for the project and draw responses from the market about meeting those objectives.

Key objectives of the market sounding include confirming or determining:

- That the project is attractive to the market.
- That there is adequate capacity, capability and competitive interest to meet the project requirements.
- That the envisaged commercial arrangements and risk allocations are acceptable to the market.
- That the procurement approach is acceptable to the market.
- Whether there are any other factors (e.g. risks) that should be considered in structuring the project.
- Information that can be extracted from the market to be used to refine the procurement plan, the key commercial principles and the Transport Agency's objectives to be communicated in the request for expressions of interest.

The market sounding also:

- Provides the opportunity to obtain feedback on other PPPs the parties have been involved with to identify any lessons learnt.
- Raises the level of awareness and understanding of the project among potential participants to encourage their preparedness for the project.
- Communicates to the market the Transport Agency's key expectations for the project, the project timelines and the approach to the market.

13.2.3.1 Market Sounding Plan

A market sounding plan was produced in advance of commencing the market sounding process. The plan outlines the proposed nature and extent of interaction with the market. The plan presents:

- The objectives of and the outcomes being sought from the market sounding.
- The market participants to be contacted.
- The process for meeting with the market participants and documenting the discussions.
- Who from the Project Team (and its advisers) should attend the market sounding meetings.
- A proposed letter inviting interested market participants to be involved in the market sounding and an agenda listing issues to be discussed.
- Rules for engagement. Importantly, this will provide guidance on the process to be followed to ensure the engagement has integrity and protects the commercial and reputational positions of all participants and of the procurement process itself.
- Timelines.

- An outline of the report to be produced after completion of the process. This will summarise the issues and themes obtained from the discussions with the participants and the conclusions drawn.

13.2.4 Request for expressions of interest

The principal objective of the request for expressions of interest stage is to confirm the level of market interest and capability and to select a shortlist of Respondents who may subsequently be invited to submit detailed, binding and fully funded proposals for the project.

The procurement process will be designed to encourage the private sector to develop innovative design and operational solutions over the term of the Project Agreement that will deliver value for money. As part of this process, the request for expressions of interest will be used to reinforce the Transport Agency's focus on long term partnership, safe journeys, customer satisfaction and reliable travel times.

In addition to requesting that Respondents demonstrate their track record, experience and capability as well as their understanding of the project and its key commercial terms, the request for expressions of interest will require Respondents to provide preliminary information on how they will improve outcomes and cost savings through:

- Adopting a whole of life approach to design and services provision.
- Providing design and service innovations not currently used within the Transport Agency's network.
- Adopting incentives to improve performance and incorporate efficiencies on an ongoing basis

Prior to the receipt of responses to the request for expressions of interest, a clear and transparent expressions of interest evaluation plan and associated documentation will be developed and approved. This will include:

- An appropriate evaluation team structure, including protocols on interaction with specialist advisors and bidders during the evaluation process.
- An evaluation methodology that covers how proposals will be assessed and the relative importance of particular evaluation criteria. The request for expressions of interest will provide considerable guidance to Respondents on how the Transport Agency will evaluate the request for expressions of interest responses.
- The approvals process.

The following two-stage process will be adopted to evaluate the expressions of interest.

- Stage 1 – Compliance assessment

  Respondents must provide the information requested under each of the Sections set out in the request for expressions of interest to be considered compliant. The Transport Agency may decide not to conduct the Stage 2 detailed assessment of a Respondent's expression of interest if it is not considered compliant following the Stage 1 compliance assessment.

- Stage 2 – Detailed Assessment

  Compliant expressions of interest will be assessed against the evaluation criteria set out in the request for expressions of interest.

The realistic choice is between shortlisting three or two Respondents. The preliminary intention is to short-list three, who will be invited to participate in the RFP proposal process. The following factors have been considered in proposing three bidders:

- The number of Respondents in the proposal process needs to be sufficient to ensure robust competition across all the elements of the PPP offering

- The number should protect the Agency against the risk of one bidder dropping out.
- The number should maximise the potential for design innovation offered by the non-prescriptive consent conditions.
- The number needs to enable the Agency to explore the potential offered by new entrants who have been attracted to the New Zealand market by the PPP opportunity, while also covering off the downside risk associated with seeing a new player for the first time.
- The number needs to be small enough to encourage each Respondent to put its best efforts into the process. The effort and cost incurred by Respondents in preparing their proposals and by the Transport Agency in managing the proposal process and then evaluating the proposals received is significant. If too many Respondents are selected the process will be unwieldy to manage and Respondents could reduce their investment in the proposal because of the lower chances of success.

The TGP procurement process demonstrated that it is possible to run a competitive process with two Respondents but it is also clear that the risks are higher because competitive tension can be compromised if one bidder drops out.

On balance, the potential process and competitive efficiency gains offered by having three bidders is considered to outweigh the additional resource costs. The lessons learnt from the TGP process suggest the interactive tender process can be refined to reduce the resource intensity of the bidding stage for all participants. Additionally, there is potential to reduce the intellectual property payment made by the Agency for the intellectual property of the losing bidder(s), which would further lessen the cost impact of having an additional bidder. The IP payment is an important consideration because it makes it easier for bidders to get approvals to bid and helps to overcome the risk mentioned above that bidders will reduce their investment in the bid. However, in other PPP jurisdictions such payments are often not made (eg, UK) or are much lower (eg, US and Australia) than the one on TGP. Furthermore, a special dispensation was made for the IP payment on TGP given it was a first-of-a-kind procurement in the NZ market. This was considered by some to be generous compared to payments made by the Agency on other projects. This does suggest there is scope for reducing it without compromising the value that it brings to the process.

A final decision on how many bidders to take through will be made following more detailed consideration of the various elements, which will be carried out as part of the RFP development phase, and based on the strength of EOI responses received.

13.2.5 Request for Proposals

The short-listed Respondents will be announced following the conclusion of the request for expressions of interest stage. The RFP will require short-listed Respondents to submit fully costed proposals. TGP required proposals to include fully committed funding and this approach may also be taken on P-Wk. However, one of the lessons taken from the TGP process was that there may be potential to improve the competitive tension and thereby the price received for the financing. The options to achieve this, including potentially modifying the financing bid requirements, will be explored during the RFP development phase.

The proposal process will incorporate an interactive procurement process. There will be complexities in designing and constructing P-Wk. While every effort will be made to ensure that the RFP comprehensively describes the outcomes that the Transport Agency is seeking and the roles and responsibilities of the Contractor and the Transport Agency, discussions with the Respondents will be required to ensure they clearly understand the Transport Agency's requirements and the risk allocation.

The objective of the interactive procurement process is to ensure that the proposals are focussed and comprehensively address the matters of primary importance to the Transport Agency. This is expected to assist in minimising the risk of a protracted proposal evaluation process and facilitate the short-listing of one Preferred Bidder requiring minimal negotiation to reach the point of having an agreed Project Agreement that can be signed by both parties.

Interactive procurement process does have probity risks, particularly:

- Respondents misinterpreting communications. The TGP interactive process demonstrated the importance of being very precise in the messages being given to the bidders.
- Inconsistent messages being given to Respondents
- Respondents considering they have been treated unequally
- Respondents perceiving that their commercial information, including intellectual property developed during the interactive procurement process, has been shared with others.

These are all real risks. They will be managed through a transparent and comprehensive approach to probity. This will involve:

- Carefully planning the interactive sessions and conducting them in strict confidence to protect the know-how of the Respondents.
- Ensuring that all members of the Project Team participating in the interactive process are fully trained on their obligations and the boundaries they are working within.
- Communicating to the Respondents the need for transparent and equitable treatment of all of the short-listed Respondents and for observing all communication and procedural protocols.
- Communicating to all parties participating in the process the sensitivity surrounding commercial-in-confidence material and intellectual property.
- Ensuring that Respondents have agreed to the proposed process before it starts, that they have signed disclaimer and indemnity deeds and conditions of tendering have been developed specifically for the workshops.
- The Transport Agency having the right people to properly resource the conduct of interactive procurement process within a reasonable timeframe.

Although there are inherent risks in adopting interactive tendering, the benefits in terms of securing a value for money outcome for the Transport Agency will outweigh the risks and costs. The Transport Agency has considerable experience across a range of procurement activities in successfully running such processes.

13.2.6 Evaluation of Proposals and Negotiation

13.2.6.1 Evaluation

An evaluation and negotiation plan will be developed prior to release of the RFP to the market. The TGP RFP evaluation plan will provide the basis for the P-Wk plan. The plan will include descriptions of the evaluation and negotiation process, the key participants in the process and their roles and responsibilities (including the approvals process), the approach to scoring, evaluating and short listing and the negotiation process and procedures.

Respondents will be requested to provide separate non-price and price responses to the RFP. The Transport Agency will evaluate non-price components of proposals separately to the price proposals as was the approach adopted for the TGP proposal evaluation process.

13.2.6.2 Clarification process

Once the Preferred Bidder has been selected a clarification process will take place during which the Respondent will be required to clarify points in its bid. This process will take place before the Preferred Bidder is appointed, meaning that competitive tension is retained for as long as possible. The aim of this stage in the process is to achieve the highest degree of completeness and commitment in the bid as possible. This will provide the platform for entering the final negotiations phase.

The importance of this clarification process is one of the learnings from TGP. The negotiations phase on TGP was drawn out, partly because it was a first-of-a-kind transaction,

but also partly because bid positions were re-opened during negotiations. During the RFP development phase consideration will be given to approaches that might be used to further enhance and enforce the committed bid positions.

The intention in this process will be that the negotiation phase can be shortened (though the time taken overall might remain the same).

13.2.6.3 Negotiation

The intention is for the evaluation of proposals to produce a recommendation of one Preferred Bidder that will be invited to enter into negotiations with a view to finalising Project Agreement terms. The Transport Agency will reserve the right to proceed at its discretion with two short-listed Respondents [redacted]

The Transport Agency will reserve the right to withdraw if negotiations between the Transport Agency and the Preferred Bidder do not result in the execution of the Project Agreement in accordance with the Transport Agency's expectations.

It is expected that the precedent set by the TGP Project Agreement will assist in reducing the number of contentious matters to be negotiated with the preferred bidder and so assist in minimising the time between preferred bidder announcement and financial close.

The expected outcome of the negotiation process will be an agreed Project Agreement that can be signed subject to the appropriate recommendations and approvals.

13.3 Future Stakeholder Management

Stakeholder management is an important component of the implementation strategy. There may be groups of key stakeholders who will have a preference to deal with the Crown through its Agency directly rather than with an entity further removed from the Crown (i.e. the PPP contractor). Iwi groups in particular have such a preference and this is an important consideration that must be taken into account in the design of the PPP arrangements. Clearly the PPP entity would also need to honour and adhere to any existing Memorandum of Understanding (MOU) arrangements that have been entered into with stakeholder groups.

The consent conditions for P-Wk include specified conditions relating to the preparation of a Stakeholder and Communication Plan ("SCP"). This plan needs to set out the procedures detailing how the public and stakeholders will be communicated with throughout the construction period. The plan needs to be completed prior to commencement of construction.

The purpose of the SCP is to provide the framework for:

- Informing the community of construction progress, including proposed hours of operation outside normal working hours and project contact details;
- Engaging with the community in order to foster good relationships and to provide opportunities for learning about the project;
- Providing early information on key project milestones;
- Identifying stakeholders such as educational facilities (including Mahurangi College), iwi and hapu groups, community groups, business groups, residents organisations, Auckland Council, Watercare Services Limited, and local board; and
- Establishing Community Liaison Groups.

Other conditions include:

[redacted]

- Maintaining a permanent register, during construction, of any complaints received alleging adverse effects from, or related to, the exercise of the designation.
- At least 12 months prior to commencement of Construction Works, requesting relevant Iwi to appoint an Iwi Advisor or other nominated kaitiaki.

These conditions must be taken into account in the design of PPP arrangements. In particular, the PPP contractor will need to be contractually bound to honour and adhere to the conditions set by the Board of Inquiry.

13.4 Probity Plan

The procurement process for the selection of the P-Wk Contractor will be robust, open and fair. A Probity Plan will be developed to provide the control framework for the tasks, procedures and treatment required to manage the probity-related aspects of the procurement process.

The overarching objective of the Probity Plan will be to ensure, through the identification of key risks and the adoption of a set of guiding principles and specific controls, that probity issues are taken into account throughout, and reflected in, the procurement. The Probity Plan will assist in:

- Ensuring that the main processes and decision-points are relevant to the needs of the project, readily identifiable and well understood by all those associated with it.
- Ensuring that roles and responsibilities within the procurement are clearly allocated, provide a strong basis for decision-making and enable those responsible to be held accountable for their actions.
- Ensuring compliance with all process requirements, thereby promoting the use of best practice and minimising the risk of procedural or other challenge.
- Minimising the risk of material conflicts of interest not being identified and appropriately managed.
- Maintaining public sector integrity by generating and preserving confidence in the process.
- Enabling the procurement to result in an outcome which delivers the best value for money.

Any large scale procurement process will have probity risks. The procurement of P-Wk through a PPP will add another dimension to this risk set. In particular, there will be inherent probity risks arising from:

- The long term nature of the PPP Project Agreement.
- The attraction of offshore bidders that may be unfamiliar with New Zealand conditions and requirements.
- The risks around the negotiation of a large-scale, risk-sharing arrangement.
- The potentially fluid nature of the engagement with bidders compared with more conventional tendering processes.

Mitigation of these risks will be achieved through:

- Appointment of a probity adviser to, among other things, provide independent advice during the procurement process on all probity-related issues, so that the Transport Agency's processes and procedures meet recognised probity standards and that any problems or questions are dealt with satisfactorily.
- Design of the procurement process taking into account probity requirements.

- A comprehensive probity plan that documents the standard of behaviour required from all Project Team members and the documentation needed to evidence that the procurement process has been undertaken in accordance with good probity principles.
- Requiring all Project Team members to be fully familiar with their probity obligations and supporting this with thorough training.

14 Governance and Management

14.1 Project Governance and Management

The following figure outlines the governance and management structure for the procurement. This assumes a PPP procurement and has been based on the structure used for the TGP also incorporating the successful Alliance structure utilised in the consents phase by the Further North Alliance.

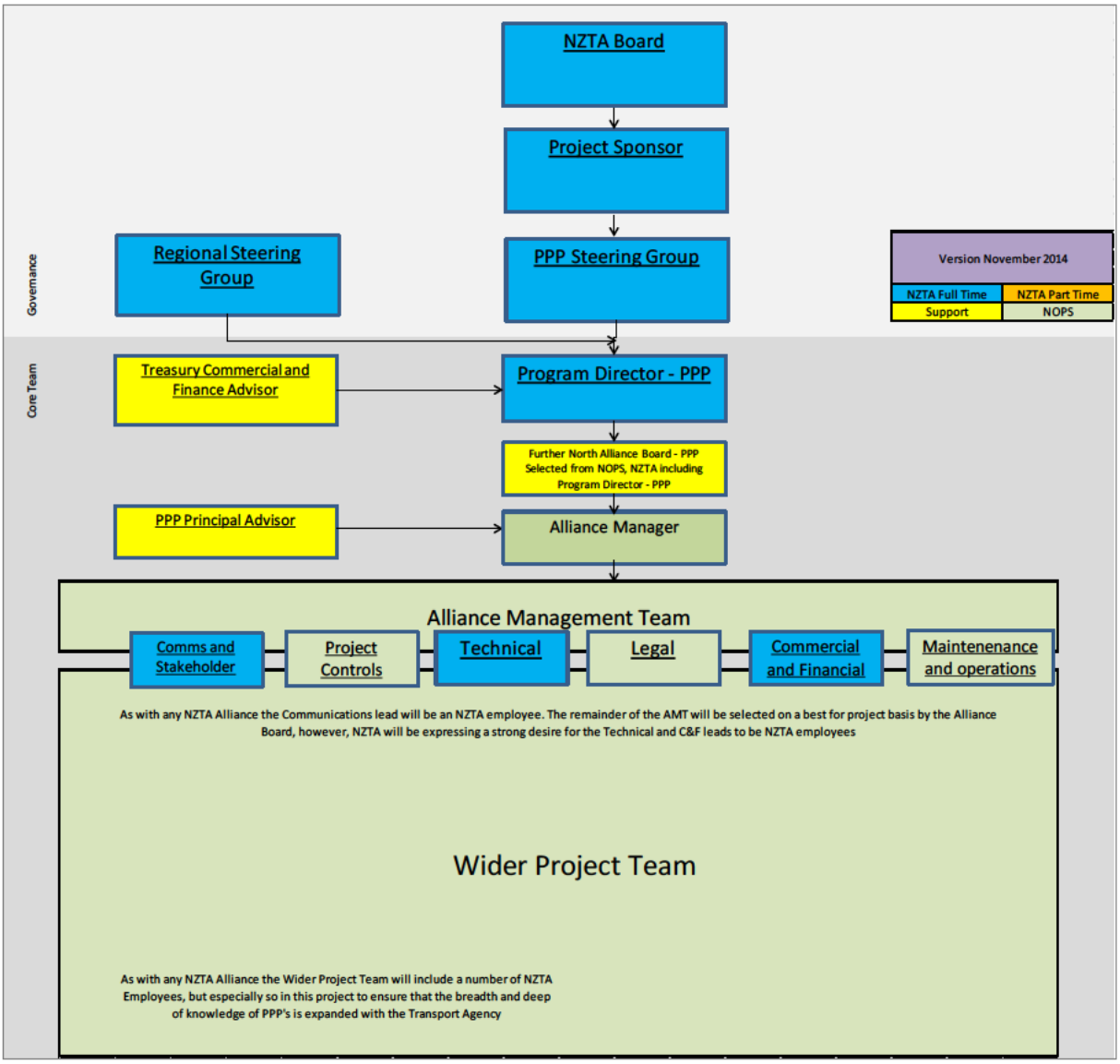


Figure 14-1: Governance and management structure

The PPP Steering Group, Regional Steering Group and Alliance Board (which includes the Programme Director) contain individuals that will have governance responsibilities within the project structure. The Core Team (which also includes the Programme Director and Alliance Board) will be responsible for managing and delivering the procurement.

The division between governance and project management and delivery is distinct, however the Programme Director role and the Alliance Board straddle both governance and management.

Descriptions of the responsibilities of each of the key groups/individuals in the governance and management/delivery structures are presented in the following tables.

Table 14-1: Project governance responsibilities

Role	Responsibilities
The Transport Agency Board	Overall governance responsibility for the project
Project Sponsor	Ensure the successful delivery of the procurement of the project within the agreed scope, timetable, resources, quality expectations and budget. To this end the Project Sponsor will: • Have ultimate authority and responsibility for the project, subject to delegations from the Board. • Approve changes to scope, schedule, budget and quality. • Escalate and champion recommendations to the Transport Agency Board. • Provide policy guidance to the Programme Director. • Review progress and provide advice on resolution of issues. • Support the Programme Director. • Resolve issues that are beyond the Programme Director's authority.
Governance Group	• Make recommendations on decisions that are outside of the delegated authority of the PPP Director. • Review high level performance in the areas of program, cost and risk. • Supporting the timely resolution of appropriately escalated issues that may affect the successful delivery of the project. • Approve key documents and decisions impacting on the delivery of the project. • Make recommendations about any requested changes to the agreed project scope. • Recommending decisions and documents for approval • Report to the Project Sponsor
Programme Director	• Project highlight reporting • Escalate matters outside of his or her delegated authority to the Governance Group and the Project Sponsor as appropriate. • Developing, implementing and managing the governance framework

Table 14-2: Project management and delivery

Name	Responsibilities
Programme Director	• Overall responsibility for successful delivery of the procurement outcomes, acting within his or her delegated authority. • "Day to day" agent of the Project Sponsor • Provide overall project management direction including management of variations and overall project planning. • Provide budgetary and financial control. • Provide quality assurance.

	• Review and actively manage project risks. • Provide oversight of stakeholder management and communications activities.
Alliance Board	• Forum that represents the interests of all Participants to the Further North Alliance providing guidance to the Alliance Manager. The Programme Director is a member of this Alliance Board, and draws upon the experience and knowledge of fellow senior Alliance Participant executives that comprise this Board. All decisions must be a consensus.
Regional Liaison Group	• Receives advice and information from the Programme Director to enable effective management of key stakeholder relationships • Provides advice to the Programme Director on critical stakeholder issues that need to be considered to ensure that the project is implemented seamlessly and that important relationships are managed effectively.
Alliance Manager	• Focus for day-to-day management of the project. • Conduct resource allocation and manage the project team. • Monitor and report team performance to the Programme Director and Alliance Board. • Develop, maintain and monitor the procurement timetable and programme for the project. • Negotiate, commission and manage the necessary team of advisors. • Manage the project risk management process and Risk Management Plan. Commission the support required and implement the process. • Support the Programme Director in overall project management, as required. • Monitor and report any potential or emerging stakeholder and/or communications risks.
Alliance Management Team (Worksteam leads)	• Lead the relevant work programme. • Negotiate, commission and manage, in conjunction with the Alliance Manager, advisors and consultants. • Manage resource allocation. • Communicate with other workstream leads. • Report to the Alliance Manager

14.2 Decision making and approvals

The delegated responsibilities for decisions at key points in the procurement process are presented in Table 14-3. Important points to note are:

- The release of the request for expressions of interest document will be the first point at which there will be the release of a formal, authorised document to the market for the procurement. The EOI can only be released once Cabinet approval to proceed with PPP procurement has been received.
- Other than approval to release the request for expressions of interest document and consent to sign the Project Agreement, key decisions will be made within the governance structure for the project.

Table 14-3: Decision making and delegations

	Programme Director	Governance Group	Sponsor	Board	Minister	Cabinet
Approve Expression of Interest Content	R	R	A	I		
Approval to Release of Expression of Interest	R	R	R	R	I	A
Selection of Consortia to Receive RFP	R	R	R	A	I	
RFP Bid Evaluation Criteria	R	A	I	I		
Approve RFP Content (including draft Contract)	R	R	A	I		
Approval to Release RFP	R	R	R	A	I	
Delegated Authority to Decide Preferred Bidder	R	R	A	A	I	
Approval of Negotiation Strategy and Brief	R	R	R	A		
Approval to sign the Project Agreement	R	R	R	R	I	A
Approval that conditions precedent are met for Financial Close	R	R	A	I	I	
Approval to accept interest rate offers and to Financial Close	R	R	A	I	I	I

The key for the table is:

A = authority to approve a decision

R = authority to recommend a decision

C = consulted in making a decision or recommending a decision

I = informed of a decision

14.3 Project Management Framework

The project will be controlled using a project management framework that will focus on:

- Project governance: reporting and oversight, effective management of change processes, risk and issue management, definition of roles, responsibilities and required delegations.
- Project control processes: planning and scheduling, resource management, dependency management, risk and issue management, monitoring and reporting, stakeholder and communication management, quality management and information management.

Application of the project management framework will be supported by the use of standard project management tools.

15 Assurance

15.1 Acceptance

Formal construction funding acceptance (sign-off) of a project of this size will require approval of the Transport Agency Board. As for a traditional procurement model (e.g., Competitive Alliance), all standard HNO and P&I value gate processes would apply, including risk and assurance committee, VAC, and P&I GM and HNO GM, prior to going to the Board.

Ongoing Board reporting will occur at major decision hold points, as set out in section 13.1.

15.2 Peer Review

The Transport Agency has documented processes and policies for independent road safety audits, structures design reviews and internal and external roading, environmental including urban and landscape design reviews under a traditional procurement approach. This will be used, where appropriate but with the overriding objective of ensuring that the intent of the PPP approach to facilitate innovation and being outcomes focussed is not hindered but also maintaining assurance for the Transport Agency around the asset quality.

15.3 Change Control

The HNO Group of 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 with escalation to the appropriate scope committees 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.

15.4 Cost Management

As for scope, cost management policies are well documented within the Transport Agency and within the financial delegations of the organisation.

For a PPP model, quarterly Unitary Payments based on availability and any abatement adjustments will be paid upon certification by the Transport Agency in accordance with the agreed payment model. The role of the Transport Agency or its agent will be limited to exception reporting on delivery failure, and agreement with the operator that an abatement notice is applicable. The Transport Agency will put in place suitable monitoring and reporting mechanisms to ensure that its contracted performance deliverables are being achieved. These will be developed and implemented for the TG PPP and this base can be leveraged for P-Wk and any subsequent PPPs.

As part of the PPP negotiations, the Transport Agency will look to gain a share of any refinancing savings that the equity partners may secure following project commencement.

KPIs will be in line with the Transport Agency asset maintenance and operation deliverables, as well as any consent condition mitigation measures that apply i.e. ecological planting performance. KPIs will include crash rate monitoring, safe system delivery, lane availability, travel real-time monitoring and incident management.

15.5 Issues Management

Issues management will be undertaken at a number of levels, and via a number of channels. Incident response will be the responsibility of the P-Wk operator. The Project Agreement, following the precedent set in TGP, will include a comprehensive set of reporting requirements back to the Transport Agency.

The operator will be required to provide a 24/7 incident reporting communications facility, with specified response times dependent on incident severity. Similarly, reporting to the Transport Agency will be required, along with risk management.

The Transport Agency structural, SCRIM and high-speed RAMM inspections, safe systems and road safety audit programmes are all expected to apply to P-Wk. This will ensure that those areas of greatest risk to the Transport Agency are independently inspected and monitored, in line with the required KPIs for the motorway.

The Transport Agency will require a seamless operation of its network, with regard to the HPermit, overweight, Over dimension and third party traffic management requirements (e.g. hikoi), and the PPP operator will be required to take full responsibility for those operational requirements.

The Transport Agency intervention during the concession period would be very limited. Escalation triggers will apply where repeated KPI failure and the abatement penalties fail to deliver the required contract performance. Initial escalation will be by way of the PPP governance board structure (Project Sponsor's representative), and the agreed dispute resolution mechanism. Unsatisfactory resolution would require rapid escalation up the Transport Agency management structure, as the financial implications of any failure to agree will very quickly exceed current delegations, and would have wider portfolio implications. Any decision around early termination of a PPP concession would have significant financial implications for the Transport Agency and is likely to require Treasury involvement.

15.6 Tolerances

Liquidated damages will be specified for late commissioning of the project, including late delivery of any separable portion that may be specified, or agreed with the PPP.

Limited design minima with zero tolerances will be specified for key design parameters e.g. lane widths, safe-stopping sight distances. However, the PPP would be able to present specific design departures for approval where value-for-money to the Transport Agency can be demonstrated, either by way of cost savings, early delivery or improved performance (safe system approach).

Tolerance on agreed contract price will be subject to the Transport Agency financial advisor scrutiny as part of the overall financial due diligence. As indicated any client-initiated scope changes including quality, levels of service, aesthetics will attract a significant premium and will be best managed by the Transport Agency taking a "hands-off' approach.

15.7 Assurance Deliverables

Under a traditional Alliance contract, the Transport Agency would be engaging a client's representative and/or designer's representative to undertake random verification testing and a surveillance role during construction to provide assurance that specified levels of quality were being delivered.

Under a PPP procurement model, the Transport Agency will rely on provision of specified levels of quality assurance and formal design, surveillance and MSQA for code and the Transport Agency standards compliance certification, by the constructor. Issues to be dealt with by the Transport Agency include comprehensive and sufficiently enduring professional indemnity and public liability insurance or suitable performance bond cover.

An Independent Reviewer will be jointly engaged by the Transport Agency and the PPP Contractor to provide independent assurance and sign-offs through the construction phase.

Pre-commissioning condition surveys in accordance with required KPIs and aligned with O&M asset management handover requirements, will be required to be undertaken and complied with prior to opening. The Transport Agency will commission independent pre- and post-commissioning road safety audits that the PPP will need to satisfactorily address before either permitting the motorway or separable portion to be opened or suitable measures implemented that will effectively mitigate the road safety issues (with any payment abatement as appropriate).

16 Lessons Learnt and Post Project Monitoring

16.1 Lessons Learnt

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

A lessons learnt process has been implemented for the TGP procurement and this provides a template for the lessons learnt process for P-Wk. The TGP lessons learnt has involved independent external consultants facilitating lessons learnt workshops with the Agency's TGP team, conducting interviews with key people on both the public and private sector sides of the transaction, and providing expert review and insight based on their own PPP experience. The process has involved close guidance and working with an internal Transport Agency steering group to ensure that the lessons taken from TGP are the right ones and that they are presented so as to be transferable to a future PPP.

The magnitude and public and political exposure of the project would ordinarily suggest that a Level 4 SSC Gateway review would be undertaken, particularly if the project is to be delivered by way of a PPP. A Gateway process has been arranged for P-Wk.

With the exception of the SSC Gateway review, which would be funded out of the project budget but has not specifically been included in the project estimate, all lessons learnt dissemination is included within existing Transport Agency administration budgets.

16.2 Post Project Monitoring

The P-Wk project objectives are presented in Section 4. Monitoring the achievement of these objectives will be a continuous process as the project progresses through detailed design, construction and operation.

A detailed P-Wk post construction monitoring regime will be developed 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.

Appendix A – Capital Cost Estimates

Table A-1: P-Wk capital cost estimate

[redacted]

Appendix B – Programme Evaluation Framework

Table B-1: Programme evaluation criteria

Strategic Study – Evaluation Criteria			
Category	**Criteria**	**Measure**	**Data source**
Assisting Economic Development	Creation of and strengthening of national economic growth and regional productivity between the Auckland and Northland regions, e.g. freight, tourism	Overall network travel time	Transport model
	Contribution to more efficient freight supply chains between the Auckland and Northland regions through improved route quality (gradient, alignment, overtaking opportunities, connections to main centres)	Travel time on SH1 from Orewa to north of Wellsford.	Transport Model
	The extent to which the transport network integrates with planned land-use	Consistency with proposed future land-use provision in regional and district planning documents	Qualitative professional assessment
Safety and Personal Security	The extent to which road safety is expected to improve in the study area and reduce all road crashes	Reduction in traffic on existing SH1 (and therefore volume of traffic that will use safer high quality route)	Transport Model
Improving Access and Mobility	The extent to which the strategic (through traffic) function of SH1 as a nationally significant route linking the Auckland and Northland regions is achieved	Level of service on SH1	Transport Model
	The extent to which options provide strategic alternatives to address route security, resilience and flexibility, e.g. Brynderwyn Hills and Te Hana	Provision of route choice and reduction in vulnerability to blockage.	Qualitative professional assessment

Strategic Study – Evaluation Criteria			
Category	**Criteria**	**Measure**	**Data source**
	The extent to which options to improve journey time reliability and ease congestion	Corridor capacity	Qualitative professional assessment
Protecting and Promoting Public Health	The extent to which the options provide for walking and cycling to contribute to positive health outcomes and provide more transport choices, both through and between towns	Removal of through traffic from local roads. Measured by the reduction in traffic on existing SH1 (therefore providing additional capacity in town centres and along existing SH1 for walking and cycling space).	Transport Model
Environmental Sustainability	The extent to which solutions make best use of existing networks and infrastructure	Appropriate use of existing SH1 and local roads for localised trip making.	Qualitative professional assessment
	The extent and significance of effects on environment including noise, air quality, emissions, landscape, ecological areas, heritage	Environmental mapping	Qualitative professional assessment
	The extent to which overall energy use and greenhouse gas emissions are reduced (As per the New Zealand Energy Efficiency and Conservation Strategy)	Vehicle operating costs.	Transport Model
	The extent and significance of developed land take, severance; negative and positive opportunities	Volume and type (e.g. HCV) of traffic passing residential / open space amenity areas. Route location and opportunities to integrate with existing and proposed land-uses. Connectivity across offline routes and community connections.	Qualitative professional assessment
Value-for-Money	The overall cost of the option	Dollars	Qualitative professional assessment

Strategic Study – Evaluation Criteria			
Category	**Criteria**	**Measure**	**Data source**
	The ability of the option to be tolled	Ability to meet LTMA tolling criteria, e.g. free alternative route	Qualitative professional assessment

Appendix C – Project Evaluation Framework

Table C-1: Project evaluation framework

Categories and Criteria	Criteria	Measures	Data Source	Targets
Assisting Economic Development	The extent to which the option will enhance inter regional and national economic growth and productivity (RONS #1).	Overall network travel time (function of vehicles per hour x travel time - hrs).	Not a differentiator	
	The extent to which the option will improve movement of freight and people between Auckland and Northland (RONS #2).	Length of grade over 4% (km).	Option plans	Less than 6km (current option 6km) is greater than 4% grade
	The extent to which the option will improve connectivity between the medium to long term growth areas in the northern Rodney area (Orewa, Warkworth and Wellsford) (RONS #3).	Distance between Warkworth (Hill St/SH1 intersection) and Wellsford (Matheson St/SH1 Intersection) (km).	Not a differentiator	Interchanges within 3km of Warkworth Town Centre, and within 2km of Wellsford Town Centre
	The extent to which the option will support local economic development.	Maintenance of town centre viability	Qualitative professional assessment	Solution is well integrated with the Warkworth and Wellsford Structure plans
Safety and Personal Security	The extent to which the option is expected to improve road safety in the area and reduce all road crashes.	Accident Rate Analysis (exposure) (2026).	Not a differentiator	30% reduction in Accident Costs across the corridor
Improving Access and Mobility	The extent to which the option achieves the strategic (through traffic) function of SH1 as a nationally significant route linking the Auckland and Northland regions.	Level of service on RoNS (2026).	Not a differentiator	LOS of B on RoNS in 2026 (Standards Report endorsed by VAC)
	The extent to which the option provides a strategic alternative to address route security,	Provision of route choice and reduction in vulnerability to blockage.	Qualitative professional assessment	RoNS provide alternative routes to Dome Valley and Schedewys Hill

Categories	Criteria	Measures	Data Source	Targets
	resilience and flexibility.	(Will existing highway and upgrade be affected by same event?)		
	The extent to which the option provides a strategic alternative to address a point incident.	Provision of route choice and reduction in vulnerability to blockage. (Ability to address point incident)	Not a differentiator	RoNS provide alternative routes to Dome Valley and Schedewys Hill
	Proximity of the option's interchange locations to activity nodes.	Distance from interchange location to Warkworth (Hill St / SH1 Intersection) and Wellsford (Matheson St/SH1 Intersection) (km).	Option plans	Interchanges within 3km of Warkworth Town Centre, and within 2km of Wellsford Town Centre
	The extent to which the option will improve the reliability of the transport network through providing a more robust and safer route between Auckland and Northland (RONS #4).	Corridor capacity	Not a differentiator	RoNS provide alternative routes to Dome Valley and Schedewys Hill
	The extent to which the option maintains convenient local access and connectivity.	Number of properties with an increased travel time / distance exceeding 15%	Not a differentiator	n/a
	Impacts on and realignment of SH1 during construction	Length of SH1 to be realigned (km).	Option plans	No impact on SH1 except at tie in / crossing points
		Number of crossing points of RoNS with SH1 (number).	Option plans	Option limited to a single crossing point
Protecting and Promoting Public Health	The extent to which the option can provide for walking and cycling to contribute to positive health outcomes and provide more transport choices, both through and between towns.	Removal of through traffic from local roads (2026). Measured by the reduction in traffic on existing SH1 therefore providing additional capacity in town centres and along existing SH1 for walking and cycling space.	Not a differentiator	Reduction of 1000 vehicle trips on SH1 between Woodcocks and Hudson Road during the peak hour

Categories	Criteria	Measures	Data Source	Targets
		(Average of reduction in northbound and southbound vehicles per hour)		
Environmental Sustainability	The extent to which the option will minimise the physical extent and significance of the project.	Area of works (hectares).	GIS	Option impacts on less than 350 Ha
		Quantum of earthworks (millionm^3).	12D – cut and fill	Option should involve less than 18.26 million m^3 of cumulative earthworks
	The extent to which the option will avoid potential environmental impacts on areas of high ecological value or high landscape value.	DoC reserves (hectares).	GIS	No impact on DOC land
		Significant natural areas (RDC) (hectares).	DoC and Council databases	Impact less than 2 Ha of significant natural area
		Area of affected Outstanding Natural Landscapes (ARC) (hectares).	GIS	Impact less than 17 Ha of Outstanding Natural Landscapes
		Maximum cut and fill heights (m).	Qualitative professional assessment (maximum depth)	Cut and fill maximums of 46/30 m
	The extent to which the option will impact on coastal areas or water courses.	CMA's (ARC) (hectares).	DoC and Council databases	No impact on CMA's
		Significant streams. Riparian margins (Ha)	GIS	Option has impact on less than 16 Ha
	The extent to which the option will impact on sensitive receptors with regards air quality and noise during both construction and operation.	Sensitive receptors within 50m of carriageway (air quality).	GIS	Option alignment is within less than 30 sensitive receptors
		Sensitive receptors to traffic noise exposures (moderate, high)	GIS - employing NZS6808 Noise Criteria (moderate: 57-64dB Laeq24hrs; high: >64dB Laeq24hrs)	Option impacts less than 150 sites with traffic noise exposures

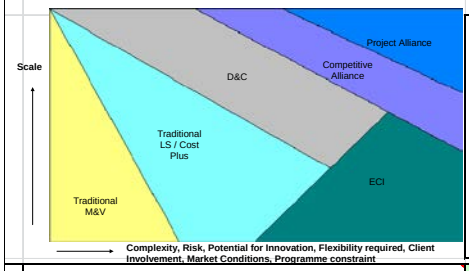
Categories	Criteria	Measures	Data Source	Targets
		Road with grades steeper than 4%.	Long sections	Less than 6km (current option 6km) is greater than 4% grade
		Vehicle kilometres travelled (VKT) through corridor (2026).	Qualitative professional assessment	15,5000 -16,5000 VKT during the peak period in 2026
			Strategic transport model	
	The extent to which the option will reduce overall energy use and greenhouse gas emissions (NEECS).	Vehicle operating costs (2026).	Transport Model (Annualised, 2010$)	$60,000-$65,000 per peak period in VOC in 2026
			Qualitative professional assessment	
	The extent to which the option will avoid impacts on places of archaeological or heritage significance (eg Protected Items – RDC).	Number of impacted places of significance.	GIS, DoC and Council databases	Impact on less than six places of significance
	The extent to which the option will avoid impacts on places of cultural significance.	Number of impacted places of significance.	GIS, DoC and Council databases, iwi investigations	No effect on places of significance
	The extent to which the option will impact on communities during both construction and operation.	Number of buildings directly affected.	GIS	
		Properties (by type) directly affected (land take) – i.e. dwellings, community facilities, businesses.		Alignment effects no more than 50 buildings
	The extent to which the option will minimise social effects on community facilities (e.g. schools, hospitals, sports fields)	Any community facility directly affected.	GIS, aerial photography and RDC information	n/a

Categories	Criteria	Measures	Data Source	Targets
	The extent to which the option will minimise local economic effects including community attractions (e.g. Ransom Wines, Honey Centre) and businesses (e.g. Genesis Aquaculture, Southern Paprika Ltd).	Any business directly affected	GIS, aerial photography and RDC information	No direct impact on business except minor adjustment to access arrangement and reduction of passing traffic due to RoNS
	The extent to which the option will support regional and local land use planning intentions.	Opportunities to integrate with existing and proposed land-uses.	Qualitative professional assessment	Integrates well with proposed land-uses
		Connectivity across offline routes and community connections.	Qualitative professional assessment	Low impact on connectivity
Value-for-Money	The overall cost of the option.	Dollars (millions).	Preliminary cost assessment	
	Geotechnical cost risk (construction and operation)	Level (low to high)	Qualitative professional assessment	Medium Geotech risk
	Constructability cost risk	Level (low to high)	Qualitative professional assessment	Medium / Low risk
	The ability of the option to be tolled.	Ability to meet LTMA tolling criteria, e.g. free alternative route.	Not a differentiator	
	The ability of the option to be staged.	Construction sequencing options.	Qualitative professional assessment	Ability to be tolled
	The extent to which difficulties through the consenting process may delay the date for opening RoNS.	Level (low to high, relative to 'do minimum' by sector)	Qualitative professional assessment	Medium risk
	The extent to which the difficulty of construction may need to the construction period to be extended - delaying the date for opening RoNS.	Level (low to high)	Qualitative professional assessment	Medium or low risk

Appendix D – Delivery Model Selection Matrix

Delivery Model Selection Matrix

Puhoi to Walkworth



		Rating	Weighting	Comment	Delivery Model Rating (out of 5)							
					Traditional M&V	Traditional LS	Traditional Cost Plus	D&C	ECI (LS)	ECI (Prog)	Competitive Alliance	Project Alliance
1	Scale	Est>$100M	15%	With contract estimate >$700m well into the large end of the project scale, but with considerable uncertainty currently around the estimate.	1	2	1	5	1	1	5	5
					0.15	0.3	0.15	0.75	0.15	0.15	0.75	0.75
2	Complex ty / Scope for innovation	Complex	15%	Large earthworks project. Some significant structures. Open consenting process providing good opportunities for innovation. Geotechnical complex ty with room to develop value for money approaches to dealing with poor ground cond tions.	1	1	2	4	4	4	4	5
					0.15	0.15	0.3	0.6	0.6	0.6	0.6	0.75
3	Programme constraint	Constrained	5%	Construction start 2016/17 planned. Sept'14 Prime Minister told the Northland Economic Forum in Whangarei that construction would start in 2016-17.	2	1	2	3	4	5	4	4
					0.1	0.05	0.1	0.15	0.2	0.25	0.2	0.2
4	Market conditions	Moderate	5%	Good levels of market interest including international consortia. Bouyant regional / inter-regional market, with a significant amount of other projects going to market in advance of P2Wk.	3	3	4	3	2.5	3	3	3
					0.15	0.15	0.2	0.15	0.125	0.15	0.15	0.15
5	Risk	High	10%	Significant earthworks and ground improvement issues, with some sensitive environmental issues. Lim ted design development completed to date. Additional geotechnical investigations and property acquisition to be completed in parallel with procurement processes.	1	3	3	4	4	4	5	5
					0 1	0 3	0.3	0 4	0 4	0 4	0 5	0 5
6	Stakeholders	Moderate	10%	Large number of key stakeholders - property, DoC and Iwi. Significant investment into relationships for outcopme based consents.	3	3	3	3	3	3	3	3
					0 3	0 3	0 3	0 3	0 3	0 3	0 3	0 3
7	Client involvement, control, capability and availability	Moderate	10%	Changes in key NZTA project team resource, with a number of internal positions to be con irmed dependant on the de ivery model used. Desire to remain involved, but cha lenges with a range of competiting priorities.	3	3	3	3	3	2.5	3	3
					0.3	0.3	0.3	0.3	0.3	0.25	0.3	0.3
8	Focus on non-cost success	Moderate	10%	Some challenging environmental and social issues on the project. A strong desire to retain the good community relationships build up on the project to date.	3	3	3	3	3	3	3	3
					0 3	0 3	0 3	0 3	0 3	0 3	0 3	0 3
9	Tang ble demonstration of value for money	High	10%	High profile project given it's scale, with a strong resultant political and public expectation on the demonstration of value for money.	4	4	2	5	2	2	4	1
					0.4	0.4	0.2	0.5	0.2	0.2	0.4	0.1
10	Flexibil ty to deal with change	Moderate	10%	Macro-scope of the works fairly well locked down within consenting framework with limited current insights to potential new scope items. However with limited design deta ls, some scoping issues may occur as the design develops.	3	3	3	3	3	3	3	3
			100%		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	OVERALL RATING TOTAL				2.25	2.55	2.45	3.75	2.88	2.90	3.80	3.65
	OVERALL RANK				**8**	**6**	**7**	**2**	**5**	**4**	**1**	**3**

Appendix E – Risks included in the PSC

Table E-1: Risks included in the PSC

Risk #	Risk category	Risk Description	Risk Allocation	
			Contractor	Shared
Site risks				
S14	Political	The interpretation of the non-prescriptive consent conditions by Auckland Council carries some residual risk for the project.	✓	
S17	Environmental	Unidentified environmental considerations require protection. Has the possibility of causing cost increases and delays. Cost occurs over the construction phase.	✓	
S18	Design issues	Inadequate investigation and design with geotechnical. There is uncertainty around geotechnical challenges with an inability to quantify impacts or costs from the selection of the preferred route. Cost occurs over the construction phase.	✓	
S19	Design issues	Inadequate design with regard to drainage, storm water and water quality for example culvert sizes too small. Could cause delays to program and cost increases.	✓	
S20	Design issues	Inadequate field data received from ground survey causing delays in time, increase costs and an inadequate designation area.	✓	

Risk #	Risk category	Risk Description	Risk Allocation	
			Contractor	Shared
Design risks				
D10	Design creep	The special purpose vehicle adds to the concept design during construction which causes increases in price which cannot be managed through value engineering. Includes the possibility that the initial scope is inadequate.	✓	
Construction risks				
C9	Design issues	Unrealistic standards with the footprint ultimately too narrow for the project construction.	✓	
C10	Buildability	Constructability considerations, needing to ensure adequate access to the site.	✓	
C16	Adverse weather on contractors programme and production	Adverse weather on contractors programme and production. The site may be subject to adverse weather during construction. - a. Precipitation - b. Wind/cyclone - c. Flood	✓	
C17	Prime contractor faces financial distress	Prime contractor faces financial distress which results in the possible cessation of service, forced change in ownership and/or possible corporate failure causing financial loss to private party. Cost in re-tendering and delay during process.	✓	

Risk #	Risk category	Risk Description	Risk Allocation	
			Contractor	Shared
C18	Force majeure	A force majeure event during construction leads to damage or delays in construction progress (e.g. an earthquake).		✓
C19	Industrial action	Industrial action during construction impacts on the ability of the constructor to continue construction.	✓	
C21	Environmental management of earthworks to avoid consent issues	Compliance with consent requirements more onerous than expected resulting in additional cost and delay to meet requirements.	✓	
C22	Road safety audit	Safety issues identified by Road Safety Audit team, result in an increase in construction and design costs to meet compliance standards.	✓	
C24	Ground conditions	Collapse of cut or fill as a result of unexpected events such as slope is cut too steep and fallen down. This risk is present due to lots of cutting and filling in the project.	✓	
O&M risks				
O1	Operational costs	The risk that the operating costs of the highway are not in accordance with plans or forecasts (e.g. Increased utilities volume, traffic management costs etc.). Accident response	✓	
O2	Force majeure events during operations	Force majeure events during operations (e.g. an earthquake).		✓

Risk #	Risk category	Risk Description	Risk Allocation	
			Contractor	Shared
O6	Design risk - operational impacts	Stability of slope and erosion is not adequately designed for, which increases operating costs. Known risks with landscape for blowing out bridges and culverts	✓	
O8	Failure of mitigation (planting)	Failure of mitigation (planting).	✓	
L2	Poor pavement design	There is a risk that poor pavement design and construction results in increased maintenance costs, meaning that the asset is not available for use as intended as the cost of maintenance is greater than anticipated.	✓	
L3	Poor structure design	There is a risk that poor structure design and construction results in increased maintenance costs, meaning that the asset is not available for use as intended as the cost of maintenance is greater than anticipated.	✓	
L4	Ground conditions	There may be on-going settlement of structures or cuts during post the defects liability period. There is an area in Warkworth with a flood plan and an embankment can't be built too high causing greater risk.	✓	

Appendix F – Reconciliation of the PSC to the Transport Agency estimate

The following table provides a reconciliation from the PSC to the Transport Agency estimate and an explanation of the each of the items.

Table F-1: PSC reconciliation to Transport Agency estimate ([redacted] risk level)

	Public Sector Comparator Reconciliation	$m
	Total NPC of the PSC	[redacted]
I.	Convert the NPC to a nominal value	[redacted]
II.	Less operating costs	[redacted]
III.	Less risk adjustments	[redacted]
IV.	Less escalation on construction	[redacted]
V.	Add property costs	[redacted]
	Project base estimate	[redacted]

The following adjustments are required to the PSC in order to reconcile back to the Transport Agency estimate:

i. The PSC is has been subject to both escalation to reflect inflation and discounting to reflect the time value of money. The first step in reconciling to the Transport Agency estimate is to remove the impact of discounting, by presenting the PSC as a nominal value.

ii. Operating costs are included in the PSC to calculate the whole-of-life cost of the project over a 25 year operating period. These costs are not included in the Transport Agency estimate and therefore they are required to be removed.

iii. The risk adjustments included in the PSC are not included in the Transport Agency estimate however contingencies are. Therefore, the risk adjustments they have been removed as part of the reconciliation.

iv. Escalation to reflect inflation is added to all costs inputs in the PSC (construction, risk and operating cost inputs) at the rate of [redacted] per annum. The Transport Agency estimate does not include inflation and therefore it has been removed.

v. Property costs were not included in the base cost estimate used for the PSC analysis.

Appendix G – Potential Risk Allocation in a PPP

The Treasury's Standard Form PPP Contract sets out the allocation of risk between the Crown (Transport Agency) and the PPP contractor across the project lifecycle, including financing and handback. The following table provides an outline of potential risk allocation for P-Wk.

Table G-1: Potential risk allocation

	Type of Risk	Transport Agency retains risk	Contractor retains risk
	General		
1	Specific Law changes	Yes	No
2	General changes in law during construction phase	No	Yes
3	General changes in law during operations phase	Shared	Shared
4	Force majeure events e.g. earthquake, extreme weather events	Shared	Shared
5	Uninsurable risks	Shared	Shared
6	Insurance costs: construction	No	Yes
7	Insurance costs: operation	Shared	Shared
8	Insurance deductibles	No	Yes
9	Protest Action	Shared	Shared
10	Labour relations	No	Yes
11	Terrorism	Yes	No
	Financial risk		
12	Interest rate movement risk - fluctuation in the base-rate for loan interest	Yes	No
13	Interest rate movement risk – fluctuation in interest rate margin	No	Yes
14	Indexation risk (construction phase)	No	Yes
15	Indexation risk (maintenance and operational phase)	Yes	No
16	Exchange rate movements	No	Yes
	Site Risk		
17	Land acquisition delay	Yes	No
18	Ground conditions	No	Yes
19	Unforeseen contamination	Shared	Shared
20	Planning approvals	No	Yes
21	Third party site access e.g. utility	No	Yes

	Type of Risk	Transport Agency retains risk	Contractor retains risk
	owners, land owners etc.		
22	Archaeological artefacts	Yes	No
	Design		
23	Design specification / fit for purpose	No	Yes
24	Compliance with legislative design standards	No	Yes
25	Design for road safety performance	No	Yes
26	Design for specified travel volumes	No	Yes
27	Planning approvals - impact of designation conditions on design	No	Yes
28	Cost and responsibility of obtaining outline planning consent approvals	No	Yes
29	Additional design works required by operator	No	Yes
30	Design delays	No	Yes
	Construction		
31	Site safety	No	Yes
32	Construction cost and programme risk	No	Yes
33	Design fault	No	Yes
34	Construction traffic management	No	Yes
35	Adverse weather events (other than comprising force majeure)	No	Yes
36	Planning approvals - impact of designation conditions on construction	No	Yes
37	Construction cost increases including fuel and material supply costs	No	Yes
38	Construction errors and defects	No	Yes
	Operational Risks		
39	Site safety	No	Yes
40	Non-performance of services or poor performance of services (not achieving the performance regime)	No	Yes
41	Traffic and incident response management	Shared	Shared
42	Failure of electricity, water or other utility service provided by a third party	No	Yes
43	Increase in maintenance and operational energy cost (above	No	Yes

	Type of Risk	Transport Agency retains risk	Contractor retains risk
	indexation)		
44	Operation and maintenance cost over-run risk	No	Yes
45	Incorrect estimate of life cycle expenditure	No	Yes
46	Residual asset condition and remaining life at end of contract duration	No	Yes
	Lifecycle Risks		
47	Availability	No	Yes
48	Facility management provider insolvency	No	Yes
49	Consent conditions performance management	No	Yes
50	Road user and third-party damage to facility (graffiti etc.)	No	Yes
	Other		
51	Toll revenue or losses	Yes	No

Appendix H – Reviews and Safety Audit

Peer Review

A peer review has been undertaken as part of the P-Wk SAR. All issues arising from the review have been addressed to the satisfaction of the peer reviewer and agreed with Transport Agency.

Constructability Review

An initial constructability review was conducted on the preferred option from P-Wk. Additional assessment was undertaken through the Scheme Assessment process to address the issues raised.

Safety Audits

A road safety audit was conducted on the P-Wk. All major/significant issues have been addressed through the scheme assessment process. Several of the minor issues have been agreed to be addressed at the Scheme Design stage. Agreement has been reached with Transport Agency at the scheme assessment close out. Details of this can be obtained in the P-Wk SAR[52].

A preliminary stage Road Safety Audit was conducted on the P-Wk preferred option design, covering both general design matters and safety issues. The main findings of the audit relating to P-Wk are minor design issues associated with items that are subject to further development through the bidder design phase. All of the audit findings can be addressed and none are expected to require significant changes that would result in the alignment extending past the consented designation. The main audit finding relating to safety is set out in the table below together with the designer's response.

Table H-1: Road safety audit findings

Recommendation	Designer Response
SH 1 to SH 17 connection – Significant Concern Provide the link between SH 17 and SH 1 on the eastern side of the RoNS alignment.	Three alternative alignments were developed by Further North Alliance during the consenting process. The selected option provides a two-way link on the eastern side of the new RoNS alignment.

[52] Transport Agency, 2011, Pūhoi to Warkworth Scheme Assessment Report,